Interreg Danube Region

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DRWO4.0

DRWO4.0

Activity 1.1. Assessment of the baseline status of the DR forest-based industry according to the I4.0 standards; Task 3: Assessing stakeholders potential

D1.1.1 Baseline Status Assessment Report

Danube Region Wood Industry TransformationModel towards Industry 4.0

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THE BASELINE STATUS ASSESSMENT REPORT OF THE DANUBE REGION FOREST-BASED INDUSTRY ACCORDING TO THE INDUSTRY 4.0 STANDARDS (D1.1.1.)

Purpose

DRWO4.0 objective is the improvement of Danube Region forest-based industry through the industry 4.0 (I4.0) transformation which will be supported by the transnational development of the applicable, modifiable and replicable forest-based I4.0 transformation model as a solution for the Danube Region (DR) forest-based industry improvement according to the I4.0 standards.

Deliverable *D.1.1.1 Baseline Status Assessment Report* serves as a fundamental document for the DRWO4.0 project. It is structured around three major components, each of which plays a critical role in setting the basis for subsequent project activities in the transformation process.

The first component is the **Mapping of Relevant Stakeholders**. This section is devoted to the comprehensive identification and categorization of all key stakeholders involved in the transformation of the forest-based sector. These stakeholders include industry players, governmental bodies, research institutions, and non-governmental organizations across the Danube Region. The mapping process is crucial as it provides a detailed understanding of the network of actors that will influence and drive the adoption of I4.0 technologies. By identifying these stakeholders, the project ensures that all relevant parties are accounted for and can be engaged effectively in the transformation process. The stakeholders' roles, interests, and potential influence on the transformation process are also analysed to facilitate targeted communication and strategic planning.

The second component focuses on the **Assessment of Stakeholder Capacity for Transformation**. This section examines the existing capacities and capabilities of the identified stakeholders to adopt and implement I4.0 practices. The assessment covers a range of factors including technological readiness, organizational structure, human resource capabilities, and financial resources. This thorough evaluation helps in identifying the strengths and weaknesses of each stakeholderin relation to their ability to contribute to the I4.0 transformation. The assessment also considers external factors such as market conditions, regulatory environments, and global trends that may impact the stakeholders' capacity to implement changes. The outcome of this assessment is critical for designing tailored interventions and support mechanisms to enhance stakeholders' readiness for transformation.

The third component is the **Comparative Analysis of Countries** within the DR countries involved in the DRWO4.0 project. This analysis provides a detailed

comparison of the current status and readiness of each country to embrace I4.0 practices in the forest-based sector. The comparative analysis looks at various indicators including technological infrastructure, policy frameworks, industry adoption rates, and educational and training systems. By comparing these factors across countries, the report identifies best practices, gaps, and opportunities for collaboration and knowledge sharing. This analysis is particularly important for understanding the diversity of the Danube Region and for designing strategies that are sensitive to the specific needs and conditions of each country.

In addition to these three components, the deliverable also highlights the importance of **informing regional and national policy authorities** about the current state of the forest-based sector and its potential for transformation. By providing policymakers with a clear picture of the baseline status, the report aims to support the development of policies and strategies that will facilitate the adoption of I4.0 practices. This includes recommendations for policy adjustments and the creation of supportive regulatory environments.

Overall, Deliverable D.1.1.1 is a critical document that lays the groundwork for the DRWO4.0 joint development of the applicable, modifiable and replicable I4.0 transformation model. It provides a comprehensive overview of the current status of the forest-based sector in the DR, identifies key stakeholders, assesses their capacity for transformation, and offers a comparative analysis of the countries involved. The insights and data presented in this deliverable will guide the project's future activities, ensuring that the transformation towards I4.0 is based on a solid understanding of the existing landscape and is tailored to the specific needs and conditions of the region.

Mapping of existing stakeholders in partner countries

DRWO4.0 supports cross-border cooperation of stakeholders and institution capacity building of the DR countries involved in DRWO4.0 – Croatia, Austria, Slovenia, Hungary, Bosnia and Herzegovina, Serbia, Romania, Bulgaria, Moldova, Czech Republic and Ukraine.

The analysis of the stakeholder mapping data for the DRWO4.0 project, which focuses on the transformation of the Danube Region Wood Industry towards Industry 4.0 standards, reveals several key insights into stakeholders' potential engagement and influence across partner countries.

Stakeholders are defined as persons, groups, or institutions with involvement in, interests in, or in-depth knowledge of the DRWO4.0 topic and context.

The goal was to identify the regional, national and international stakeholders potentially engaged in the project activities and the development of the Danube Region Wood Industry Transformation Model towards Industry 4.0. Early

stakeholder involvement will help make DRWO4.0 project more relevant to a particular country or region, thereby increasing the likelihood of Model utilization and/or taking up. Mapping of existing stakeholders was conducted through desk research and field research, communication with local and regional stakeholders in order to collect data and to promote DRWO4.0 project.

Overview of Stakeholder Categories

Stakeholders identified within this project include a diverse range of entities such as regional and national policymakers, development agencies, companies, clusters, chambers, universities, research organizations, business support organizations, and non-governmental organizations. These stakeholders are critical to the project's success, as they have varying degrees of interest, influence and knowledge concerning the DRWO4.0 objectives.

The stakeholder mapping process categorised stakeholders into several groups, which include:

- Public Sector Institutions: Government agencies, regional authorities, and policy makers involved in digital transformation and innovation strategies.
- Private Sector and Industry Representatives: Companies, SMEs, and industry associations with interests in digital technologies and the wood processing sector.
- Research and Academic Institutions: Universities, research centres, and innovation hubs focusing on Industry 4.0, digital skills and sustainable development.
- Civil Society and NGOs: Organizations advocating for sustainable growth, environmental protection, and community engagement.
- End Users and Beneficiaries: Local businesses, professionals in the wood processing industry, and broader communities impacted by the project outcomes.
- Additional Stakeholders: The mapping process also identified potential additional stakeholders who could influence the project's success. These include other industry associations, international organizations, and academic institutions with expertise in Industry 4.0 technologies and practices.

Key Findings of Stakeholder Mapping

The analysis of stakeholders' data revealed several key insights:

- **Diverse Stakeholder Interests**: Stakeholders range from those with direct economic interests (e.g. industry representatives) to those concerned with broader social and environmental impacts (e.g. NGOs). This diversity underscores the need for a multi-faceted communication and engagement strategy.
- **High Influence of Public Sector Stakeholders**: Government institutions and policy makers emerged as highly influential, given their role in shaping regulatory frameworks and funding mechanisms critical to the project's success. Coordination with these actors is essential for the smooth implementation of project activities.
- **Industry Readiness and Adoption Barriers**: While private sector stakeholders expressed interest in digital innovations, there are varying levels of readiness for Industry 4.0 technologies. The mapping highlighted potential barriers, such as limited financial resources and lack of digital skills, particularly among SMEs.
- **Academic and Research Contributions**: Research institutions play a pivotal role in providing knowledge, innovation, and training solutions. Their involvement is crucial for developing digital competencies and facilitating technology transfer.
- **Community and Environmental Considerations**: Civil society organizations emphasize the importance of sustainability and inclusive growth. Ensuring that digital advancements align with environmental standards and community needs is key to gaining public support.

Stakeholder Influence and Interest

The stakeholders were evaluated based on several criteria: their interest in the project (rated from 1 to 5, where 1 represents the highest interest), their power of influence (categorized as "Key Player," "Meet their Needs," "Show Consideration," or "Least Important"), their level of knowledge about the issue (from "Uninformed" to "Expert"), and their level of support (ranging from "Actively Opposed" to "Actively Supportive").

Applied criteria resulted with the following categorisation of stakeholders:

1. **Key Players**: These stakeholders are the primary focus of engagement efforts. They are highly influential and must be regularly consulted and involved in decision-making processes. Their active support is crucial for the project's success. Key players in this project are national policymakers and leading industry organizations with a vested interest in the wood industry's transformation.

2. **Meet Their Needs**: These stakeholders have significant interest but lower influence. Efforts should be made to increase their engagement and move them towards becoming key players. These might include regional clusters and business support organizations that could benefit from the project's outcomes.
3. **Show Consideration**: Stakeholders in this category have influence but may not be highly interested. Engaging them in low-risk areas and keeping them informed is essential, as their support could prove beneficial, particularly in advocacy and broader project communication efforts.
4. **Least Important**: These stakeholders require general communication strategies such as web and social media publications, newsletters and updates being sufficient. However, potential shifts in their interest or influence should be monitored.

Engagement Strategies

Different engagement strategies are suggested based on the stakeholder's interest and influence. For high-interest stakeholders with considerable influence, direct involvement in project activities is recommended. For those with high interest but less influence, efforts should focus on consulting them in their areas of interest and working to increase their influence within the project.

The data collected suggests several strategic implications:

- **Tailored Engagement Approaches**: Different stakeholder groups require tailored engagement strategies. For instance, industry players may need more technical support, while public sector collaboration should focus on policy alignment and co-creation of innovation frameworks.
- **Capacity Building Initiatives**: Addressing the identified skill gaps, particularly in the private sector, should be a priority. Training programs and workshops designed in partnership with academic institutions can bridge these gaps.
- **Policy Advocacy and Multi-Level Governance**: Given the central role of public sector stakeholders, continuous advocacy for supportive policies and cross-regional cooperation is necessary. Engaging local, regional and national authorities can enhance the project's scalability and sustainability.
- **Inclusion of Environmental and Social Considerations**: Integrating environmental sustainability and social equity into the project's digital transformation strategies will help align the project with broader EU goals and ensure long-term impact.

The stakeholder mapping exercise for the DRWO4.0 project highlighted the importance of targeted engagement strategies based on the stakeholders' influence, interest, and support levels. By focusing efforts on key players and thosewith the potential to increase their influence, the project can maximize its impact and ensure broad-based support for transforming the Danube Region's wood industry towards Industry 4.0 standards. This strategic approach will be vital in achieving the project's objectives and fostering sustainable industry development across the region.

The stakeholder mapping for the DRWO4.0 project highlights the complexity and interdependence of various actors involved in the digital transformation of the wood-based industry. Effective stakeholder engagement, capacity building, and alignment with policy frameworks will be crucial to achieving the project's objectives. As the project moves forward, maintaining a dynamic and responsive stakeholder engagement will be a key to navigating challenges and maximizing the project's positive impact across the Danube region.

OVERVIEW OF STAKEHOLDERS MAPPING PER COUNTRY

Croatia

Croatia's stakeholders are characterized by a strong presence of academic institutions and research centres with high levels of technical knowledge. However, their influence is moderate due to limited industry engagement. Development agencies and regional industry clusters show high interest but need capacity building to fully engage in the DRWO4.0 project. Policymakers, though supportive, require continued engagement to align project activities with national initiatives.

- **Key Players**: Universities, Research Centres, Development agencies; specialized Chambers and SMEs;
- **Engagement Strategy**: Involve in technical advisory roles, conduct capacity-building workshops, and ensure frequent communication with policymakers.
- **Potential Challenges**: Bridging the gap between academia and industry for effective collaboration.
- **Recommendations:** Engage research institutions in technical advisory roles and involve the chambers in promotional and advocacy campaigns to elevate their influence.

Austria

Austria's stakeholders are characterized by a strong presence of academic institutions and research organizations, reflecting the country's emphasis on innovation and technology. These entities have high levels of knowledge about Industry 4.0 and demonstrate strong support for the DRWO4.0 project. Key Players in Austria include universities and development agencies, and industry leaders which are critical for advancing the project's technical aspects. Austrian policymakers, while supportive, indicate the need for ongoing engagement to ensure alignment with national policies.

- **Key Players**: Universities, Development agencies, Industry leaders.
- **Engagement Strategy**: Involve in strategy development and decision-making processes, and consult regularly on technical developments.
- **Potential Challenges**: Ensuring continued alignment with national policy priorities.
- **Recommendations:** Austrian stakeholders could take on leadership rolesin transnational collaborations and knowledge transfer.

Romania

Romania’s stakeholder base is led by influential government agencies and large enterprises with varying degrees of support. While government bodies are key players with high influence, regional associations and NGOs show significant interest but need more tailored engagement strategies. The academic sector alsoplays a critical role in providing technical expertise, though they require clear alignment with project goals.

- **Key Players:** Government Agencies, Large Enterprises, Sector related Associations.
- **Engagement Strategy:** Regular engagement and consultations with government bodies, partnerships with regional associations, and engaging academia in technical roles.
- **Potential Challenges:** Coordinating the diverse interests of regional and national stakeholders. Enhancing stakeholder knowledge and engagement in less developed regions.
- **Recommendations:** Focus on building partnerships with regional associations while maintaining strong ties with influential government agencies through regular consultations and project briefings.

Slovenia

Slovenia's stakeholders consist of government bodies and innovation centres, both of which are highly knowledgeable and demonstrate strong support for the project. Their influence is significant, particularly in policy-making and technological integration, making them key players. However, sustained alignment with industry needs will be essential. The stakeholder landscape is dominated by companies and industry associations who show significant interest in the project, given the potential economic benefits of transitioning to Industry 4.0. However, their influence is moderate, necessitating efforts to increase their role within the project.

- **Key Players**: Industry Associations, SMEs, Innovation Centres.
- **Engagement Strategy**: Engage Key players in policy development, involve in pilot environments, and use their expertise to shape project direction.
- **Potential Challenges**: Maintaining industry alignment and adapting to shifting technological demands, simultaneously overcoming any resistance from traditional industry sectors.

  Recommendations: Engage these stakeholders in policy development and use their expertise for technology integration, creating a feedback loop for continuous improvement within the project.

Hungary

Hungary's stakeholder ecosystem features prominent industry associations and technical universities. These entities possess high levels of knowledge and influence but show varying levels of interest depending on the project's alignment with their strategic priorities. Hungary's stakeholders include a mix of national policymakers and regional development agencies. These stakeholders have substantial influence but varying levels of interest in Industry 4.0. Regional stakeholders are also crucial but need enhanced engagement to maximize their contributions.

- **Key Players:** SMEs, Industry Associations, Technical Universities, NGOs.
- **Engagement Strategy:** Collaborate in research activities and pilot environments, and enhance communication with regional players; regular consultation to align the project with national strategies.
- **Potential Challenges:** Ensuring consistent engagement across different regional and national stakeholders by addressing regional disparities in interest and influence.
- **Recommendations:** Strengthen collaboration with universities through partnership initiatives and activities of the DRWO4.0 project, while offering industry associations strategic roles in project planning and dissemination.

Bulgaria

In Bulgaria, stakeholders are a mix of national policymakers, industry associations, and research institutions. These stakeholders demonstrate high influence but varying levels of interest in Industry 4.0. Policymakers are essential for securing the necessary support and resources for the project. Bulgaria's stakeholders are a mix of private companies and NGOs. The private sector demonstrates strong interest and support, with some key players actively driving project initiatives. NGOs, while influential in advocacy and policy, require more consistent engagement to fully align with the project's objectives.

- **Key Players**: National Policymakers, Industry Associations, Leading Private Companies.
- **Engagement Strategy**: Focus on integrating Industry 4.0 into national policy agendas; involve industry associations in project activities. Leverage private sector enthusiasm through collaboration initiatives and maintain regular communication with NGOs and government bodies.
- **Potential Challenges**: Increasing interest among industry stakeholders who are unfamiliar with Industry 4.0 concepts. Aligning diverse objectives across private, NGO, and public sectors.
- **Recommendations:** Greater impact of the private sector's commitment through strong collaboration in the project activities. Improve NGO involvement by aligning their priorities and social objectives with project goals.

Czech Republic

In the Czech Republic, industry and academia are the primary stakeholders, characterized by high influence and expertise. While they are well-aligned with Industry 4.0 objectives, the level of support varies depending on project relevance. Policymakers also require ongoing engagement to maintain alignment with national priorities. Strong role is played by the research, business and networking NGOs and clusters are dedicated to the digitalisation and environmentally advanced technologies.

- **Key Players**: Industry Leaders (Wood/ICT), Networks, NGOs, Clusters,Academic Institutions, Policymakers.
- **Engagement Strategy**: Focus on Industry 4.0 alignment, involve in project activities, and engage policymakers through regular briefings.
- **Potential Challenges**: Ensuring sustained stakeholder interest acrossdifferent phases of the project.
- **Recommendations:** Tailor engagement strategies by focusing on Industry 4.0

alignment and offering stakeholders involvement in pilot environments and training initiatives.

Serbia

Serbia's stakeholder network includes national policymakers and business support organizations, with a significant focus on economic development and industry modernization. The influence of these stakeholders is high, particularly at the national level, but their interest in Industry 4.0 may need to be enhanced. Policymakers are essential for ensuring that the project aligns with national economic development goals. Industry in general has the significant expertise in technology and Industry 4.0 have lower interest level, indicating the need for strategic motivation. SMEs and industry leaders are identified as Key players.

- **Key Players**: SMEs, Industry leaders, Chamber of Commerce, Universities.
- **Engagement Strategy**: Regular consultation and involvement through targeted efforts to increase interest and support for Industry 4.0. Integration into pilot environments and provide recognition and support for incentive programs.
- **Potential Challenges**: Aligning the project with Serbia's broader economic development strategies. Maintaining high levels of interest and ensuring sustained commitment over time.
- **Recommendations:** Involve the top players in pilot environments and roadmaping activities.

Bosnia and Herzegovina

Bosnia and Herzegovina's stakeholder group includes a mix of SMEs and local government bodies, both of which are essential for grassroots implementation. While their influence is moderate, they show high interest and need focused engagement strategies to maximize their impact. Moreover, they are critical in driving local implementation. Local industry associations and development agencies also hold potential as key supporters.

- **Key Players**: Local Government, Industry Associations, Development Agencies.
- **Engagement Strategy**: Involve SMEs in pilot environments, provide targeted initiatives for local government for regulatory support, and offer advisory roles to industry associations, organization of demonstration events for presentation of the practical use of I4.0 technologies and tools, applicable within the forest-based industries.

- **Potential Challenges**: Limited resources and regulatory complexities at the national, regional and local levels.
- **Recommendations:** Involve SMEs in promotion of project results and benefits for the country. Support and motivate stakeholders in collaboration activities devoted to knowledge and experience sharing.

Moldova

Moldova's stakeholders involve a diverse array of regional and national policymakers, business support organizations, companies, and research institutions. The engagement of these stakeholders is crucial for the success of the DRWO4.0 project aimed at modernizing Moldova's wood industry in alignment with Industry 4.0 standards. The influence of these stakeholders is substantial at both regional and national levels, while their interest and support for Industry 4.0 activities vary:

- **Key Players:** SMEs, Companies and Cluster in the wood industry sector, Chambers of Commerce, Universities, Research Organizations, National and Regional Policy Makers.
- **Engagement Strategy:** Regular consultation and involvement in DRWO4.0 project activities through targeted communication efforts; Inclusion of stakeholders in pilot environments, study visits, and providing recognition and support for their contributions.
- **Potential Challenges:** Align the project's goals with Moldova's broader economic development and environmental strategies; Sustaining the interest and commitment of key players over time, especially when dealing with different levels of interest in I4.0; Overcoming potential bureaucratic hurdles and ensuring that all relevant stakeholders are adequately informed and involved.
- **Recommendations:** Involve key players actively in the project; Enhance communication channels and provide more information on the benefits of I4.0 to increase the interest levels among less involved stakeholders; Showcase pilot project success stories to motivate broader engagement from both public and private sectors.

Ukraine

Ukraine's stakeholders include influential wood processing companies and international clustering organization, both of which play critical roles in the project. However, while these entities are knowledgeable, their interest and active support need boosting. Private companies are less prominent but could be key allies if strategically engaged. Industry leaders and cluster organizations have a rich experience in I4.0 and are drivers of the transformation on regional and national

levels.

- **Key Players:** Cluster organizations, Industry leaders and University.
- **Engagement Strategy:** Capacity-building programs, regular stakeholder training, and strategic partnerships.
- **Potential Challenges:** Addressing political and regulatory barriers that may affect stakeholder alignment.
- **Recommendations:** Prioritize capacity-building initiatives and stakeholder training programs to enhance the support of cluster organizations and government bodies while leveraging their influence for advocacy and policy alignment. Introduction of latest I4.0 tools and methodologies to the wood processing sector could boost the implementation of I4.0 solutions.

DRWO4.0 identified interested stakeholders based on the quadruple helix approach which supports the linkage between science, policy, industry, and society essential for the knowledge transfer, innovative solutions driving and enhancement of regional and national competitiveness with a special focus on SMEs, national, regional and sectoral policy authority institutions that will be in position to uptake data and recommendations developed within the DRWO4.0 project implementation.

The stakeholder analysis by country underscores the importance of tailored engagement strategies that reflect the unique characteristics of each nation's stakeholders. By focusing on the "Key Players" and strategically increasing the influence and interest of other stakeholders, the DRWO4.0 project can effectively drive the transformation of the wood industry across the Danube Region. Addressing the specific challenges and opportunities in each country will be crucial for the overall success and sustainability of the project. Moreover, some representatives of stakeholder groups are involved as Associated Strategic Partners, while the involvement of other identified stakeholders will be intensified via the project activities.

Summary of Stakeholder Analysis per Country is supported with the graphic images developed based on the data gathered by the DRWO4.0 project partners (Appendix 1.).

Further elaboration of DRWO4.0 findings will be devoted to the transformation capacity and comparative analysis of countries involved in the project, moreover the provision of comparative analysis of DR countries' wood industry readiness towards I4.0.

STAKEHOLDERS' TRANSFORMATION CAPACITIES

Introduction to stakeholders' potential analysis

The assessment of stakeholders' potential for transformation into Smart factories, based on key elements of Industry 4.0[1]. Industry 4.0, is a crucial step in understanding a company's readiness for this significant shift. This assessment is conducted through a detailed questionnaire, which was answered by a selected team of company employees. Ideally, this team should comprise individuals who have a deep understanding of the company's processes, goals, development direction, and strategy, including members of the company's management.

Each question within the assessment is designed to be rated on a scale from 1 to 5.

To aid in the evaluation, descriptions for scores 1, 3, and 5 are provided, offering a clear criteria to help assess the company's current state. If the team's evaluation falls between the described scores of 1 and 3 or 3 and 5, it is possible to assign an intermediate score of 2 or 4, providing flexibility in the assessment.

The overall readiness of a company for transformation into a Smart factory is determined by calculating the average readiness across three key areas of transformation as outlined by Culmena's Culis methodology: Lean, Digital, and Green transformations. The readiness score for each transformation type is the average of the scores for all related questions, and the company's overall readiness is the average of the readiness scores for the three transformation types.

This structured approach ensures a comprehensive evaluation of the company's potential to successfully transition into a Smart factory, aligning with the advanced requirements of Industry 4.0.

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[1] Industry 4.0 refers to the integration of advanced digital technologies such as IoT, AI, and robotics into manufacturing processes, creating smart factories with enhanced interconnectivity, automation, and data-driven decision-making.

Lean Manufacturing

Lean manufacturing is a systematic approach to minimizing waste within a manufacturing system without sacrificing productivity. By focusing on value creation for the end customer and eliminating non-value-added activities, Lean principles drive efficiency and cost reduction. Key Lean tools include 5S, Value Stream Mapping, Continuous Improvement (Kaizen), SMED (Single-Minute Exchange of Die), Poka Yoke, Visual Management, and Standardized Work. Lean manufacturing emphasizes the importance of empowering employees and fostering a culture of continuous improvement. When transforming into a smart factory, Lean principles are enhanced by advanced technologies, enabling more precise control over production processes and further reducing waste. The real-time data and interconnected systems of a smart factory support Lean methodologies by providing deeper insights into process inefficiencies and opportunities for continuous improvement.

Digitalization

Digitalization refers to the adoption of digital technologies to transform business processes and operations. In manufacturing, this involves the integration of advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), and cloud computing to create a connected, intelligent production environment. Digitalization enables real-time data collection and analysis, predictive maintenance, and enhanced automation. As manufacturers transform into smart factories, digitalization plays a crucial role by enabling seamless connectivity and real-time analytics, which are essential for advanced automation and decision-making. The integration of digital technologies ensures that all aspects of manufacturing, from supply chain management to production floor operations, are optimized for greater flexibility, responsiveness, and efficiency, ultimately supporting the continuous evolution towards smarter manufacturing.

Green Manufacturing

Green manufacturing focuses on sustainable production processes that minimize environmental impact and reduce resource consumption. This approach includes the use of renewable energy sources, waste minimization, recycling, and the implementation of environmentally friendly materials and practices. In the context of a smart factory, green manufacturing principles are integrated with advanced technologies to create an eco-efficient production system. Smart factories utilize real-time monitoring and optimization of energy use, emissions, and resource consumption, ensuring that sustainability goals are met alongside operational efficiency. By incorporating green manufacturing into the smart factory

transformation, manufacturers can achieve a harmonious balance between technological innovation, operational excellence, and environmental stewardship, contributing to a sustainable future while maintaining competitive advantage.

LEAN TRANSFORMATION TOOLS

Over the past 50 years, Lean methodology has proven to be the most efficient approach worldwide for eliminating waste, consequently reducing costs, and increasing product quality and organizational productivity. As the first step in transforming into a smart and green factory, CULIS utilizes Lean tools and principles. Implementing Lean in organizational processes helps identify activities, locations, or departments that are primary candidates for digitalization, automation, and robotization, thereby redPucing the ROI for investments in Industry 4.0 technologies. Furthermore, CULIS is designed to ensure that each implementation step provides the necessary resources for subsequent steps. For example, savings achieved in processes will secure resources for further investments.

The five most important Lean tools for effective implementation are Value Stream Mapping, 5S and Visual Management, Standardization, Quality, and Kaizen. Each tool is connected and has specific implementation steps and offers various savings and improvements for the organization.

Value Stream Mapping (VSM)

Value Stream Mapping (VSM) is a Lean tool that creates a visual representation of all the steps involved in a process, from start to finish, including both value-adding and non-value-adding activities. It is utilized at the beginning of a Lean transformation to understand and analyse the current state of processes within the organization, helping to identify areas of waste and opportunities for improvement. Implementing VSM leads to the identification and elimination of waste, resulting in cost reductions, improved process efficiency, and enhanced product quality. It can also reduce lead times and increase customer satisfaction.

It is crucial for digitalization as it offers a clear understanding of current processes, making it easier to identify where digital tools can be effectively applied. This ensures that digitalization efforts are focused on areas that will yield the most significant benefits.

5S and Visual management

The 5S methodology focuses on workplace organization and standardization, consisting of five principles: Sort, Set in order, Shine, Standardize, and Sustain. Visual Management involves using visual signals to communicate information quickly and clearly. By maintaining an orderly environment, organizations can experience cost savings through reduced waste, lower accident rates, and improved employee morale and productivity.

5S and Visual Management are important for digitalization as they establish a structured and clear workplace, making it easier to integrate digital tools and technologies. A well-organized environment enhances the effectiveness of digital solutions.

Standardization

Standardization involves creating uniform procedures and practices for performing tasks to ensure consistency and quality across the organization. This tool is used after identifying best practices and improvements, ensuring that these practices are consistently applied across all processes and departments. Organizations benefit from reduced variability, lower defect rates, and increased productivity. Consistent processes also make training easier and faster for new employees.

Standardized processes are essential for digitalization because they provide a stable foundation for implementing digital tools. Consistency in procedures ensures that digital solutions can be effectively integrated and utilized.

Quality

Quality in Lean refers to the practices and processes that ensure products and services meet customer expectations and standards. Improving quality reduces costs associated with defects, rework, and returns. It also enhances brand reputation and can lead to increased market share.

High-quality standards are vital for digitalization because they ensure that the digital tools and technologies implemented are reliable and effective. Consistent quality practices support the smooth integration of digital solutions.

Kaizen

Kaizen is a Japanese term meaning "Continuous improvement." It involves making small, incremental changes to processes to improve efficiency, quality, and performance. Regular, small improvements accumulate over time, resulting in significant cost savings, better resource utilization, and higher overall performance.

Kaizen is important for digitalization as it ensures that the organization continuously evolves and adapts, making it more receptive to integrating new digital tools and technologies. Continuous improvement supports the successful implementation and optimization of digital solutions.

ANALYSIS OF STAKEHOLDERS' POTENTIAL

The questionnaire analysis involved participation from 170 organizations across 11 countries in Danube region (Figure 1 and 2), with the highest number of responses, 25, coming from Slovenia. This questionnaire enabled an initial classification of participants into micro, small, medium, and large enterprises. Consequently, the analysis will cover both overall scores and scores categorized by company size within the region and specific countries.

Figure 1 - Countries in Danube Region

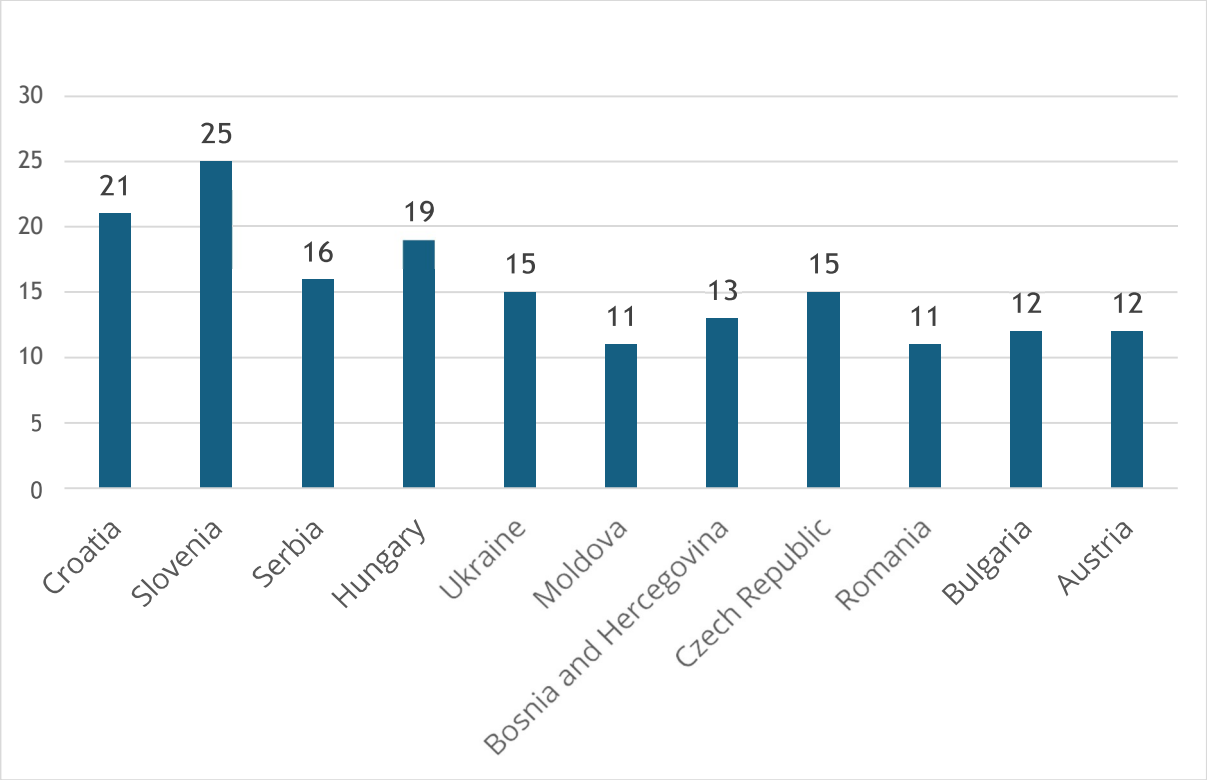


Figure 2 - Completed questionnaires by the countries in Danube region

In the Lean assessment section, 19 key questions were posed to determine the extent to which Lean methodology is utilized within these organizations. The influence of Lean methodology is significant as a prerequisite for digital and green transformation. Through Lean principles, we identify priority areas for digitalization within companies and institutions. Additionally, Lean implementation helps eliminate losses, directly impacting cost reduction and green indicators such as waste reduction, increased use of circular economy practices, and the exploration of alternative, environmentally friendly materials.

The digitalization section comprised 15 questions aimed at gaining insights intothe usage of Industry 4.0 technologies. This section not only provides an overview of the technological adoption status but also includes a detailed analysis of the two most important digital technologies.

The green section consisted of 10 questions examining whether businesses and institutions utilize renewable energy sources, monitor green indicators, and manage resource usage effectively.

The entire questionnaire is structured according to Culmena's innovative CULIS transformation methodology, which outlines a comprehensive sequence of activities for transforming into Lean, Digital, and Green enterprises and institutions. At the end

of the questionnaire, conclusions and recommendations are provided, guiding the direction for future developments.

ANALYSIS METHODOLOGY

The CULIS methodology aids businesses in transforming more quickly and efficiently into smart and green enterprises and institutions by utilizing three transformation pathways: Lean, Digital, and Green (Figure 3). Each transformation comprises specific steps that businesses need to follow. The Lean transformation involves five steps: Value Stream Mapping, 5S and Visual Management, Standardization, Quality, and Kaizen. Each of these steps will be further explained in the Lean analysis by country. The Digital transformation is carried out through seven steps using eight technologies to ensure effective transformation. The Green transformation follows four steps: using renewable energy sources, implementing a circular economy, managing the use of the planet's seven resources, and fostering the relationship and synergy between humans and nature.

The CULIS methodology is applicable at various levels, including countries, regions, cities, municipalities, manufacturing companies, enterprises, and individuals as the key actors in the transformation process and is therefore considered very effective and efficient. CULIS has proven effective in transforming entire industrial sectors.

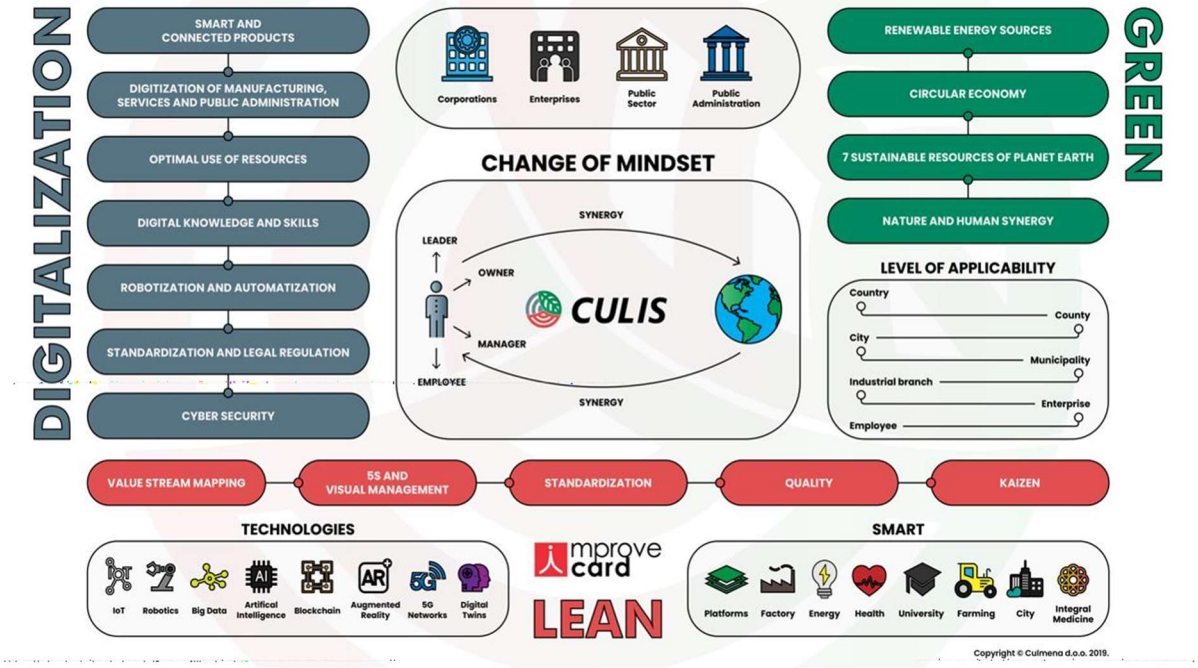


Figure 3 - CULIS methodology

The overall results of the questionnaire for all countries and all 170 respondents, divided into the three areas of Lean, Digital, and Green, are presented in Figures 4 and 5. As outlined in the introduction, the questionnaire scores range from 1 to 5. Respondents rated their companies' use of Lean methodologies at 3.00, with this area showing moderate application across processes. The digital transformation, including the adoption of Industry 4.0 technologies, received a slightly lower score of 2.86, indicating that while there is some adoption of digital tools, significant growth potential remains. The Green transformation area achieved the highest score of 3.04, demonstrating a stronger commitment to sustainability practices and the implementation of green technologies.

These results reveal that while companies in the surveyed regions are making advancements across all three transformation areas, there is still a need to place greater focus on enhancing digital capabilities. The moderate Lean score of 3.00 suggests that companies have made progress in reducing waste and improving process efficiency, but there remains room for further refinement. The Digital transformation score of 2.86 underscores the gradual but incomplete integration of digital solutions, reflecting an ongoing shift toward smart technologies. Meanwhile, the Green score of 3.04 highlights that sustainability is becoming a more prominent priority among businesses.

With an overall readiness score of 2.94 across all transformation areas, the results suggest that while progress is evident, a more coordinated and integrated approach is necessary to further boost efficiency, digital maturity, and sustainability across the surveyed companies.

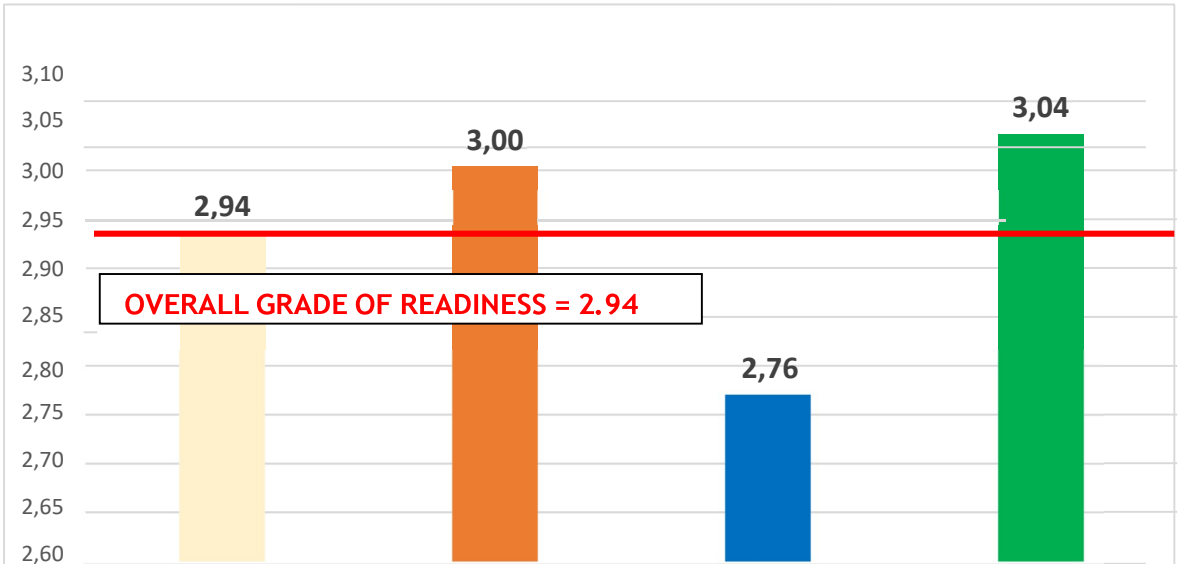


Figure 4 - Overall grades of all countries

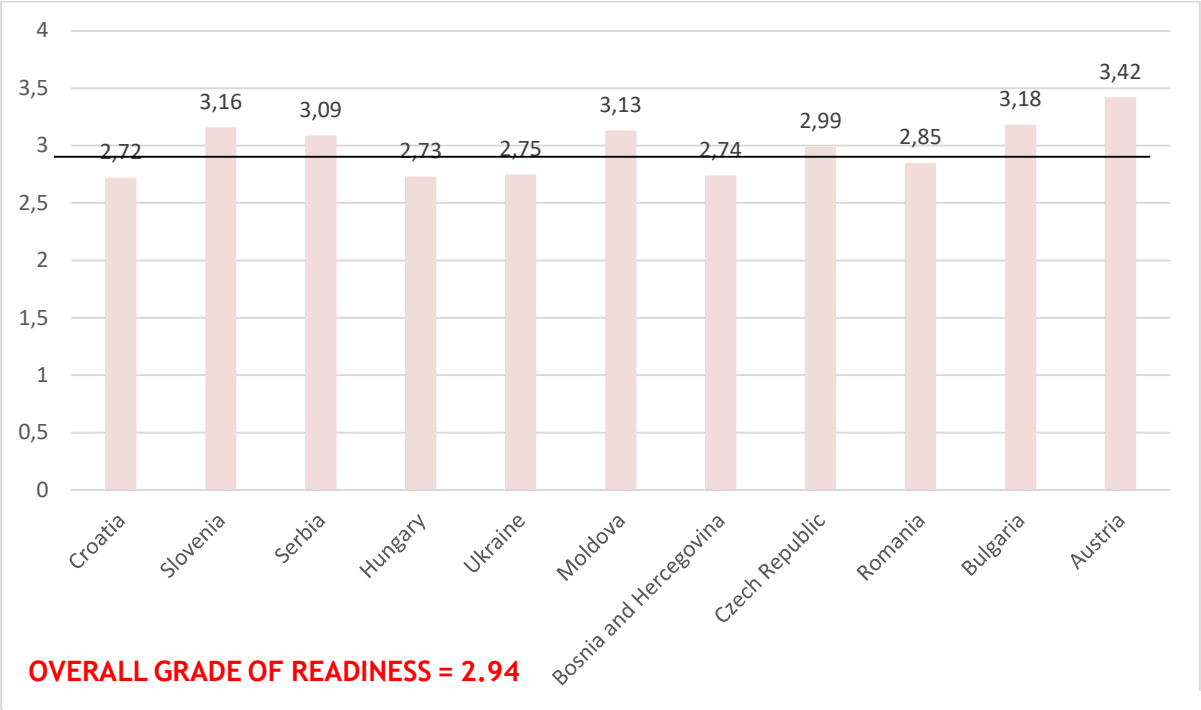


Figure 5 - Overall readiness results by country

The average score for readiness in Lean, Smart, and Green transformation is 2.94. Austria leads the way with the highest score of 3.42, positioning itself as the leader ahead of other countries. Out of the 11 countries surveyed, 6 scored above and 5 below the Danube region's average.

In conclusion, the current average readiness score of 2.94 reflects the baseline state of enterprises in the Danube region regarding Lean, Smart, and Green transformations. With Austria setting a high standard, there is a clear need for an action plan aimed at improving the overall readiness. By implementing targeted strategies and initiatives, we can aim to raise both the regional average and the individual country scores by over 20% in the coming years. This proactive approach will ensure that all countries in the region can enhance their transformation readiness and competitiveness.

The questionnaire categorized respondents based on the size of their organizations into micro, small, medium, large enterprises and Research and higher education to establish a correlation between scores and company size shown in Figure 6 and 8. The highest number of micro respondents came from Hungary and Moldova, with 8 respondents each, while Austria took third place with 7 micro enterprises respondents. Slovenia had the highest number of medium-sized enterprises participating, with 10 respondents. Among large enterprises, there were 2 respondents each from Croatia, Bosnia and Herzegovina, and Bulgaria.

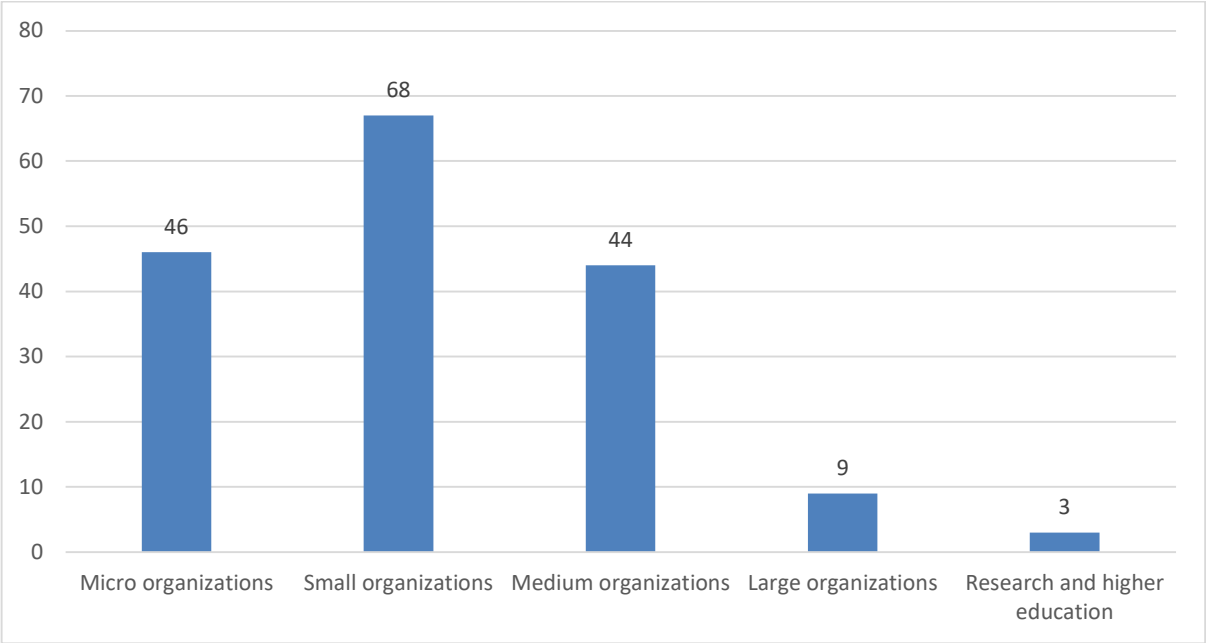


Figure 6 - Overall summary by size of organizations

The overall results of the questionnaire for readiness in Lean, Smart, and Green transformation, categorized by company size, are as follows and are shown in Figure 7:

- Micro organizations - average score of 2.55, with 46 organizations participating.
- Small organizations - average score of 2.81, with 67 organizations participating.
- Medium organizations - average score of 3.39, with 44 organizations participating.
- Large organizations - average score of 3.45, with 9 organizations participating.
- Research and higher education – average score of 3.20, with 3 organizations participating.

The data indicates a clear trend where medium and large organizations exhibit higher readiness scores compared to micro and small organizations.

Micro organizations, with the lowest average score of 2.55, may face significant challenges in adopting Lean, Smart, and Green practices. These smaller entities often have limited resources and expertise, which can hinder their ability to implement and benefit from such transformations effectively.

Small organizations show a moderate improvement with an average score of 2.81. While they may have slightly more resources and capabilities than micro-organizations, they still face similar constraints that can affect their readiness for comprehensive transformation.

Medium organizations achieve the highest average score of 3.39. This suggests that medium-sized enterprises are generally better positioned to adopt and integrate Lean, Smart, and Green principles. They likely have more structured processes, greater access to resources, and a higher capacity for investing in transformation initiatives.

Large organizations, with an average score of 3.45, also demonstrate a high level of readiness. Although slightly lower than medium organizations, this score indicates that large enterprises possess the necessary infrastructure, financial resources, and strategic vision to pursue transformative initiatives effectively.

The readiness scores highlight the correlation between company size and the ability to undertake Lean, Smart, and Green transformations. Medium and large organizations are generally better equipped and more prepared to embark on these journeys compared to their smaller counterparts.

This insight underscores the need for tailored support and resources for micro and small organizations to enhance their readiness and capability. Strategies could include targeted training programs, financial incentives, and access to expert consultancy to help bridge the gap and enable these smaller enterprises to thrive in a transformative landscape.

By addressing these disparities, the overall readiness for transformation across the Danube region can be significantly improved, fostering a more inclusive and sustainable industrial growth.

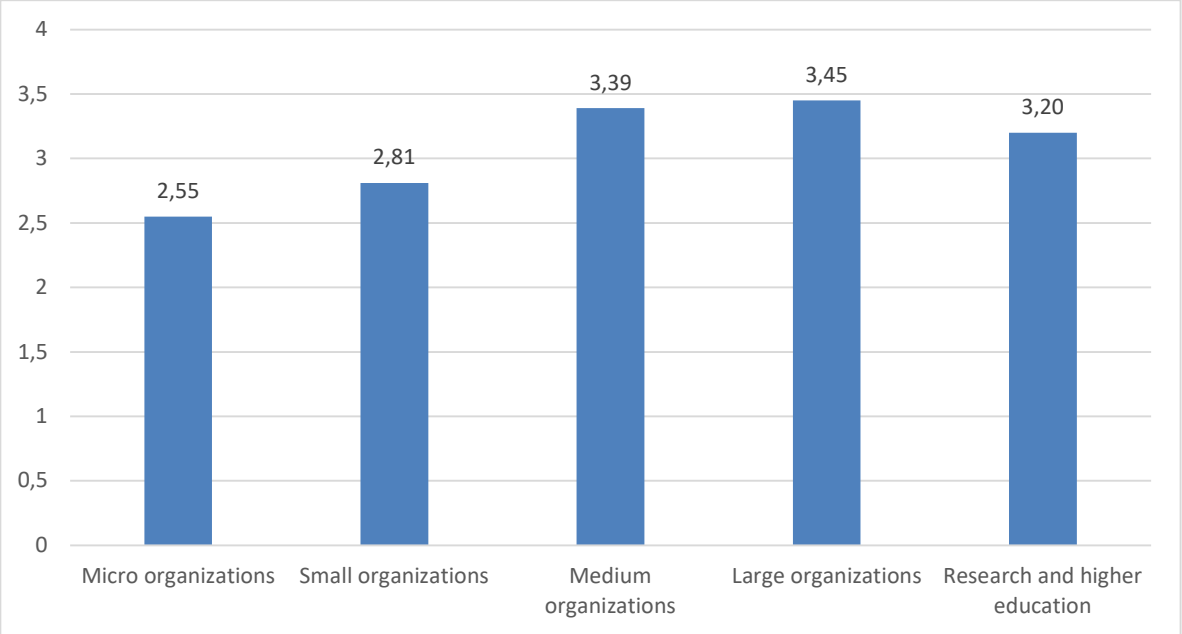


Figure 7 - Readiness grades by the size of company

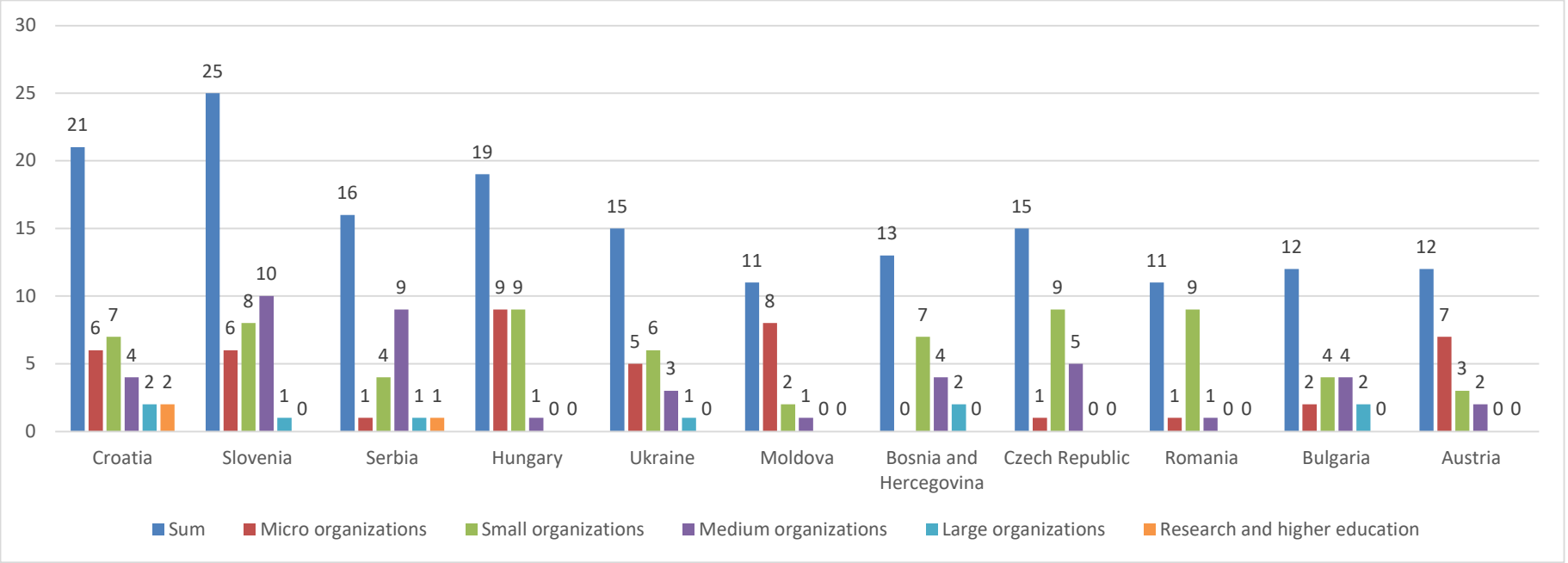


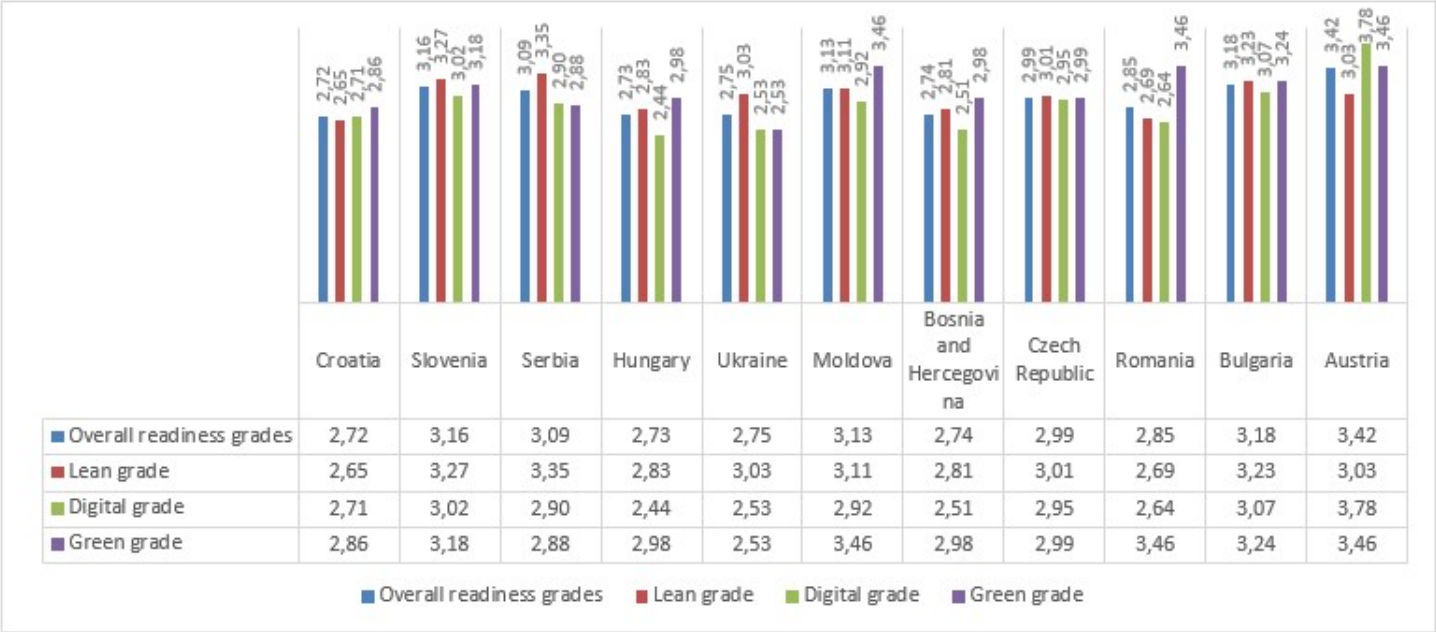
Figure 8 - Summary by size of organization

This distribution allows for an insightful analysis of how different organization sizes across various countries impact their adoption and implementation of Lean, Digital, and Green transformations.

COMPARATIVE ANALYSIS

ANALYSIS OF DRWO4.0 PARTNER COUNTRIES

According to the country-specific results, Austria emerged as the leader in overall readiness and digitalization within the wood industry in the Danube region. Meanwhile, Serbia stands out as the leader in applying of Lean principles. Romania and Moldova stand as leaders in Green. A detailed presentation of all results can be seen in Figure 9.



	Croatia	Slovenia	Serbia	Hungary	Ukraine	Moldova	Bosnia and Hercegovina	Czech Republic	Romania	Bulgaria	Austria
Overall readiness grades	2,72	3,16	3,09	2,73	2,75	3,13	2,74	2,99	2,85	3,18	3,42
Lean grade	2,65	3,27	3,35	2,83	3,03	3,11	2,81	3,01	2,69	3,23	3,03
Digital grade	2,71	3,02	2,90	2,44	2,53	2,92	2,51	2,95	2,64	3,07	3,78
Green grade	2,86	3,18	2,88	2,98	2,53	3,46	2,98	2,99	3,46	3,24	3,46

Figure 9 - Summary of the grades by the countries in Danube region

The Figure 9 provides a comparative view of multiple readiness grades: Overall Readiness, Lean, Digital, and Green, across several countries in the Danube region. Austria, Bulgaria, Moldova, Serbia and Slovenia, lead in the Overall Readiness grade, indicating relatively higher preparedness in these countries compared to others. On the other hand, Hungary and Croatia have lower overall readiness scores, suggesting that they might face more challenges in transformation efforts.

In terms of Lean grade, Serbia, Slovenia, and Bulgaria perform the best, showing that they are more advanced in implementing Lean methodologies. However, Croatia and Romania score lower, indicating that Lean practices are less ingrained in their operations. Austria also stands out with the highest Digital grade, demonstrating strength in digital transformation, while Hungary and Bosnia and Herzegovina show weaker digital readiness, reflecting slower digital progress.

Romania, Moldavia and Austria excel in Green grade, suggesting strong sustainability initiatives. Conversely, Ukraine lags behind with the lowest score in Green readiness, indicating that sustainability efforts may need more focus.

Countries like Slovenia, Bulgaria and Czech Republic show balanced progress across all categories, making strides in Lean, Digital, and Green transformations at a similar pace. However, countries such as Ukraine, Hungary, and Croatia exhibit more variability, highlighting the need for focused improvements in specific areas.

Austria, accordingly to its economic strength, ranks the highest in these categories, as expected, particularly in Digital grade, which is the highest grade shown in the Figure 9. Bosnia and Herzegovina's strong performance in the Green grade surpasses its overall readiness, marking it as a standout in sustainability efforts.

In conclusion, countries in the Danube region show varied levels of readiness in Lean, Digital, and Green transformations. While some lead in specific areas, they may lag in others, underscoring the need for targeted strategies to balance their overall industrial transformation progress across multiple dimensions.

1. LEAN TRANSFORMATION GRADES

Based on the ratings for readiness in Lean transformation and knowledge of Lean principles and tools, scored on a scale of 1-5 for 19 key questions, the average score for the Danube region's wood industry and organizations is 3.00, shown in Figure 10. Although 7 out of the 11 countries have a score higher than this average, the overall average remains low, making it difficult to consider being above average as satisfactory. For the Danube region, the target score for the upcoming period should be at least 3.5. Serbia holds the highest score with 3.35.

Danube Region Lean Average Grade= 3.00

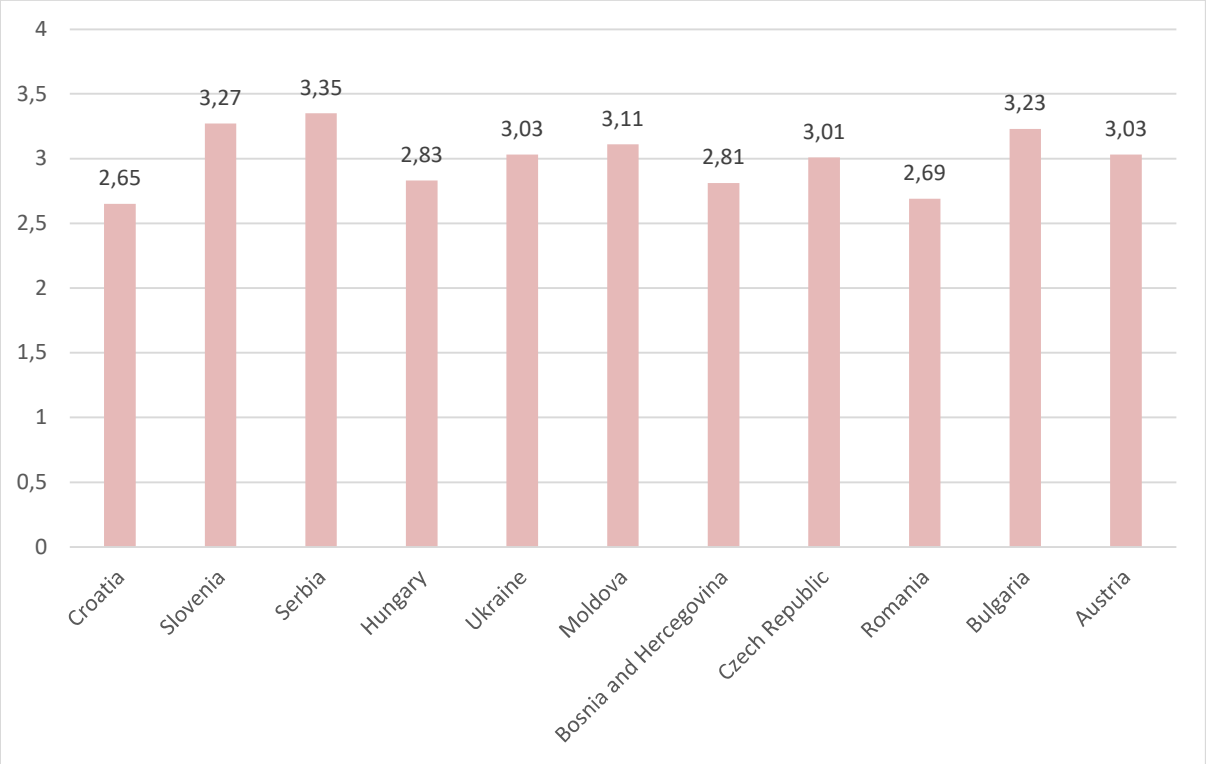


Figure 10 - Lean grades for Danube region

For a deeper analysis of the Lean transformation ratings and recommendations, it is essential to evaluate each question and determine the extent to which organizations have implemented Lean principles. Table 1 provides a breakdown of each question along with the corresponding average score for the entire Danube region.

The lowest score in the Lean transformation questionnaire is related to the skills and

knowledge of employees about Lean, with a rating of 2.10. This highlights a significant gap in Lean expertise among the workforce. To successfully implement Lean methodologies, the foundational step must be the education and training of employees in Lean principles and tools. Developing Lean skills through continuous training and practical application is crucial for the success of Lean initiatives.

Improving employee knowledge and skills in Lean is not just a preliminary step but an ongoing necessity. Organizations must invest in comprehensive training programs, workshops, and hands-on Lean projects to build a robust Lean culture. This involves not only formal training sessions but also fostering a mindset of continuous improvement and problem-solving among employees at all levels.

Furthermore, the analysis of each question will help identify specific areas where Lean implementation is lagging. For instance, if certain Lean tools like Value Stream Mapping or Kaizen are underutilized, targeted interventions can be planned to address these gaps. This approach ensures that resources are allocated efficiently to the areas that need the most improvement.

Addressing the deficiencies in Lean knowledge and skills can also have a cascading effect on other aspects of Lean transformation. As employees become more proficient in Lean practices, they are better equipped to identify and eliminate waste, improve process efficiency, and contribute to higher quality and productivity.

Ultimately, setting a regional target score of at least 3.5 for Lean readiness in the Danube region is a realistic and achievable goal. It requires a concerted effort from all stakeholders, including organizational leadership, employees, and Lean experts, to drive this transformation forward. By prioritizing education and skill development, organizations can build a strong foundation for successful Lean implementation and continuous improvement.

#	Question*	Average grade of Question	Overall Lean grade	Difference
1.	Has the company ever helda Lean workshop, implementation of Lean or any Lean tool?	2.24		-0.76
2.	How familiar is the company's management and the company in general with the Lean methodology?	2.78		-0.22
3.	Did the employees undergo training where they were introduced to the Lean methodology and its tools?	2.10		-0.90
4.	Do and to what extent do employees have the skills necessary to implement Lean methodology in their daily work?	2.63		-0.37
5.	Does the company have a process optimization department or, if not, at least certain practices?	2.75		-0.25
6.	Which Lean tools do the management and workers of the company know? Which of them do they use in their daily work?	2.36		-0.64
7.	Are certain Lean tools applied in the company's daily work?	2.31	3.00	-0.69
8.	Does management encourage employees to solve problems in the workplace? In what way is it done, how actively?	3.76		+0.76
9.	Is there a culture of continuous improvement in the company? Is the continuous improvement strategy clearly communicated to employees?	3.68		+0.68
10.	Are Key Performance Indicators defined in the company and to what extent? In which departments and in which not? What are the KPIs?	2.73		-0.27
11.	How does the company carry out planning?	3.13		+0.13
12.	What is the quality of the supplier's	3.66		+0.66

	goods (%)? In what percentage of cases do suppliers deliver goods on time?			
13.	Is the operation of the production facility monitored and in what way?	**3.41**		**+0.41**
14.	In your opinion, is there a problem in the exchange of information and information flows?	**3.19**		**+0.19**
15.	Are there KPIs for monitoring information flows?	**2.49**		**-0.51**
16.	Are company leaders actively involved in company processes and change processes?	**4.15**		**+1.15**
17.	Are the responsibilities of employees in the change process defined?	**3.40**		**+0.40**
18.	Do employees understand the company's goals and how their work contributes to those goals?	**3.54**		**+0.54**
19.	Are there KPIs for monitoring the realization of goals?	**2.84**		**-0.16**

Table 1 - Lean readiness overall average grades by every question

*Detailed description of questions is in attachment of document – Questionnaire

The table provides a detailed breakdown of how companies in the Danube region's wood industry are progressing in various aspects of Lean transformation. The overall Lean readiness is moderately low, with an average score of 3.00, indicating room for improvement in Lean practices. Below is a comprehensive analysis of the key findings:

1. **Lean Workshops and Tool Implementation**

   - **Average grade: 2.24**
   - **Difference: -0.76**

   Few companies have conducted Lean workshops or implemented Lean tools. The negative difference indicates that this is a critical area where many companies are behind, suggesting a lack of initial Lean exposure.

2. **Familiarity with Lean Methodology**

   - **Average grade: 2.78**
   - **Difference: -0.22**

   While there is some awareness of Lean within management, the score suggests that knowledge is still limited, preventing companies from fully embracing Lean practices.

3. **Employee Training in Lean**

   - **Average grade: 2.10**
   - **Difference: -0.90**

   This is one of the lowest-scoring areas, highlighting the lack of structured Lean training for employees. The large negative difference indicates that insufficient training is a significant barrier to Lean adoption.

4. **Employee Skills for Lean Implementation**

   - **Average grade: 2.63**
   - **Difference: -0.37**

   Employees' skills to implement Lean are relatively low, further demonstrating the need for training and capacity-building initiatives.

5. **Process Optimization Practices**

   - **Average grade: 2.75**
   - **Difference: -0.25**

   While some companies have process optimization departments or practices, the score shows that formal Lean process optimization is not widely implemented across the region.

6. **Knowledge of Lean Tools**

   - **Average grade: 2.36**
   - **Difference: -0.64**

   Both management and workers demonstrate limited knowledge ofLean tools, underscoring the need for greater emphasis on education and practical application of these tools.

7. **Application of Lean Tools in Daily Work**

   - **Average grade: 2.31**
   - **Difference: -0.69**

   Lean tools are not commonly applied in daily operations, which suggests that even when there is awareness of Lean, companies struggle with the practical implementation of its methodologies.

8. **Management Encouragement for Problem-Solving**

   - **Average grade: 3.76**
   - **Difference: +0.76**

   A positive result shows that management is actively encouraging problem-solving, a key Lean principle. This suggests that companies are creating a supportive environment for employee-driven improvements.

9. **Culture of Continuous Improvement**

   - **Average grade: 3.68**
   - **Difference: +0.68**

   A relatively strong score here indicates that a culture of Continuous improvement exists in some companies, though there is room for this mindset to become more widespread.

10. **Definition of Key Performance Indicators (KPIs)**

    - **Average grade: 2.73**
    - **Difference: -0.27**

    While some companies have KPIs defined, many are still lacking in this area. KPIs are critical for measuring Lean performance, so this gap represents a significant barrier to progress.

11. **Planning Practices**

    - **Average grade: 3.13**
    - **Difference: +0.13**

    Companies show moderate competency in planning, which is a positive

aspect, but there is still potential for improvement, particularly in integrating Lean tools into planning processes.

12. **Supplier Quality and On-Time Delivery**

- **Average grade: 3.66**
- **Difference: +0.66**

Companies are performing relatively well in terms of supplier quality and delivery, reflecting good external process management.

13. **Monitoring of Production Facility Operations**

- **Average grade: 3.41**
- **Difference: +0.41**

The high score here reflects that companies are generally effective in monitoring production operations, an important aspect of maintaining Lean efficiency.

14. **Information Flow Efficiency**

- **Average grade: 3.19**
- **Difference: +0.19**

While there are still issues, this positive difference indicates that companies have begun addressing the challenges in communication and information flow within their operations.

15. **KPIs for Monitoring Information Flow**

- **Average grade: 2.49**
- **Difference: -0.51**

Many companies lack KPIs for information flow, which suggests a gap in monitoring and optimizing communication, an essential element of Lean.

16. **Leadership Involvement in Company Processes**

- **Average grade: 4.15**
- **Difference: +1.15**

This is the highest-scoring category, showing that leadership is highly engaged

in company processes, which is a critical driver of successful Lean transformation.

17. **Employee Responsibilities in Change Processes**

    - **Average grade: 3.40**
    - **Difference: +0.40**

    A strong score here indicates that responsibilities in change processes are clearly defined, helping companies stay on track during transformations.

18. **Understanding of Company Goals**

    - **Average grade: 3.54**
    - **Difference: +0.54**

    Employees generally understand how their work contributes to company goals, which is crucial for aligning daily tasks with Lean objectives.

19. **KPIs for Monitoring Goal Realization**

    - **Average grade: 2.84**
    - **Difference: -0.16**

    The relatively low score suggests that while some KPIs exist for goal realization, there is still room for improvement in setting clear and measurable targets.

The analysis reveals that while companies are progressing in certain aspects of Lean transformation, particularly in management encouragement and leadership involvement, there are still significant gaps in employee training, familiarity with Lean tools, and the practical application of Lean methodologies. The most pressing needs include increasing Lean-related training, developing process optimization practices, and establishing clearer KPIs for monitoring performance.

To improve their Lean readiness, companies should prioritize:

1. More structured Lean workshops and employee training.
2. Implementation of Lean tools in daily operations.
3. Defining clear KPIs for monitoring both process and information flows.
4. Strengthening the culture of continuous improvement throughout all levels of the organization.

1.1 Lean readiness grades by size of organizations

The Lean readiness scores reveal a similar trend to the overall readiness scores, with larger organizations generally showing higher levels of readiness shown in Figure 11.

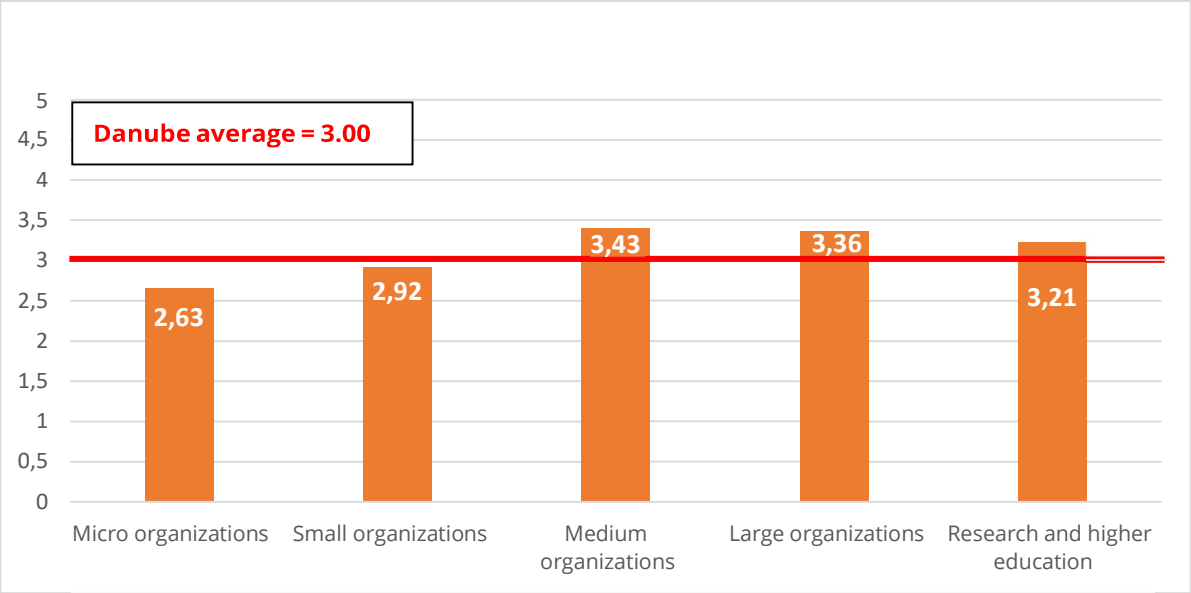


Figure 11 - Overall Lean grades by size of organizations

The Lean readiness scores by company size underscore the correlation between organizational size and readiness for Lean transformation. Medium and large organizations display higher readiness levels, which suggests they are better positioned to implement Lean methodologies effectively.

To enhance Lean readiness across all sizes, especially for micro and small organizations, targeted initiatives such as specialized training, access to Lean consultants, and financial support can be crucial. By addressing these needs, the overall Lean readiness within the Danube region can be elevated, promoting efficiency and competitiveness across various industries.

1.2 Lean grades by countries and size

The Table 2 presents an analysis of the Lean implementation assessment across 11 countries in the Danube region, segmented by company size and organizational type (micro, small, medium, large, and research and higher education institutions). The scoring system ranges from 1 to 5, with the overall regional average for Lean implementation being 3.00.

#	Country	Micro org.	Small org.	Medium org.	Large org.	R&HE org.	Overall Lean
1.	Austria	2.17	3.28	3.92	N/A	N/A	3.03
2.	Bosnia and Hercegovina	N/A	2.59	3.00	3.18	N/A	2.81
3.	Bulgaria	2.47	3.22	3.67	3.17	N/A	3.23
4.	Croatia	2.58	2.68	2.63	2.63	2.82	2.65
5.	Czech Republic	1.74	2.85	3.56	N/A	N/A	3.01
6.	Hungary	2.47	3.11	3.47	N/A	N/A	2.83
7.	Moldova	2.95	3.11	4.42	N/A	N/A	3.11
8.	Romania	1.16	2.65	4.58	N/A	N/A	2.69
9.	Serbia	3.74	3.09	3.34	3.42	4.00	3.35
10.	Slovenia	3.01	3.07	3.48	4.37	N/A	3.27
11.	Ukraine	2.48	2.99	3.53	4.53	N/A	3.03
Lean average grade for DANUBE region = 3.00							

Table 2 - Lean grades by countries and size of companies

Micro Enterprises

In the micro enterprise category, Bosnia and Herzegovina had no respondents. The highest Lean score was achieved by Serbia, with a notable 3.74, while the lowest score was recorded in Romania with 1.16. This disparity highlights a significant gap in Lean adoption across micro enterprises in the region. Of the ten countries that participated, eight scored below the regional average of 3.00, underscoring the need for further development of Lean methodologies in this category.

Small Enterprises

All 11 countries had respondents in the small enterprise category. Austria recorded the highest score with 3.28, indicating a relatively strong adoption of Lean principles, while Bosnia and Herzegovina had the lowest score, 2.59. Six out of the 11 countries scored above the regional average of 3.00, suggesting that while there is solid engagement with Lean in small enterprises, significant room for improvement remains in nearly half of the countries.

Medium Enterprises

For medium-sized enterprises, all countries provided responses. Romania and Moldova achieved the highest Lean scores, with Romania leading at 4.58 and Moldova closely following with 4.42. Notably, only one country (Croatia) in this category scored below the regional average of 3.00, reflecting a stronger overall implementation of Lean practices among medium-sized enterprises compared to smaller businesses.

Large Enterprises

Six of the 11 countries had respondents in the large enterprise category. Ukraine achieved the highest score with an impressive 4.53, followed by Slovenia with 4.37. Only one of the six countries (Croatia) scored below the regional average of 3.00, indicating that Lean principles are generally more mature and better implemented in larger enterprises across the region.

Research and Higher Education Institutions

In the research and higher education sector, only two countries had respondents. Serbia achieved the highest score, with a 4.00, demonstrating a strong commitment to Lean practices in this sector. On the other hand, Croatia recorded the lowest score of 2.82, highlighting potential areas for improvement in integrating Lean methodologies within research and educational frameworks.

1.3 Conclusion and Recommendations

The analysis of Lean implementation across the Danube region demonstrates varying levels of maturity in Lean practices, with notable gaps in micro and small enterprises and certain disparities in research institutions. To improve their Lean scores, countries should focus on the following strategic initiatives:

1. **Capacity Building and Training** - countries, particularly those with lower scores, should invest in targeted Lean training programs for micro and small enterprises, emphasizing process efficiency and waste reduction.
2. **Cross-border Collaboration** - encourage knowledge sharing and collaboration between countries with higher scores (such as Romania and Serbia) and those lagging, to facilitate the exchange of best practices.
3. **Institutional Support** - governments and industry associations should provide incentives and support mechanisms to drive Lean adoption, particularly in sectors and enterprise sizes that are underperforming.
4. **Integration of Lean into Educational Curricula** - research and higher education institutions should integrate Lean methodologies into their curricula and research projects, ensuring that future leaders and innovators are equipped with the necessary skills to drive operational efficiency.

By implementing these measures, countries in the Danube region can enhance their Lean capabilities, leading to increased competitiveness and productivity within the wood industry sector.

2. DIGITAL TRANSFORMATION GRADES

Digitalization is a critical element in the transformation toward a Smart factory, especially in the wood industry, where efficient resource management is essential. Through real-time data monitoring, companies can respond swiftly to changing conditions, ensuring the optimal use of wood, one of the industry's most valuable resources. As global industries strive for higher efficiency, sustainability, and competitiveness, the shift toward smart factories becomes a necessity. This transformation not only enhances productivity but also aligns businesses with the modern demands of sustainability and technological advancement.

CULIS, the methodology developed by Culmena, approaches digital transformation in seven steps, utilizing eight key digital technologies (see Figure 3). Each of these technologies plays a unique role in driving innovation and efficiency in the wood industry:

1. **Internet of Things (IoT)** - IoT enables the connection of machines, devices and systems, allowing for real-time data collection and process optimization. In the wood industry, IoT can monitor environmental conditions, track material usage, and improve the efficiency of production lines.
2. **Robotics** - the use of robotics in manufacturing allows for precision and consistency in tasks that would otherwise require manual labour. For the wood industry, robotics can automate repetitive tasks such as cutting, assembling, or packaging, significantly reducing human error and increasing production speed.
3. **Big Data** - involves analysing large datasets to uncover patterns and trends. In the context of wood manufacturing, companies can use Big Data to forecast demand, optimize supply chains, and improve decision-making through predictive analytics.
4. **Artificial Intelligence (AI)** - enhances decision-making processes by providing intelligent solutions that can automate complex tasks. In the wood industry, AI can be applied to quality control, optimizing production schedules, and even detecting inefficiencies within the manufacturing process.
5. **Augmented Reality (AR)** - provides workers with real-time visual information through devices such as smart glasses, assisting with complex tasks. In wood manufacturing, AR can guide workers through assembly processes, machine maintenance, or even help in the design of custom furniture.
6. **Blockchain** - technology ensures transparency and traceability in supply chains. In the wood industry, it can be used to verify the origin of materials, ensuring sustainable sourcing practices and compliance with

environmental standards.

7. **5G Networks** - the high-speed, low-latency connectivity of 5G enables seamless communication between devices and systems. This is particularly beneficial in large-scale manufacturing environments where the need for real-time data and automation is critical for efficient operations.
8. **Digital Twin** - technology creates a virtual model of physical assets, processes, or systems. In the wood industry, digital twins can simulate the performance of machines or production lines, allowing manufacturers to test improvements or detect issues before they occur in the real world.

The integration of these technologies, as outlined by CULIS, forms the backbone of a smart factory, driving efficiency, reducing waste, and enabling a more responsive, data-driven manufacturing process.

2.1 Digital readiness ratings

The assessment of digital transformation readiness in the wood industry across the Danube region was conducted using a survey with 15 key questions, each rated on a scale from 1 to 5. These questions were designed to evaluate the familiarity and application of Industry 4.0 technologies in the surveyed companies. The results, presented in Figure 12, show that the average score for the region is 2.86, which is notably lower than the Lean transformation score of 3.00.

Out of the 11 countries that participated in the survey, 6 countries scored above the regional average, while 5 countries were below it. Austria achieved the highest score (3.78), demonstrating the strongest awareness and implementation of Industry 4.0 technologies. In contrast, Hungary had the lowest score, indicating significant room for improvement in adopting digital tools.

As the region continues its journey toward digital transformation, the target for future assessments should be to raise the regional average to at least 3.5. This improvement is critical for ensuring that companies are equipped with the necessary digital capabilities to compete in a rapidly evolving global market.

Danube Region Digital Average= 2.86

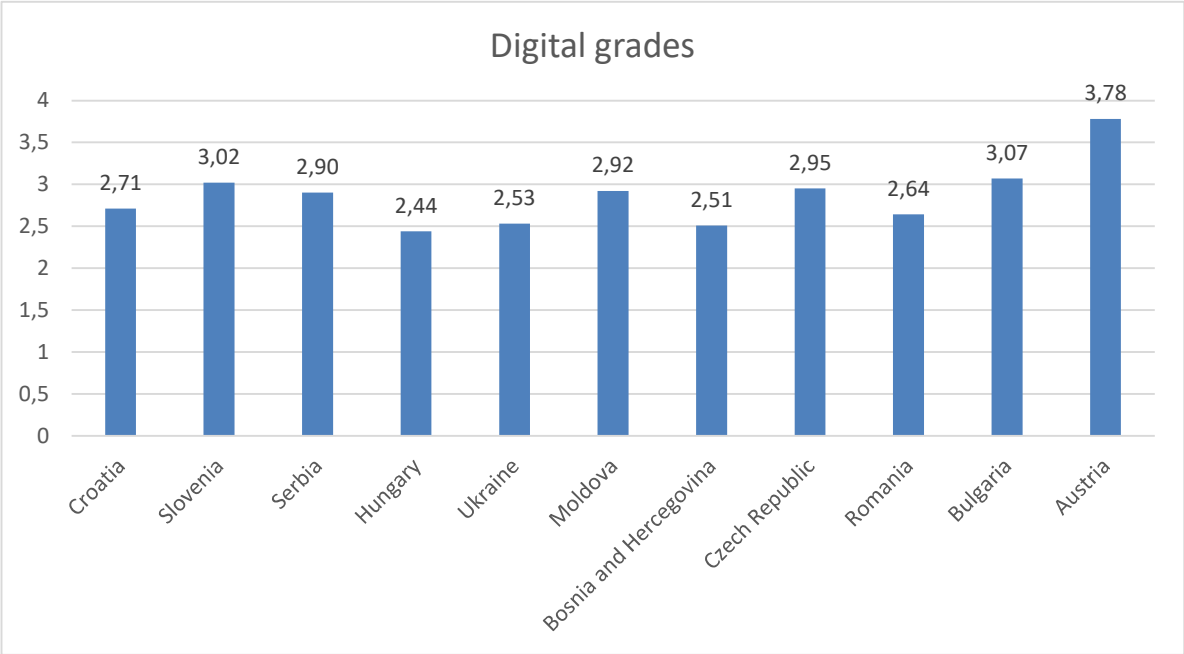


Figure 12 - Digital grades for Danube region

In the upcoming analysis, Table 3 will provide a detailed breakdown of average responses for each of the 15 questions, offering further insights into specific areas where improvements are needed.

#	Question*	Average gradeof Question	Overall Digital grade	Difference
1.	Is the company oriented towards the introduction of new technologies?	3.88		+1.02
2.	What is the company's goal in the next few years regarding Industry 4.0?	3.46		+0.60
3.	Why did the company decide to transform into a Smart Factory?	3.19		+0.33
4.	Have certain projects already been launched as part of the digital transformation?	2.95		+0.09
5.	Are there limiting factors inthe implementation of digital transformation?	2.63		-0.23
6.	What is the financing plan for projects related to the transformation into a Smart Factory?	2.95	2.86	+0.09
7.	Is there a clearly defined and announced digital strategy of the company?	2.50		-0.36
8.	Is the collected data necessary for the development of a digital strategy?	2.76		+0.10
9.	How much has been invested in industry 4.0, i.e. in its tools and methods, in the last 5 years?	2.46		-0.40
10.	What is the employee's attitude towards digital transformation?	3.17		+0.31
11.	Do employees have the necessary skills for digital transformation? What proportion of	2.81		-0.05

	employees have these skills?			
12.	Is data collected from machines? How are they collected? What data is collected? How is the collected data entered into the system? Has it been defined what data is to be collected from the machines?	**2.31**		**-0.55**
13.	Is an ERP system used?	**2.57**		**-0.29**
14.	Has the MES system been implemented?	**1.90**		**-0.96**
15.	How many Industry 4.0 technologies have been implemented in company?	**1.99**		**-0.87**

Table 3 - Digital readiness overall average grades by every question

The table provides a detailed breakdown of how companies in the Danube region's wood industry are progressing in various aspects of digital transformation. The overall average digital readiness score is 2.86, with differences in individual question scores highlighting specific areas where companies excel or need improvement. Below is a thorough analysis of the key findings:

1. **Company orientation toward new technologies**

   - **Average grade: 3.88**
   - **Difference: +1.02**

   This question received the highest score, indicating that most companies are inclined towards adopting new technologies. The significant positive difference (+1.11) suggests a strong willingness across the region to explore innovations, despite the lower overall digital readiness.

2. **Future goals related to Industry 4.0**

   - **Average grade: 3.46**
   - **Difference: +0.60**

   The relatively high score demonstrates that companies have strategic goals

related to digital transformation. However, the gap between their aspirations and overall readiness (+0.69) indicates challenges in fully realizing these goals.

3. Motivation for Smart Factory transformation

- **Average grade: 3.19**
- **Difference: +0.33**

Companies show a moderate level of awareness regarding the benefits of becoming a Smart Factory. The score suggests that while motivation exists, companies may lack the practical knowledge or resources to proceed swiftly.

4. Launch of digital transformation projects

- **Average grade: 2.95**
- **Difference: +0.09**

Some companies have started digital transformation projects, but the overall readiness shows that implementation is in its early stages. The slight positive difference suggests progress, but at a slower pace than desired.

5. Limiting factors in digital transformation

- **Average grade: 2.63**
- **Difference: +0.03**

The negative difference here shows that companies are facing obstacles intheir transformation efforts. These limiting factors could be due to financial constraints, technical challenges, or a lack of skills.

6. Financing plan for transformation

- **Average grade: 2.95**
- **Difference: +0.09**

A small positive difference suggests that financing strategies for digital projects exist, but the lower-than-average score implies these plans may notbe fully comprehensive or sufficiently developed.

7. Defined digital strategy

- **Average grade: 2.50**
- **Difference: +0.36**

A relatively low score and negative difference highlight the absence of clear and formalized digital strategies in many companies. This is a critical barrierto

digital transformation, as a lack of strategic direction can slow progress.

8. **Data collection for digital strategy**

- **Average grade: 2.76**
- **Difference: +0.10**

Close to the average score, this suggests that while companies are aware of the importance of data, there are inefficiencies or gaps in how data is being used to support digital strategies.

9. **Investment in Industry 4.0 tools**

- **Average grade: 2.46**
- **Difference: -0.40**

The low score indicates minimal investment in Industry 4.0 technologies over the past five years, which is a significant roadblock to transformation. Companies need to increase their financial commitment to digital tools and systems.

10. **Employee attitudes towards digital transformation**

- **Average grade: 3.17**
- **Difference: +0.31**

Employees generally show a positive attitude towards digital transformation, which is a promising sign. This positive outlook is crucial for fostering a culture of innovation and adaptation to new technologies.

11. **Employee skills for digital transformation**

- **Average grade: 2.81**
- **Difference: +0.05**

While the score is slightly above the overall average, it highlights the need for further upskilling. Companies may need to invest in training programs to ensure their workforce is adequately prepared for digitalization.

12. **Data collection from machines**

- **Average grade: 2.31**
- **Difference: -0.55**

The low score and negative difference suggest that companies are struggling with machine data collection, a crucial element for implementing Industry 4.0

solutions. This represents a significant gap in their digital transformation capabilities.

13. Use of ERP systems

- **Average grade: 2.57**
- **Difference: -0.29**

While some companies have implemented ERP systems, the negative difference indicates that many still lack this foundational tool, which is critical for integrating various business processes in a digital environment.

14. Implementation of MES systems

- **Average grade: 1.90**
- **Difference: -0.96**

The lowest score in the table highlights a major gap in the adoption of Manufacturing Execution Systems (MES), which are essential for real-time control and data collection in production processes. This is a key area where companies need to focus their efforts.

15. Implementation of Industry 4.0 technologies

- **Average grade: 1.99**
- **Difference: -0.87**

The second-lowest score reveals that very few companies have implemented Industry 4.0 technologies, underscoring the overall slow progress in digital transformation.

The analysis of the table reveals that while companies in the Danube region are aware of the importance of digital transformation and have set goals for it, their actual readiness and implementation levels are still low. Key obstacles include limited investment in Industry 4.0 tools, insufficient data collection capabilities, and a lack of formal digital strategies. To improve digital readiness, companies must prioritize the adoption of technologies such as ERP and MES systems, increase investment in digital tools, and develop clear digital strategies. Furthermore, enhancing employee skills and addressing limiting factors will be essential for accelerating the region's transformation into smart factories.

2.2 Digital readiness grades by size of organizations

The Digital readiness scores reveal a similar trend to the overall readiness scores,with larger organizations generally showing higher levels of readiness shown in Figure 13.

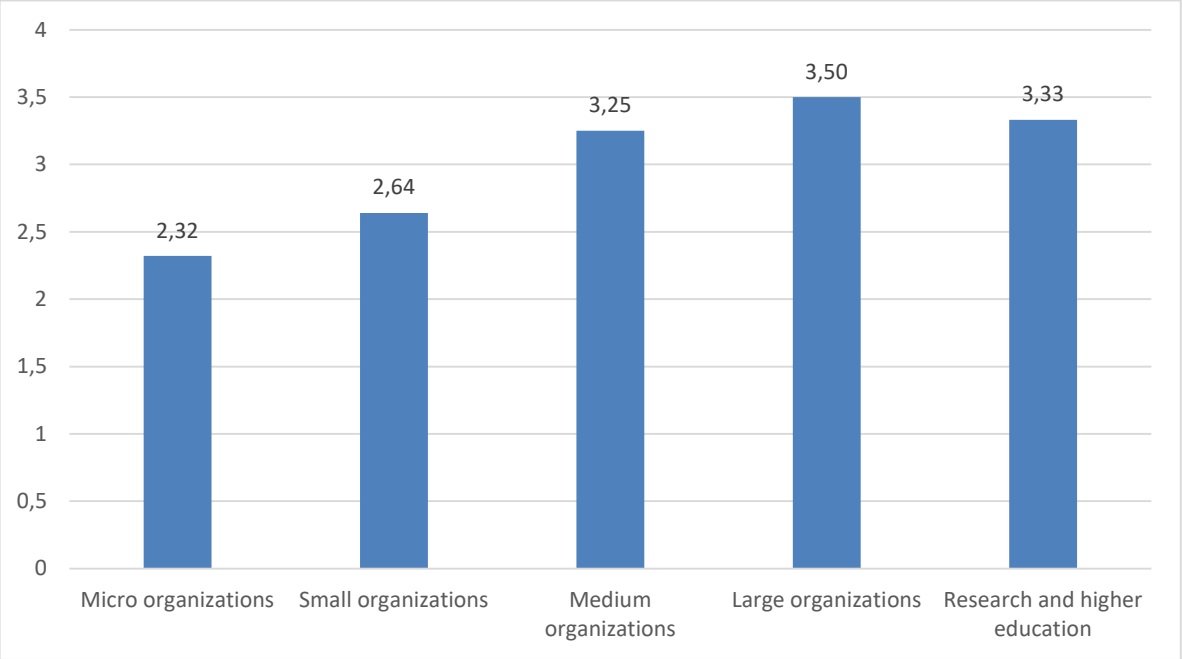


Figure 13 - Overall Digital grades by size of organizations

The Figure 13 presents the digital readiness grades by size of organizations in the Danube region, categorized into five groups: Micro organizations, Small organizations, Medium organizations, Large organizations, and Research and Higher Education institutions. The overall average digital readiness score for the Danube region is 2.86, which serves as a benchmark for evaluating the performance of each group. Analysis of the results:

1. **Micro organizations (2.32) - Below Average:** Micro organizations have the lowest digital readiness score of **2.32**, which is significantly **below the average of 2.86**. This indicates that smaller companies face considerable challenges in adopting Industry 4.0 technologies, likely due to limited resources, insufficient infrastructure, or a lack of strategic focus on digital transformation.
2. **Small organizations (2.64) - Below Average:** Small organizations perform **below the average** with a score of **2.64**. While their readiness is better than that of micro-organizations, they still face some

challenges, possibly in the form of financial or technical constraints, though they are better positioned to address these barriers compared to micro-organizations.

3. **Medium organizations (3.25) - Above Average:** Medium-sized organizations score **3.25**, **exceeding the average of 2.86**. This suggests they are better equipped to adopt digital technologies and have likely begun investing in Industry 4.0 solutions. Their larger scale and resources allow for a more structured approach to digital transformation.
4. **Large organizations (3.50) - Above Average:** Large organizations achieve a score of **3.50**, which is slightly **above the average of 2.86**. It's worth mentioning that their greater financial and technical resources likely ensure they are still advanced in implementing digital strategies and Industry 4.0 technologies.
5. **Research and Higher Education (3.33) - Above Average:** Institutions involved in research and higher education score **3.33**, which is also **above the average of 2.86**. Along with the higher score than average digital readiness score, these institutions maintain a strong focus on innovation and technological advancement, positioning them well to drive and support digital transformation efforts across the region.

2.3 Conclusion and Suggestions for Micro and Small Companies

The analysis highlights that micro and small organizations in the Danube region struggle with digital readiness, scoring below the regional average. These companies face unique challenges, including limited financial resources, inadequate infrastructure, and a lack of strategic focus on Industry 4.0 technologies. To improve digital readiness, micro and small companies should consider the following steps:

1. **Develop a Digital Strategy** - digital transformation requires clear objectives and strategies. Even with limited resources, it is important to define a roadmap for adopting technologies that improve efficiency, customer engagement, and competitiveness.
2. **Leverage External Support** - seek funding, grants, or partnerships with local governments, industry associations, or innovation hubs to finance digital transformation projects. Collaborating with research and higher education institutions can also provide access to expertise and resources.
3. **Invest in Skills and Training** - building internal digital capabilities is key. Micro

and small organizations should invest in employee training to enhance digital skills, or consider outsourcing technical tasks to specialized providers, allowing the organization to benefit from external expertise.

4. **Focus on Incremental Adoption** - rather than attempting large-scale digital overhauls, smaller organizations should adopt a phased approach. Start by implementing affordable and scalable digital tools (e.g., cloud- based solutions, digital project management tools) that address specific business challenges.

By taking these steps, micro and small companies can gradually improve their digital readiness and better position themselves to thrive in a competitive, technology-driven business landscape.

2.4 Digital grades by country and sizes

Table 4 presents an analysis of digital readiness across 11 countries in the Danube region, segmented by company size and organizational type (micro, small, medium, large, and research and higher education institutions). The scoring system ranges from 1 to 5, with the overall regional average for digital readiness being 2.86.

#	Country	Micro org.	Small org.	Medium org.	Large org.	R&HE org.	Overall Digital
1.	Austria	3.20	3.96	4.17	N/A	N/A	3.78
2.	Bosnia and Hercegovina	N/A	2.03	2.75	3.70	N/A	2.51
3.	Bulgaria	2.63	3.05	3.07	3.53	N/A	3.07
4.	Croatia	2.18	2.85	3.02	2.80	3.10	2.71
5.	Czech Republic	1.33	2.64	3.84	N/A	N/A	2.95
6.	Hungary	2.12	2.72	2.80	N/A	N/A	2.44
7.	Moldova	2.77	2.57	4.80	N/A	N/A	2.92
8.	Romania	1.20	2.59	4.60	N/A	N/A	2.64
9.	Serbia	1.67	2.72	2.34	3.67	3.80	2.90
10.	Slovenia	2.53	2.63	3.52	3.93	N/A	3.02
11.	Ukraine	2.07	2.76	2.44	3.80	N/A	2.53
Digital average grade for DANUBE region = 2.86							

Table 4 - Digital grades by countries and size of companies

Micro organizations

Among micro enterprises, Bosnia and Herzegovina not have respondents. Austria scored the highest with 3.20, followed by Moldova that scored 2.77, indicating relatively better digital adoption compared to others. However, the lowest score was recorded by Romania (1.20), showcasing a substantial gap in digital readiness in micro enterprises across the region. Most countries in this category fall below the regional average, reflecting significant challenges in adopting digital technologies in smaller enterprises.

Small organizations

In the small enterprise category, Austria led the way with the highest digital readiness score of 3.96, reflecting good adoption levels of digital technologies. Bosnia and Herzegovina recorded the lowest score of 2.03. Two out of the 11 countries scored above the regional average of 2.86, and four countries scored closely, indicating that small enterprises are making progress in digital transformation, though many still face barriers.

Medium organizations

For medium enterprises, Romania and Moldova achieved the highest scores, with Romania at 4.60 and Moldova at 4.80, demonstrating a strong commitment to digital transformation in medium-sized businesses. Serbia, Bosnia and Herzegovina, and Ukraine scored below the regional average, indicating that medium enterprises are generally better equipped and more prepared to adopt digital technologies compared to smaller firms.

Large organizations

Six countries had respondents in the large enterprise category. Slovenia recorded the highest score (3.93), followed by Ukraine (3.80) and Bosnia and Herzegovina (3.70). The overall trend for large enterprises is positive, with one of the respondents falling below the regional average. This suggests that large companies in the Danube region areleading in digital adoption and implementation of Industry 4.0 technologies.

Research and Higher Education Institutions

Only two countries provided responses in the research and higher education category. Serbia had the highest digital readiness score of 3.80, indicating strong technological advancement and digital strategies in place within this sector. Croatia had a lower score of 3.10, reflecting potential areas for improvement in driving digital innovation in higher education institutions.

Conclusion and Recommendations

The analysis of digital readiness across the Danube region highlights disparities inthe adoption of digital technologies, especially in micro and small enterprises. Medium and large organizations, as well as research institutions, show higher levels of digital readiness, suggesting that these groups are better equipped for digital transformation. To enhance digital capabilities, countries in the region should focus on the following strategic initiatives:

1. **Investment in Digital Infrastructure** - micro and small organizations, particularly in countries with low scores, should receive more support to upgrade their digital infrastructure, enabling them to better adopt new technologies.
2. **Training and Education** - countries should invest in digital skills training programs, particularly for smaller companies, to build the capacity needed for digital transformation.
3. **Public-Private Partnerships** - governments and industry associations should promote partnerships between larger organizations and smaller firms to encourage knowledge transfer and technology adoption.
4. **Support for Research and Innovation** - research and higher education institutions should continue to lead in digital innovation by integrating Industry 4.0 technologies into their research programs and offering practical digital skills training.

By addressing these areas, countries in the Danube region can accelerate digital transformation, boosting overall competitiveness and productivity.

3. GREEN TRANSFORMATION GRADES

In today's world, it is essential for companies across all industries, not just the wood industry, to focus on protecting the planet by adopting green technologies and utilizing renewable energy sources. Businesses must not only commit to reducing their environmental impact but also play a key role in raising awareness among their employees. It is vital that employees understand their individual contributions to reducing the company's environmental footprint. This includes minimizing errors, reducing waste, and optimizing the use of raw materials, as well as managing resources such as light, water, and energy in the most efficient way possible.

Companies should also aim to generate as much of their operational energy as possible from renewable sources, including solar, wind, and biomass energy. **Renewable energy sources** play a critical role in reducing greenhouse gas emissions and conserving finite natural resources. For example, solar power harnesses the sun's energy to produce electricity, while wind turbines convert kinetic energy from the wind into mechanical power. Biomass energy, especially relevant in the wood industry, involves using organic materials like wood waste to produce heat or electricity, offering a sustainable alternative to fossil fuels.

In addition, adopting the principles of the **circular economy** is essential for reducing waste and promoting sustainability. The circular economy encourages companies to rethink the lifecycle of products and materials, designing processes that maximize the use of resources and minimize waste. In the wood industry, this can involve reusing wood by-products, recycling materials, and finding ways to regenerate resources, thus closing the loop and extending the lifecycle of products.

The **synergy between humans and nature** is another important element in the green transformation. This synergy focuses on how individuals and organizations can work in harmony with the environment rather than against it. By being mindful of the planet's limited resources, businesses and their employees can contribute to preserving ecosystems. For example, sustainable forestry practices in the wood industry ensure that trees are replanted, forests are maintained, and biodiversity is protected. This human-nature partnership supports not only environmental sustainability but also long-term business growth.

Ultimately, achieving **optimal resource use** is crucial for balancing human needs with the preservation of Earth's ecosystems. In the wood industry, this means maximizing the efficiency of wood processing, reducing material waste, and conserving energy. Efficient resource management allows companies to produce more with less, lowering their environmental impact while improving their bottom line. This approach also emphasizes the importance of reducing the need for additional raw materials, conserving water, and using energy wisely, all of which contribute to the overall goal

of sustainability.

By embracing renewable energy, implementing circular economy practices, fostering a synergy between humans and nature, and optimizing resource use, companies particularly in the wood industry can lead the way in creating a sustainable future. These actions not only support environmental conservation but also enhance operational efficiency, strengthen corporate responsibility, and align businesses with global sustainability goals.

3.1 Green readiness ratings

Based on the Green readiness ratings for the Danube region's wood industry, displayed in Figure 14, companies are evaluated on their preparedness to adopt environmentally sustainable practices, with scores ranging from 1 to 5. The overall focus here is on how well these companies integrate renewable energy, resource optimization, and green technologies into their operations. The average Green readiness score across the region is higher (3.04) compared to Lean scores (3.00), reflecting the challenges businesses face in transitioning towards optimal practices.

Austria, Moldova and Romania lead the way with a score of 3.46, indicating significant progress in green transformation initiatives. These countries have made noticeable strides in reducing their environmental impact, likely through investments in renewable energy and efficiency improvements. Slovenia and Bulgaria follow closely, with scores of 3.18 and 3.24 respectively, showing a relatively strong commitment to sustainability compared to other nations in the region.

On the other end of the spectrum, Ukraine has the lowest Green readiness score of 2.53, highlighting a significant gap in the adoption of green technologies and practices. Croatia, Serbia, Hungary, Ukraine, Czech Republic and Bosnia and Herzegovina also scored below the average, with scores ranging from 2.53 to 2.99, indicating that there is substantialroom for improvement in these countries.

While some countries are making notable progress in aligning with environmental sustainability goals, the overall regional average still suggests that many businesses are lagging in their green transformation efforts. For the Danube region's wood industry, the target score for the upcoming period should be at least 3.5, reflecting a more substantial commitment to reducing carbon emissions, optimizing resource use, and fostering the synergy between humans and nature.

Danube Region Green Average= 3,04

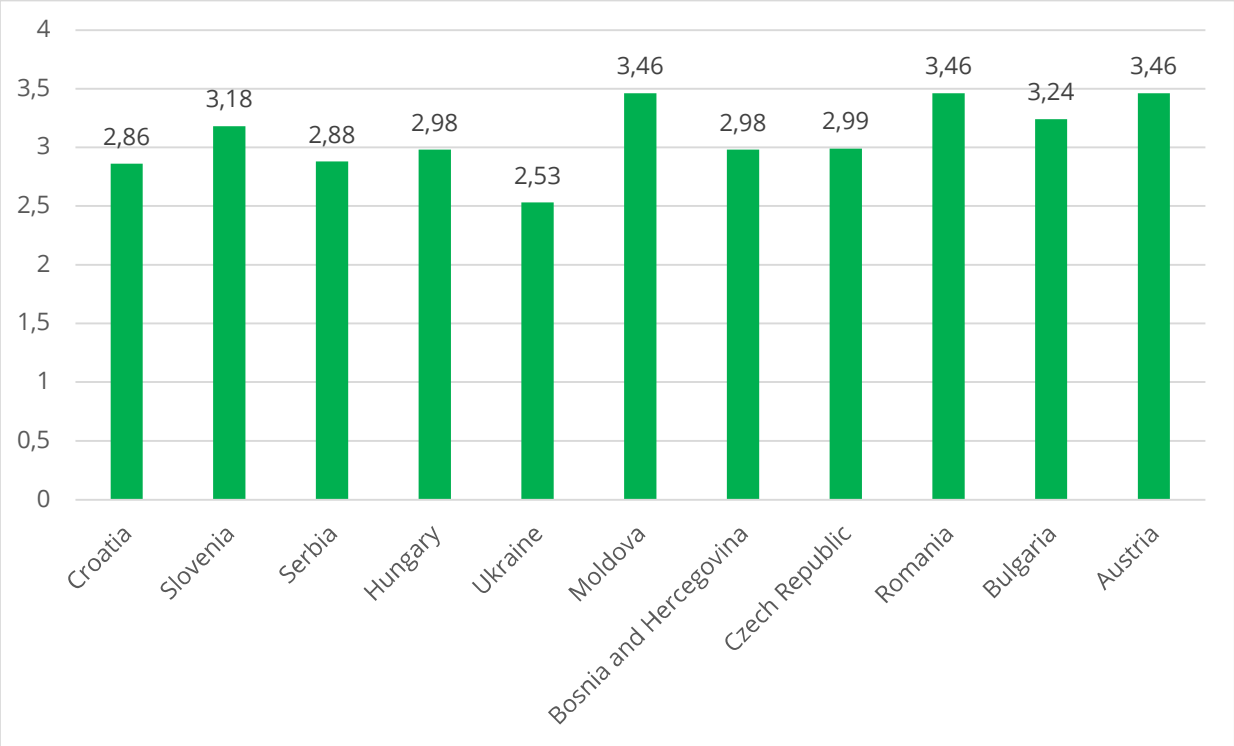


Figure 14 - Green grades for Danube region

In the upcoming analysis, Table 5 will provide a detailed breakdown of average responses for each of the 10 questions, offering further insights into specific areas where improvements are needed.

#	Question*	Average gradeof Question	Overall Green grade	Difference
1.	Is information on waste management provided to customers? Is it done efficiently and transparently?	2.80	3.04	-0.24
2.	Has the company researched related companies and their waste management practices?	2.58		-0.46
3.	Is the company familiar with the concept of circular economy? Does the company apply the circular economy in its work? To what extent is it applied?	3.30		+0.26
4.	Does the company use recycled materials in its products or as energy sources? To what extent?	3.19		+0.15
5.	To what extent is paper used to transfer information?	3.01		-0.03
6.	Regarding the use of resources, is it being reviewed? Does the company consider and explore new possibilities and new ways of using resources, which would reduce their consumption?	3.62		+0.58
7.	How easy is it to recycle the products that the company produces?	3.64		+0.60
8.	Does the company monitor its water footprint? Is the company trying to reduce that footprint? Have ways been explored to reduce the water footprint? What actions were taken?	2.54		-0.50
9.	Does the company monitorits greenhouse gas emissions? Is the company trying to reduce this emission? Have ways been explored to reduce this emission? What actions were taken?	2.88		-0.16

10.	Does the company use renewable energy sources? What percentage of energy does the company get from renewable energy sources?	**2.82**		**-0.22**

Table 5 - Green readiness overall average grades by every question

Based on the Table 5 provided, the Green readiness of companies in the Danube region is evaluated across several key aspects, with an average overall green grade of **3.04**. The difference between the average score of each survey question and this overall average, provides insights into areas where companies are excelling or lagging in their sustainability efforts.

Here is a detailed analysis of each survey question:

1. **Is information on waste management provided to customers? Is it done efficiently and transparently?**

   - **Average grade: 2.80**
   - **Difference: -0.24**

   This indicates that waste management information and transparency practices are below average. Companies need to improve communication with customers about their waste management processes, as transparency is key to building trust and demonstrating a commitment to sustainability.

2. **Has the company researched related companies and their waste management practices?**

   - **Average grade: 2.58**
   - **Difference: -0.46**

   This question has one of the lowest scores, suggesting that companies are not actively benchmarking or researching best practices from other organizations. To improve their green performance, companies should focus on learning from industry leaders and adopting proven waste management strategies.

3. **Is the company familiar with the concept of circular economy? Does the company apply the circular economy in its work? To what extent is it applied?**

   - **Average grade: 3.30**
   - **Difference: +0.26**

   Companies seem relatively knowledgeable about the circular economy,

and some are already integrating it into their operations. However, this positive score indicates that more companies could benefit from deepening their understanding and application of circular economy principles.

4. **Does the company monitor its water footprint? Is the company trying to reduce that footprint?**

   - **Average grade: 3.19**
   - **Difference: +0.15**

   Water footprint monitoring is a weak spot for companies, as this is one of the lowest scores. It suggests that many companies are either unaware of their water usage or are not taking significant steps to reduce it. Addressing this will be essential for improving overall environmental performance.

5. **Does the company monitor its greenhouse gas emissions?**

   - **Average grade: 3.01**
   - **Difference: -0.03**

   Companies are slightly below average in monitoring and reducing their greenhouse gas emissions. Although some efforts are being made, this area needs greater attention to help mitigate climate change impacts.

6. **Does the company use recycled materials in its products or as energy sources? To what extent?**

   - **Average grade: 3.62**
   - **Difference: +0.58**

   The score here shows that companies are starting to adopt the use of recycled materials, but there's still room for growth. More emphasis should be placed on incorporating recycled inputs to further reduce environmental impact.

7. **To what extent is paper used to transfer information?**

   - **Average grade: 3.64**
   - **Difference: +0.60**

   This score is very close to the overall average, suggesting that companies have made moderate progress in reducing paper use, possibly through digitalization, but this could be improved with more proactive efforts to reduce reliance on paper-based communication.

8. **Regarding the use of resources, is it being reviewed? Does the company consider and explore new possibilities and new ways of using resources, which would reduce their consumption?**

   - **Average grade: 2.54**
   - **Difference: -0.50**

   Companies are very close to the overall average in resource review and exploring new ways to reduce consumption. This is a promising area of green readiness where companies are actively seeking more efficient resource use, aligning with sustainability goals.

9. **How easy is it to recycle the products that the company produces?**

   - **Average grade: 2.88**
   - **Difference: -0.16**

   This score indicates that companies are designing products with recyclability in mind. This is a critical factor in promoting a circular economy and reducing waste, highlighting the potential for positive progress.

10. **Does the company use renewable energy sources? What percentage of energy does the company get from renewable energy sources?**

    - **Average grade: 2.82**
    - **Difference: -0.22**

    The use of renewable energy is another area where companies fall short. This score suggests that while some companies may be transitioning to renewable sources, the majority still rely heavily on non-renewable energy. Increasing the use of renewable energy is crucial for lowering the carbon footprint.

Key Insights and Recommendations

- **Strong Areas** - companies perform well in areas related to resource use optimization (Question 6) and product recyclability (Question 7). This suggests that they are prioritizing reducing resource consumption and designing for end-of-life recycling, which are core components of a circular economy.
- **Areas for Improvement** - there is a clear need for better monitoring and reduction of water footprints (Question 8) and greenhouse gas emissions (Question 9). Additionally, renewable energy adoption (Question 10) remains low, representing a significant opportunity for improvement. Companies should invest in renewable energy technologies and explore government incentives for green energy transition.
- **Waste Management** - both internal practices (Question 2) and communication with customers (Question 1) related to waste management are lagging. Companies should work on improving waste management transparency and learning from industry best practices to reduce waste.

In conclusion, while companies are showing strong performance in resource optimization and product recyclability, more work is needed in areas like waste management, water and energy usage, and emission reduction to align fully with green transformation goals. The overall average grade of **3.04** suggests moderate progress, but there is ample opportunity for improvement, especially in aligning with global sustainability standards.

3.2 Green readiness grades by size of organizations

Figure 15 presents the average green ratings for the Danube region's wood industry, categorized by company size. The results highlight significant differences in green performance across various business scales. Micro-sized organizations reported an average rating of 2.54, small-sized enterprises achieved 2.83, and medium-sized companies scored 3.36. Large organizations outperformed other categories with a rating of 3.50. Meanwhile, research institutions and higher education organizations recorded an average rating of 2.96. The overall average rating across all respondents was 3.04.

Danube Region Average= 3,04

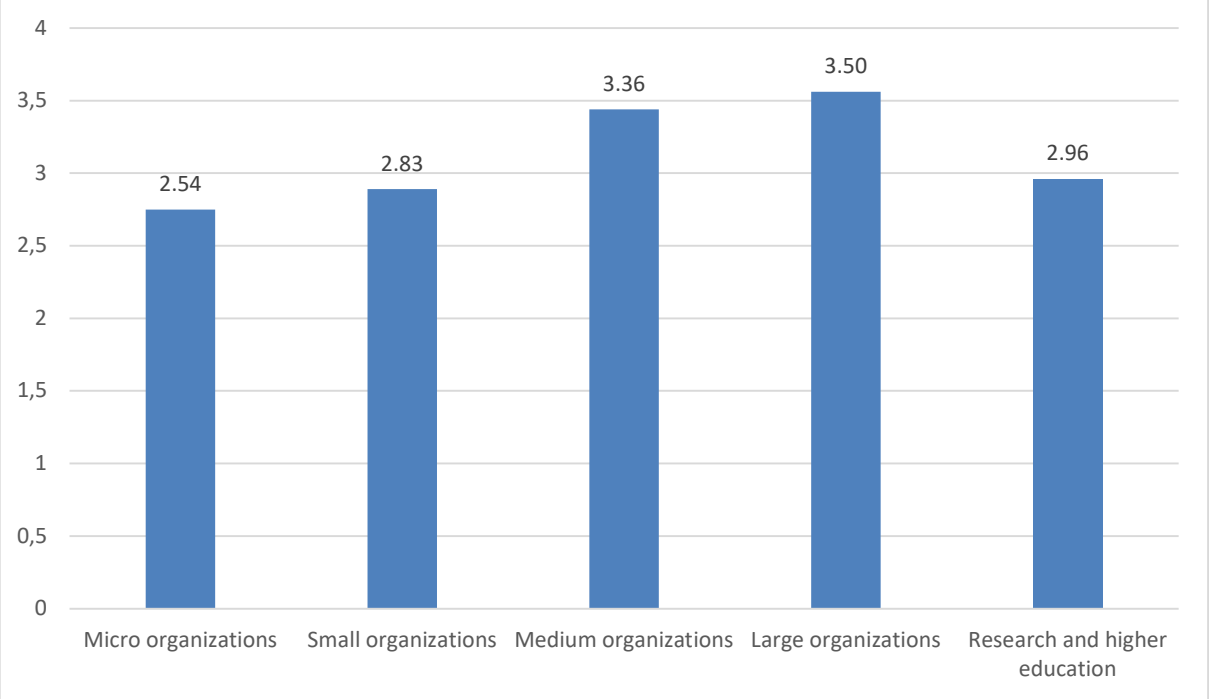


Figure 15 - Green grades by company size

3.3 Green grades by country and sizes

Table 6 presents an analysis of green performance across 11 countries in the Danube region, segmented by company size and organizational type (micro, small, medium, large, and research and higher education institutions). The scoring system ranges from 1 to 5, with the overall regional average for green performance being 3.04. Individual ratings for each company size are also provided for more detailed comparison.

#	Country	Micro org.	Small org.	Medium org.	Large org.	R&HE org.	Overall Green
1.	Austria	2.60	3.33	4.45	N/A	N/A	3.46
2.	Bosnia and Hercegovina	N/A	2.53	3.38	3.75	N/A	2.98
3.	Bulgaria	3.00	2.83	3.63	3.55	N/A	3.24
4.	Croatia	2.45	2.83	3.25	3.75	3.25	2.86
5.	Czech Republic	2.10	2.61	3.86	N/A	N/A	2.99
6.	Hungary	2.72	3.30	2.40	N/A	N/A	2.98
7.	Moldova	3.40	3.15	4.60	N/A	N/A	3.46
8.	Romania	1.70	3.53	4.60	N/A	N/A	3.46
9.	Serbia	2.00	2.60	3.08	2.90	3.10	2.88
10.	Slovenia	3.18	2.74	3.59	2.60	N/A	3.18
11.	Ukraine	1.98	2.45	3.00	4.40	N/A	2.53
Green average grade for DANUBE region = 3.04							

Table 6 - Green grades by country and sizes

Micro Organizations

Among micro enterprises Bosnia and Herzegovina did not have respondents. Moldova led with the highest green performance score of 3.40, suggesting a relatively strong focus on sustainability in smaller enterprises. On the other hand, Romania had the lowest score of 1.70, indicating significant challenges in adopting green practices. Most countries in this category scored below the regional average of 3.04, reflecting difficulties in integrating green initiatives within micro-organizations across the region.

Small Organizations

In the small enterprise category, Romania achieved the highest green rating at 3.53, demonstrating good adoption of green practices in this segment. Ukraine, however, reported the lowest score of 2.45, indicating that smaller companies in some parts of the region still face barriers to embracing sustainability. Seven out of the 11 countries scored below the regional average, showing that green transformation remains a challenge for many small enterprises.

Medium Organizations

Medium-sized companies exhibited the highest overall commitment to green practices, with both Romania and Moldova scoring 4.60. These results highlight a strong inclination towards sustainability within medium enterprises in these countries. Only Hungary (2.40) and Ukraine (3.00) scored below the regional average, indicating that medium organizations are generally better aligned with green practices compared to smaller firms in the Danube region.

Large Organizations

Only six countries reported responses for large enterprises. Ukraine recorded the highest green performance score at 4.40, followed by Croatia and Bosnia and Herzegovina (3.75). The results indicate that large companies are at the forefront of green adoption in the region, with Serbia (2.90) and Slovenia (2.60) of the countries scoring below the regional average. This suggests that larger enterprises are leading the way in integrating sustainability measures into their business models.

Research and Higher Education Institutions

Responses from research and higher education institutions were limited, with only two countries providing data. Croatia scored the highest at 3.25, while Serbia had the lower score of 3.10. These institutions are generally closer to the regional average, indicating a moderate focus on green initiatives within the academic and research sectors.

Conclusion and Recommendations

The green performance analysis across the Danube region reveals significant variation in the adoption of sustainable practices, influenced by company size and country-specific factors. While larger enterprises and medium-sized companies have made notable progress in implementing green initiatives, micro enterprises, particularly in countries such as Romania and Ukraine, lag behind. In category of small enterprises, the lowest scores are held by Ukraine and Bosnia and Herzegovina. This suggests that the adoption of green practices is more feasible for organizations with greater resources and operational capacity. Research and higher education institutions, while aligned with the regional average, have the potential to play a more active role in fostering sustainability through innovation and education.

The overall average of 3.04 for the Danube region, while positive, indicates that substantial efforts are still needed to meet higher sustainability targets, particularly in the less developed segments of the wood industry. Countries with stronger green performance, such as Austria, Moldova, and Romania could serve as benchmarks for other countries in the region. Here are the recommendations for Danube region for green transformation:

- **Tailored Support for Micro and Small Enterprises** Smaller organizations face distinct challenges in adopting green practices, often due to limited resources and lack of expertise. Governments and industry bodies should design tailored financial and technical assistance programs for micro and small enterprises, such as grants, subsidies, and low-interest loans for investing in green technologies. These programs should also include advisory services to guide companies through sustainable practices and compliance with green standards.
- **Regional Collaboration and Knowledge Exchange** The disparity in green performance across countries highlights the need for enhanced collaboration within the Danube region. Cross-border initiatives, knowledge-sharing platforms, and partnerships between high-performing countries (e.g., Moldova, Romania) and those with lower green scores could facilitate the exchange of best practices, tools, and technologies. Regional bodies, such as the Danube Transnational Program, could act as catalysts for such initiatives, ensuring that expertise is widely disseminated.

- **Incentivizing Green Innovation in Medium and Large Enterprises** While medium and large enterprises are showing positive trends in green adoption, further incentives can accelerate this momentum. Policymakers should introduce targeted tax breaks or subsidies for companies that innovate in sustainability, particularly those that develop or implement green technologies. Such incentives could not only encourage deeper integration of green practices but also position the region as a leader in sustainable manufacturing.
- **Strengthening the Role of Research and Education Institutions** Research and higher education institutions have a crucial role in driving the green transition by developing innovative solutions and cultivating a sustainability-focused workforce. These institutions should be encouraged to intensify their focus on green research, collaborate more with industry stakeholders, and incorporate sustainability into their educational curricula. Further investment in research that addresses green challenges specific to the wood industry, such as resource efficiency, carbon footprint reduction, and sustainable forestry practices, could generate substantial long-term benefits for the region.
- **Development of a Regional Green Strategy** To ensure cohesive progress across the Danube region, the development of a comprehensive green strategy tailored to the wood industry is essential. This strategy should set clear, measurable targets for green performance, outline pathways for different types of organizations, and address the specific needs of underperforming segments. A coordinated regional strategy would provide consistency in policy, facilitate resource pooling, and enhance the overall competitiveness of the wood industry in the global market.

By addressing these key areas, the Danube region can not only improve its green performance but also set an example for sustainable industrial practices, contributing to the wider European Green Deal objectives.

4. OVERALL CONCLUSION AND RECOMMENDATIONS

In analysing the Lean, Digital, and Green transformation efforts across the Danube region, several key insights emerge, highlighting both the challenges and opportunities for improvement. These three areas—Lean management, digital readiness, and green performance—are deeply interconnected, and success in one area often supports progress in the others.

Starting with **Lean management**, the varying levels of maturity across the region underscore significant gaps, particularly among micro and small enterprises. Addressing these gaps through capacity building and targeted training programs is essential to create a culture of continuous improvement. Furthermore, fostering cross-border collaboration and institutional support will help accelerate the adoption of Lean principles. By integrating Lean methodologies into educational curricula, future leaders can be equipped to drive operational efficiency. This foundation of efficiency is not only crucial for business performance but also sets the stage for further transformation in digital and green practices.

Building on this, the **Digital transformation** landscape shows clear disparities in the adoption of digital technologies, with larger organizations leading the way. To ensure that smaller enterprises do not fall behind, investments in digital infrastructure and skills training are critical. Public-private partnerships can foster knowledge exchange, helping to bridge the digital gap. Moreover, the integration of digital tools and technologies enhances the ability to implement and sustain Lean principles, creating a more agile and responsive business environment. Research institutions also play a pivotal role here, leading innovation and helping companies integrate Industry 4.0 technologies, which are foundational for both operational and green advancements.

Lastly, **Green transformation** is another area where the region faces significant variation, particularly between large enterprises and smaller companies. To advance sustainable practices, tailored support for micro and small enterprises, combined with regional collaboration for knowledge sharing, will be key. Furthermore, incentivizing green innovation, particularly in medium and large companies, can accelerate the progress. Strengthening the role of research institutions in developing sustainable solutions is essential, ensuring that green practices not only improve environmental outcomes but also enhance overall competitiveness. Importantly, the green agenda is intertwined with both Lean and digital transformations—by improving operational efficiencies and adopting digital technologies, organizations are better positioned to meet sustainability goals.

Overall Recommendation crucial starting point for transformation lies in mapping and streamlining processes using Lean management principles. Lean serves as the foundation for improving process efficiency and waste reduction which, in

turn, supports both digital and green transformations. The introduction of Lean Academies and Lean Six Sigma training programs can further reinforce this foundation. As organizations move forward with digital and green initiatives, having clear transformation strategies in place is vital. In particular, within the wood industry, adopting digital technologies for product innovation will drive the sector to higher levels of performance and sustainability. By approaching transformation holistically—starting with Lean and integrating digital and green strategies—the Danube region can enhance its overall competitiveness, productivity, and sustainability.

Interreg Danube Region

Co-funded by the European Union

DRWO4.0

DRWO4.0

Activity 1.1. Assessment of the baseline status of the DR forest-based industry according to the I4.0 standards
Annex 1 - Mapping of existing stakeholders in partner countries

Danube Region Wood Industry Transformation Model towards Industry 4.0

WHO ARE STAKEHOLDERS?

Stakeholders are persons, groups, or institutions with involvement in, interests in, or in-depth knowledge of the DRWO4.0 topic and context. They may include:

1) Those who directly influence the success of the project,

2) Those who are affected, either positively or negatively, by the project.

For example, stakeholders may include: regional and national policy makers, companies, clusters, chambers, universities, research organizations, business supporting organizations, non-governmental organizations, etc.

OBJECTIVE

Our goal is to identify stakeholders both regional, national and international in order to engage inthe project activities and the development of the Danube Region Wood Industry Transformation Model towards Industry 4.0. Early stakeholder involvement will help make DRWO4.0 project more relevant to a particular country or region, thereby increasing the likelihood of Model utilizationand/or taking up.

INSTRUCTIONS

Below are several questions to consider while communicating with stakeholders to determine their interest in the project, formulate stakeholder roles, conceptualize strategies for engaging stakeholders and obtaining support, and identify additional stakeholders. These questions are not designed to be asked in an interview format. Rather, these questions can help guide your thinkingas you speak to key informants and complete the stakeholder analysis.

The columns in the template correspond to some of the questions below:

· Is the stakeholder well-informed about DRWO4.0 topic or issue? How much influence doesthe stakeholder have in this area?

· Has the stakeholder actively and/or publicly demonstrated support or opposition to this issue?

· How can we engage the stakeholder? What might the stakeholder potentially do (now orlater) to facilitate future utilization of DRWO4.0 results and/or eventual taking up of the model?

· What other persons, organizations, or departments does this stakeholder know who might influence the success of DRWO4.0 project and/ or should be informed of or involved in our work in this area?

Mapped stakeholders per country

Institution	**Name of the Person** (responsible person/ contact person)	**Interest of Stakeholder** (1-5; 1=highest interest; 5=least interested)	**Power of Influence** (Meet their needs; Key player; Show consideration; Least important)	**Level of Knowledge About Issue** (1=Uninformed 2=Familiar 3=Expert)	**Level of Support** (1=Actively opposed 2=Somewhat opposed 3=Neutral/ undecided 4=Somewhat supportive 5=Actively supportive)	**Possible Strategies for Engaging Stakeholder**	**Additional Stakeholders Identified by this Source**

DRWO4.0 Stakeholders quadrant

Explanation of Stakeholders Quadrant terms

Meet their needs

- engage & consult on interest area
- try to increase level of interest
- aim to move into right hand box

Key player

- key players focus efforts on this group
- involve in governance/decision making bodies
- engage & consult regularly

Show consideration

- make use of interest through involvement in low risk areas
- keep informed & consult on interest area
- potential supporter/ goodwill ambassador

Least important

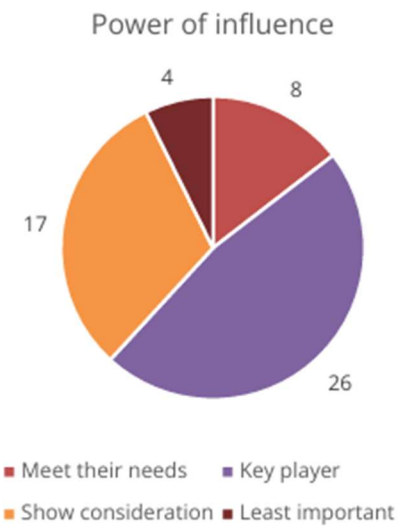
- minimum effort
- inform via general communications – newsletters, website, mail shots
- aim to move into right hand box

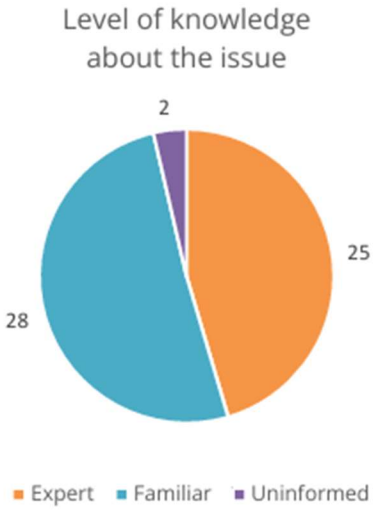
Mapped stakeholders - Croatia

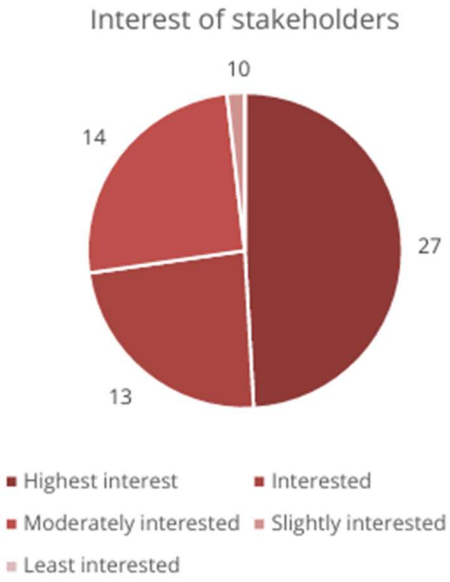
No	Institution	Name of the Person (responsible person / contact person)
1	CENTAR ZA ZNANSTVENI RAD U VINKOVCIMA (HAZU)	IGOR ANIĆ
2	HRVATSKA ZAKLADA ZA ZNANOST	OZREN POLAŠEK
3	SVEUČILIŠTE U ZAGREBU FAKULTET ELEKTROTEHNIKE I RAČUNARSTVA	VEDRAN BILAS
4	FAKULTET ELEKTRONIKE, RAČUNARSTVA I INFORMACIJSKIH TEHNOLOGIJA OSIJEK	DANIJEL TOPIĆ
5	SVEUČILIŠTE U ZAGREBU FAKULTET STROJARSTVA I BRODOGRADNJE	HRVOJE MIKULČIĆ
6	FAKULTET ŠUMARSTVA I DRVNE TEHNOLOGIJE ZAGREB	JOSIP MARGALETIĆ
7	RUDARSKO GEOLOŠKO NAFTNI FAKULTET	IVICA PAVIČIĆ
8	EKONOMSKI FAKULTET U OSIJEKU	ĐULA BOROZAN
9	HRVATSKI ŠUMARSKI INSTITUT	ROBERT LICHT
10	PANONSKI DRVNI CENTAR KOMPETENCIJA VPŽ	DENIS VALIDŽIĆ
11	RAZVOJNI CENTAR I TEHNOLOŠKI PARK KRIŽEVCI	LUKA NEMIĆ
12	RAZVOJNA AGENCIJA VSŽ	ZRINKA ČOBANKOVIĆ
13	REGIONALNI CENTAR KOMPETENTNOSTI POLJOPRIVREDNO ŠUMARSKA ŠKOLA VINKOVCI	RUŽICA ZUCIĆ
14	OTOČKA RAZVOJNA AGENCIJA	MLADEN MARKEŠIĆ
15	JAVNA USTANOVA ŽUPANIJSKA RAZVOJNA AGENCIJA OSJEČKO-BARANJSKE ŽUPANIJE	IVANA ŠIMLEŠA VONDRAK
16	POLJOPRIVREDNO ŠUMARSKA ŠKOLA VINKOVCI	RUŽICA ZUCIĆ
17	DRVODJELSKA TEHNIČKA ŠKOLA VINKOVCI	JOSIP JOVANOVAC
18	ZELENA AKCIJA	MARIJA MILETA
19	HRVATSKO ŠUMARSKO DRUŠTVO	OLIVER VLAINIĆ
20	AKADEMIJA ŠUMARSKIH ZNANOSTI	MARIJAN GRUBEŠIĆ
21	HRVATSKI SAVEZ UDRUGA PRIVATNIH ŠUMOVLASNIKA	ZDENKO BOGOVIĆ
22	UDRUGA UMIROVLJENIKA DRVARACA — ŠUMARA VSŽ	MATO VUKOVAC
23	HGK UDRUŽENJE DRVNO- PRERADIVAČKE INDUSTRIJE	FILIP GELAKOVIĆ
24	DRVNI KLASTER SJEVEROZAPADNE HRVATSKE	ADA KEZIĆ
25	BJELIN SPAČVA D.O.O.	VLADIMIR BATAKOVIĆ
26	BJELIN OTOK D.O.O.	JOSIP GLAVAŠ
27	ŠIŠARKA D.O.O.	GIUSY ASERO
28	ŠIŠKA D.O.O.	ANTUN ČOŠKOVIĆ
29	DESIĆEVO D.O.O.	ILIJA TIKVIĆ
30	FRANKOPROM J.D.O.O.	MARKO BOŠNJAK
31	URA D.O.O.	MIJO RADAT
32	ALPI AVIATION D.O.O.	DARIO PAOLI
33	EFEKTIV D.O.O.	DRAGAN ZAKŠEK
34	AKORD D.O.O.	MARIO ŠPOLJAR
35	CARPINUS D.O.O.	MILE PERKOVIĆ
36	OBRT ZE-LAC	DARKO LACIĆ
37	IVEX D.O.O.	ILIJA PAVLOVIĆ
38	OBRT STOLARIJA ŠPURGA	IVAN ŠPURGA
39	OBRT STOLARSKA RADIONICA JAKOB IVKIĆ - BAJA	JAKOB IVKIĆ
40	OBRT PA - OR	JASNA RAJKOVIĆ
41	DOM-PARKET D.O.O.	ANTONIO MARKOVIĆ
42	SUO VESELČIĆ	DRAGO VESELČIĆ
43	ŠPOLJAREC D.O.O.	VLADIMIR ŠPOLJAREC
44	GREEN WOOD J.D.O.O.	ROBERT POSTRUŽIN
45	PATOS D.O.O.	ANĐELKO ČULJAK
46	TROKUT D.O.O.	SAFET MALAGIĆ
47	EXCELSIOR D.O.O.	STJEPAN NIKOLIĆ
48	EIG VARGA DESIGN D.O.O.	EMANUEL VARGA
49	VU-CREATOR J.D.O.O.	JOSIP SALAIĆ
50	STRIZIVOJNA HRAST D.O.O.	MATO RAVLIĆ
51	PERO STRUJA D.O.O.	PERO UDOVČIĆ
52	TIMWOOD D.O.O.	DRAŽEN HOLMIK
53	HRASTIK D.O.O.	DAVOR GRIZELJ
54	PILANA STRPOR D.O.O.	MARIJAN SVILIČIĆ
55	BPD, OBRT ZA PROIZVODNJU BRIKETA	JOSIP BRČIĆ
56	MINISTARSTVO POLJOPRIVREDE SEKTOR ZA PRERADU DRVA I PROIZVODNJU NAMJEŠTAJA	DANIJELA ZAJAC
57	OBNOVLJIVI IZVORI ENERGIJE OSIJEK	DAMIR BAJSIĆ

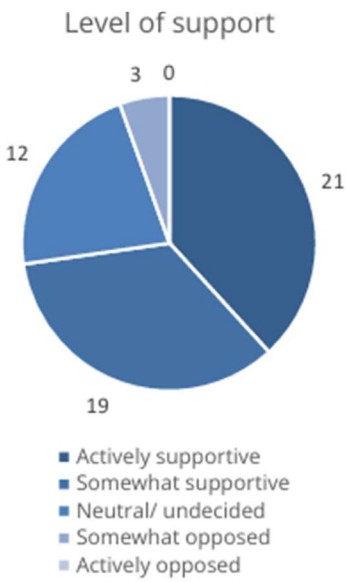
Mapped stakeholders - Croatia

Average value by categorie		
Average interest of stakeholders	2	Interested
Average level of knowledge about issue	2	Familiar
Average level of support	4	Somewhat supportive

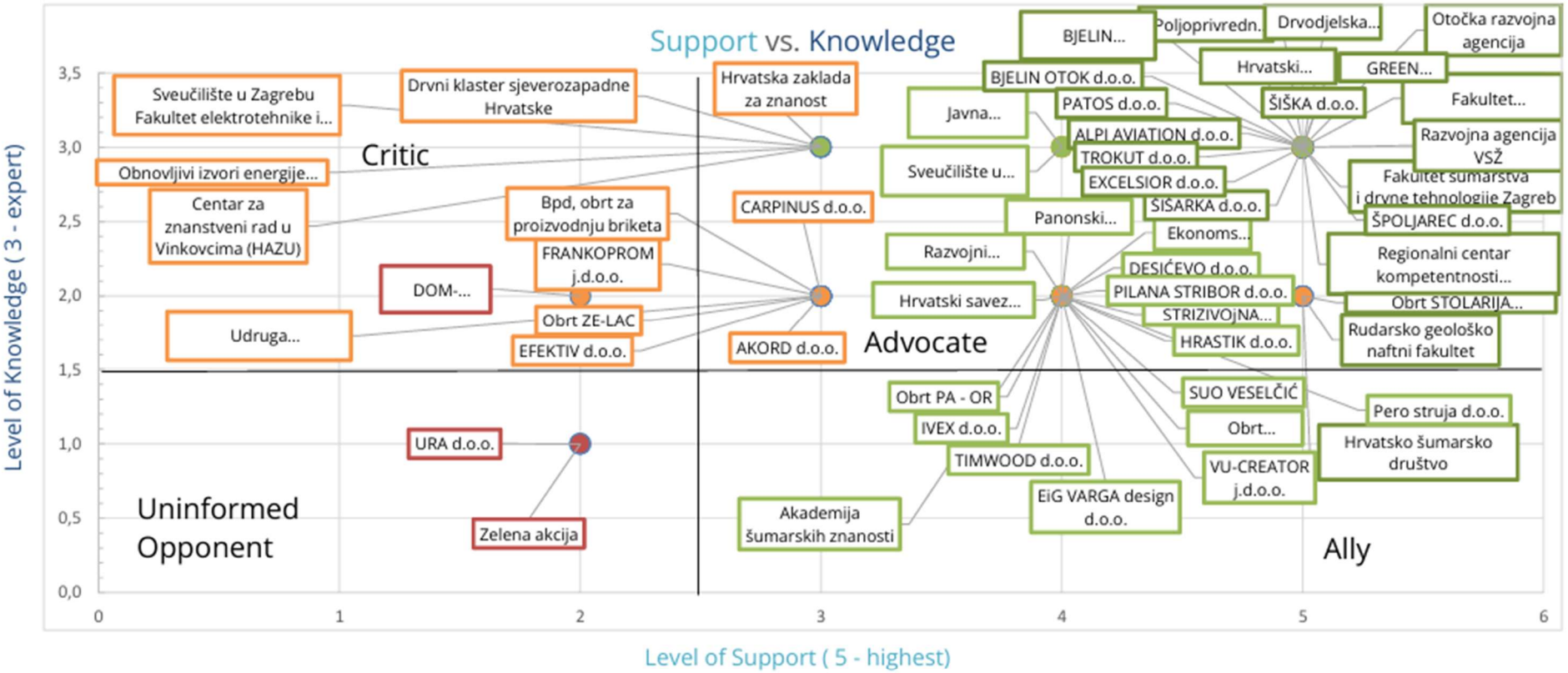








Mapped stakeholders - Croatia

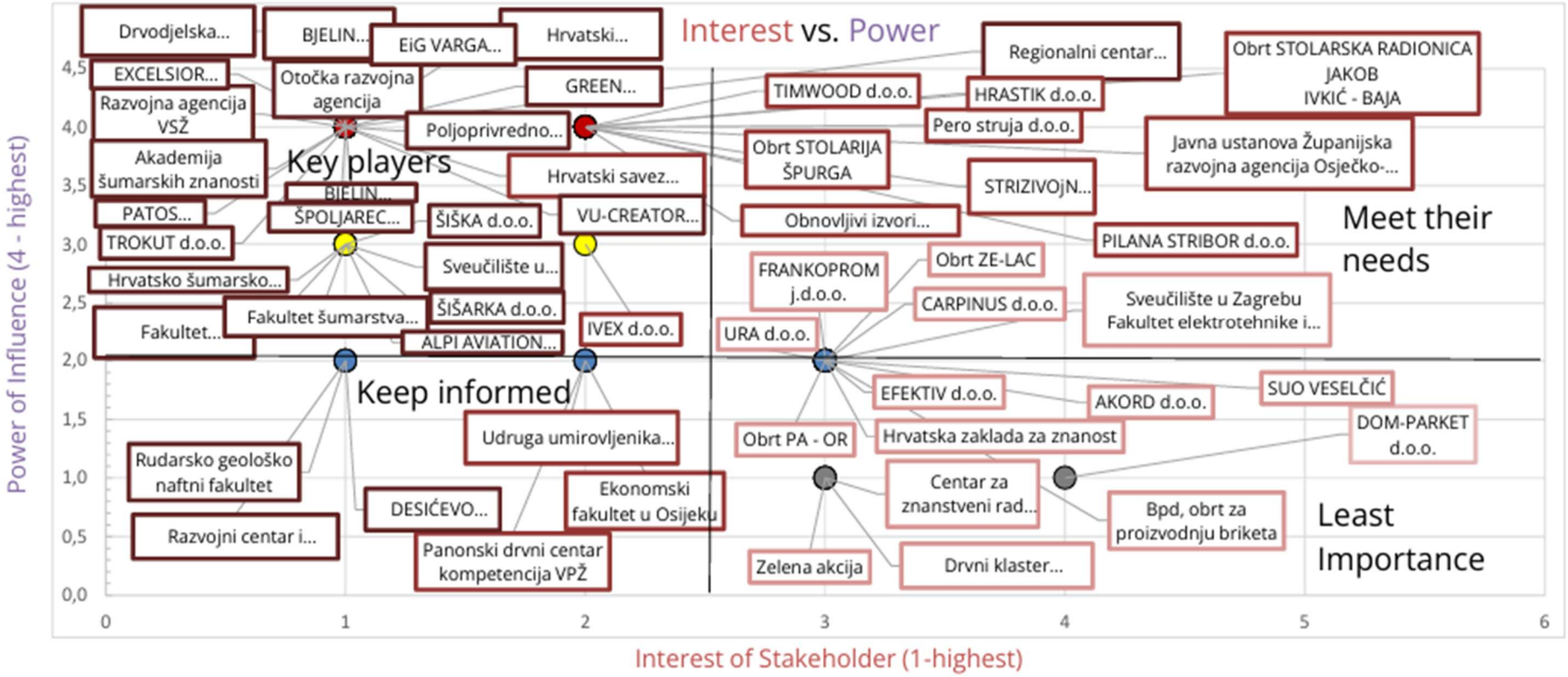


Legend

- Level of Knowledge - Expert
- Level of Knowledge - Familiar
- Level of Knowledge - Uninformed
- Level of Support - Actively supportive
- Level of Support - Somewhat supportive
- Level of Support - Neutral/ undecided
- Level of Support - Somewhat opposed
- Level of Support - Actively opposed

Top-Right Quadrant (High Support/High Knowledge): Advocates – Leverage their influence. **Top-Left Quadrant (Low Support/High Knowledge):** Critics – Engage and address their concerns. **Bottom-Right Quadrant (High Support/Low Knowledge):** Allies – Educate and involve them more. **Bottom-Left Quadrant (Low Support/Low Knowledge):** Uninformed Opponents – Consider how to inform or neutralize their influence.

Mapped stakeholders - Croatia



Legend

- Power of Influence - Key player
- Power of Influence - Meet their needs
- Power of Influence - Show Consideration
- Power of Influence - Least Important
- Interest of Stakeholder - Highest interest
- Interest of Stakeholder - Interested
- Interest of Stakeholder - Moderately interested
- Interest of Stakeholder - Slightly interested
- Interest of Stakeholder - Least interested

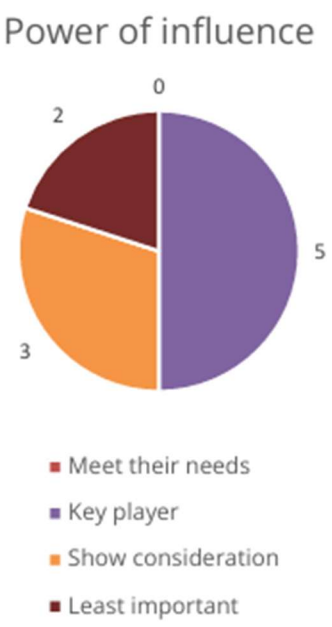
Top-Left Quadrant (High Interest/High Power): Key players – Leverage their influence. **Top-Right Quadrant (Low Interest/High Power):** Meet their needs – Engage and address their concerns. **Bottom-Left Quadrant (High Interest/Low Power):** Keep informed – Educate and involve them more. **Bottom-Right Quadrant (Low Interest/Low Power):** Least Importance – Consider how to inform or neutralize their influence.

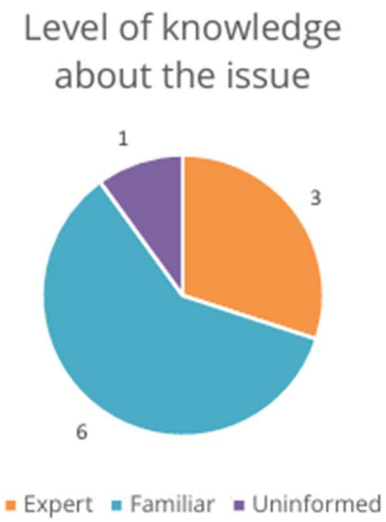
Mapped stakeholders - Austria

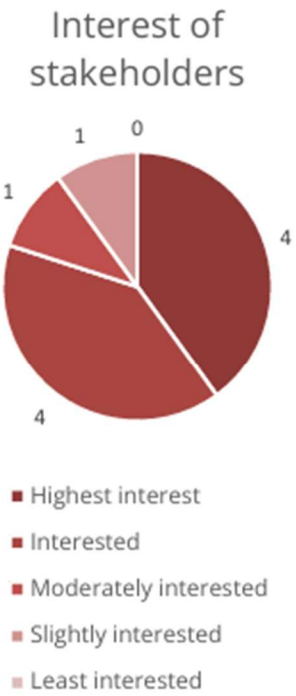
No	Institution	Name of the Person (responsible person / contact person)
1	HOLZCLUSTER SALZBURG	DI (FH) MATTHIAS JESSNER
2	SALZBURG UNIVERSITY OF APPLIED SCIENCES - DEPARTMENT GREEN ENGINEERING AND CIRCULAR DESIGN	ALEXANDER PETUTSCHNIGG
3	EDELZWEIG OG	BERNHARD LAPUSCH
4	BEYOND BENDING	DR. STEFAN PILLWEIN
5	INGENIEUR BÜRÖ MÖSL	BERNHARD MÖSL
6	TIMBERFREAKS GMBH	MAXIMILIAN PRISTOVNIK
7	SCHMIDHUBER RAUM	JOHANNES SPATZENEGGER
8	WEINBERGER HOLZ ABTENAU	JOHANN WEINBERGER
9	HT PLAN GBH	ALFRED VORDEREGGER
10	EBSTER HOLZBAU GMBH	MARTIN TRICKL

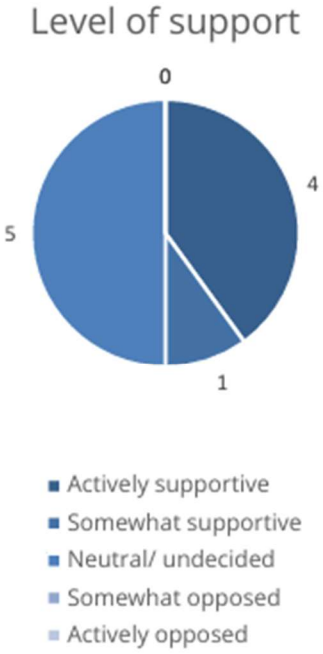
Average value by categorie		
Average interest of stakeholders	2	Interested
Average level of knowledge about issue	2	Familiar
Average level of support	4	Somewhat supportive

Mapped stakeholders - Austria

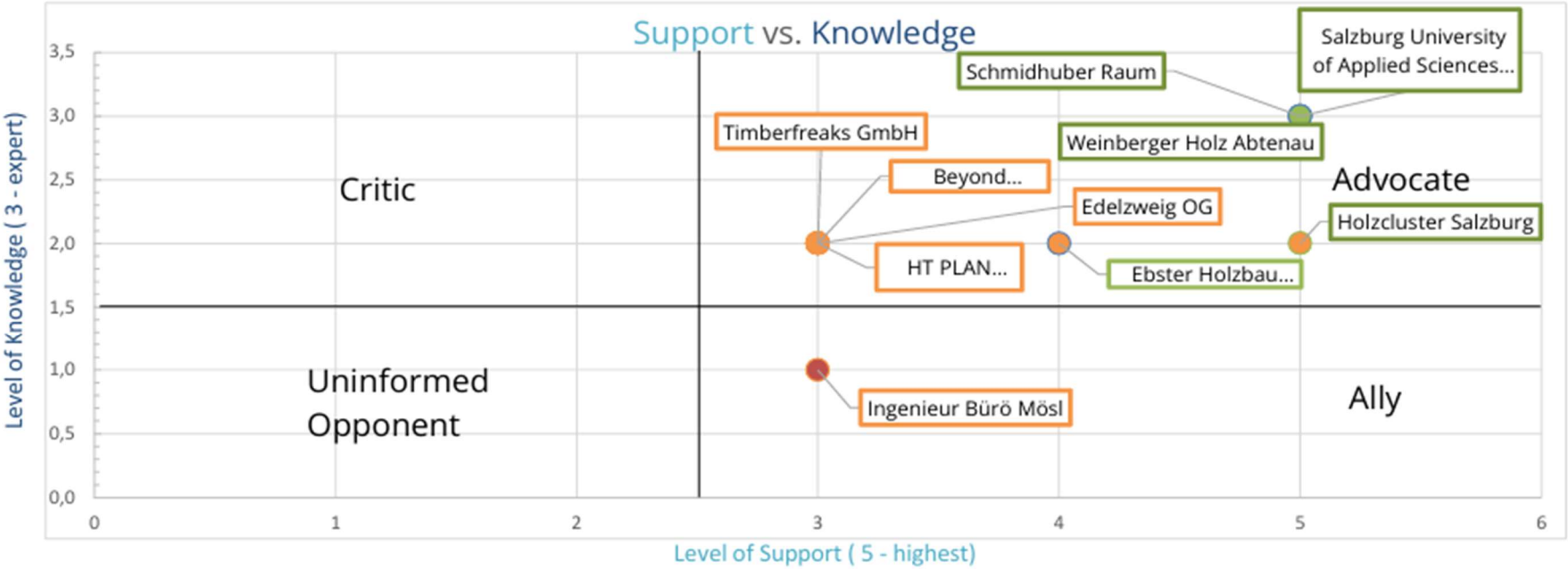








Mapped stakeholders - Austria

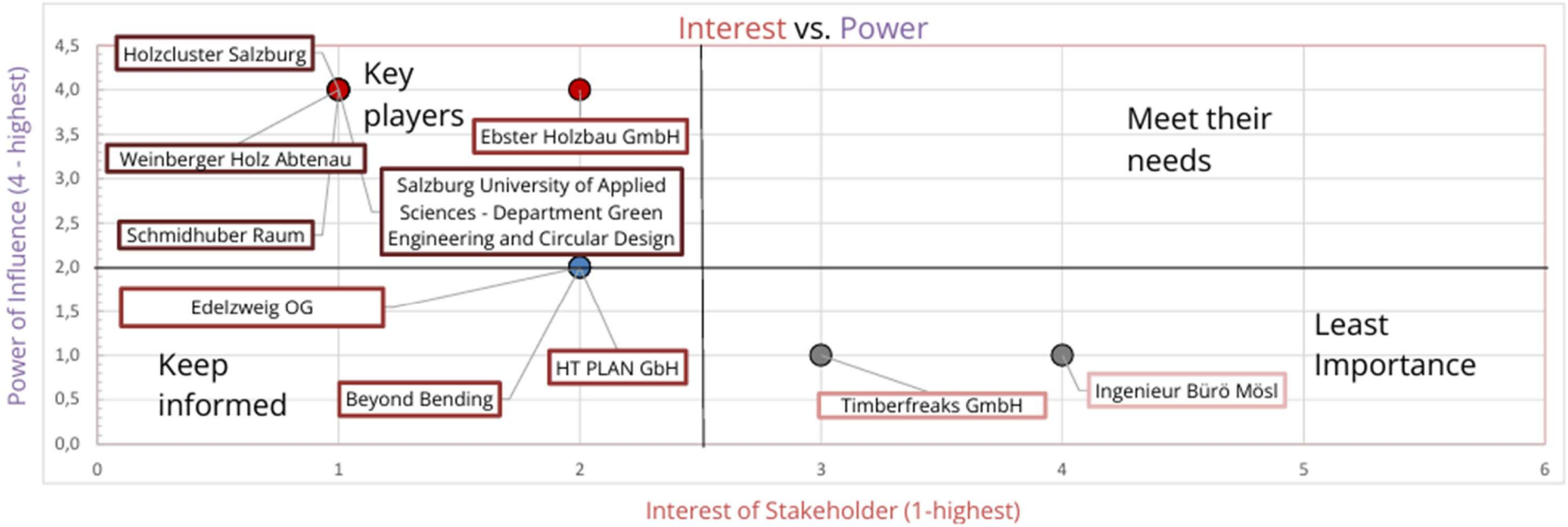


Legend

- Level of Knowledge - Expert
- Level of Knowledge - Familiar
- Level of Knowledge - Uninformed
- Level of Support - Actively supportive
- Level of Support - Somewhat supportive
- Level of Support - Neutral/ undecided
- Level of Support - Somewhat opposed
- Level of Support - Actively opposed

Top-Right Quadrant (High Support/High Knowledge): Advocates – Leverage their influence. **Top-Left Quadrant (Low Support/High Knowledge):** Critics – Engage and address their concerns. **Bottom-Right Quadrant (High Support/Low Knowledge):** Allies – Educate and involve them more. **Bottom-Left Quadrant (Low Support/Low Knowledge):** Uninformed Opponents – Consider how to inform or neutralize their influence.

Mapped stakeholders - Austria



Legend

- Power of Influence - Key player
- Power of Influence - Meet their needs
- Power of Influence - Show Consideration
- Power of Influence - Least Important
- Interest of Stakeholder - Highest interest
- Interest of Stakeholder - Interested
- Interest of Stakeholder - Moderately interested
- Interest of Stakeholder - Slightly interested
- Interest of Stakeholder - Least interested

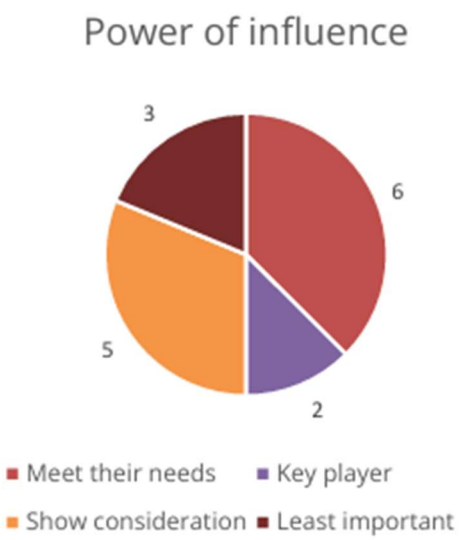
Top-Left Quadrant (High Interest/High Power): Key players – Leverage their influence. **Top-Right Quadrant (Low Interest/High Power):** Meet their needs – Engage and address their concerns. **Bottom-Left Quadrant (High Interest/Low Power):** Keep informed – Educate and involve them more. **Bottom-Right Quadrant (Low Interest/Low Power):** Least Importance – Consider how to inform or neutralize their influence.

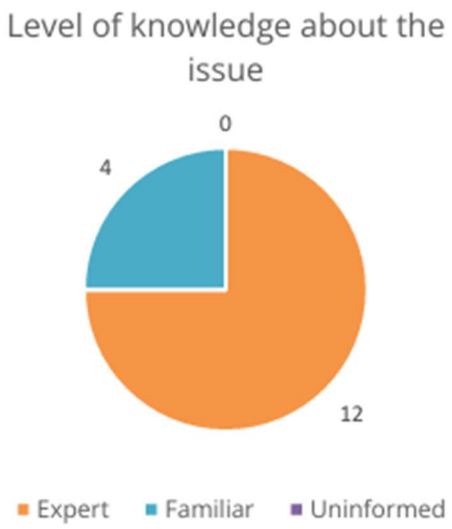
Mapped stakeholders - Romania

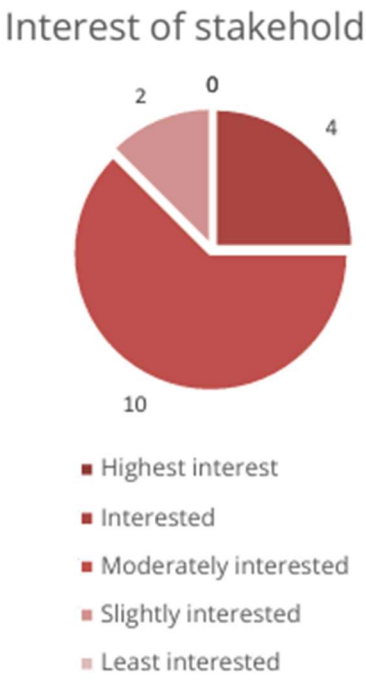
No	Institution	Name of the Person (responsible person / contact person)
1	APAPET - ASSOCIATION OF THE FOREST OWNERS AND MANAGERS FROM THE EAST OF TRANSYLVANIA	MELLES ELÖD
2	ASFOR - ROMANIAN FORESTERS ASSOCIATION	CIPRIAN - DUMITRU MUSCĂ
3	SAPIENTIA UNIVERSITY - FACULTY OF FORESTRY	DR. NÁHLIK ANDRÁS
4	TRANSILVANIA UNIVERSITY OF BRAŞOV - FACULTY OF SILVICULTURE AND FOREST ENGINEERING	DR. BOGDAN POPA
5	FORESTRY GUARD BRAȘOV (GARDA FORESTIERĂ BRAȘOV)	ING. NAGY DANIEL
6	TORNATOR LTD.	KOSY ZOLTÁN
7	FOREST OWNERS ASSOCIATION	ANDRÁS RÓBERT
8	TOFER LTD.	TÖRÖK FERENC
9	PRODUCȚIE ȘI PRESTĂRI ALEXANDER LTD.	GÓLICZA ZOLTÁN
10	CASARBOR LTD.	MANEA LIVIU
11	PAL-PRODEX LTD	PÁL GÁBOR
12	MONDOIMPEX LTD.	BAGOLY MIKLÓS - LEVENTE
13	FATIP LTD.	KÁDÁR REZSÖ
14	KAFOR COMPANY LTD.	ANDRÁS ALBERT
15	SELEMEN HOLZBAU LTD.	NEMES DÉNES- ZSOLT
16	WOOD MANAGEMENT LTD.	MIKLÓS ERVIN

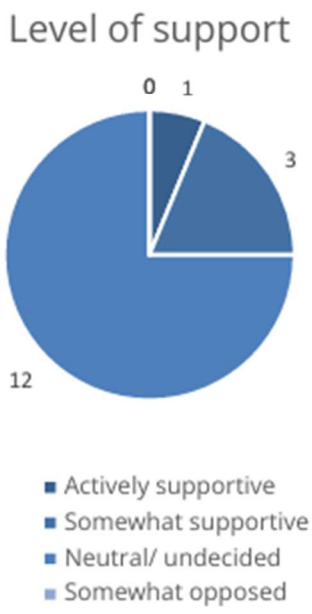
Average value by categorie		
Average interest of stakeholders	3	Moderately Interested
Average level of knowledge about issue	3	Expert
Average level of support	3	Neutral/undecided

Mapped stakeholders - Romania

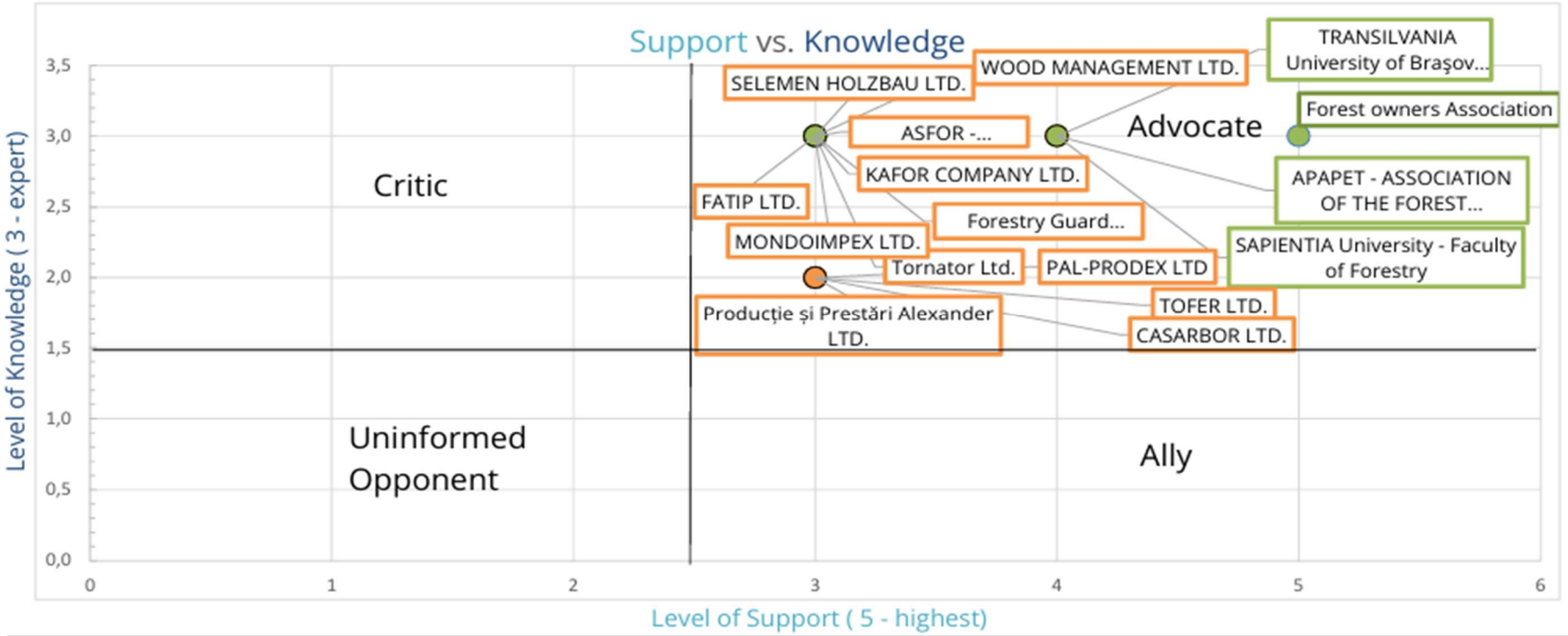








Mapped stakeholders - Romania

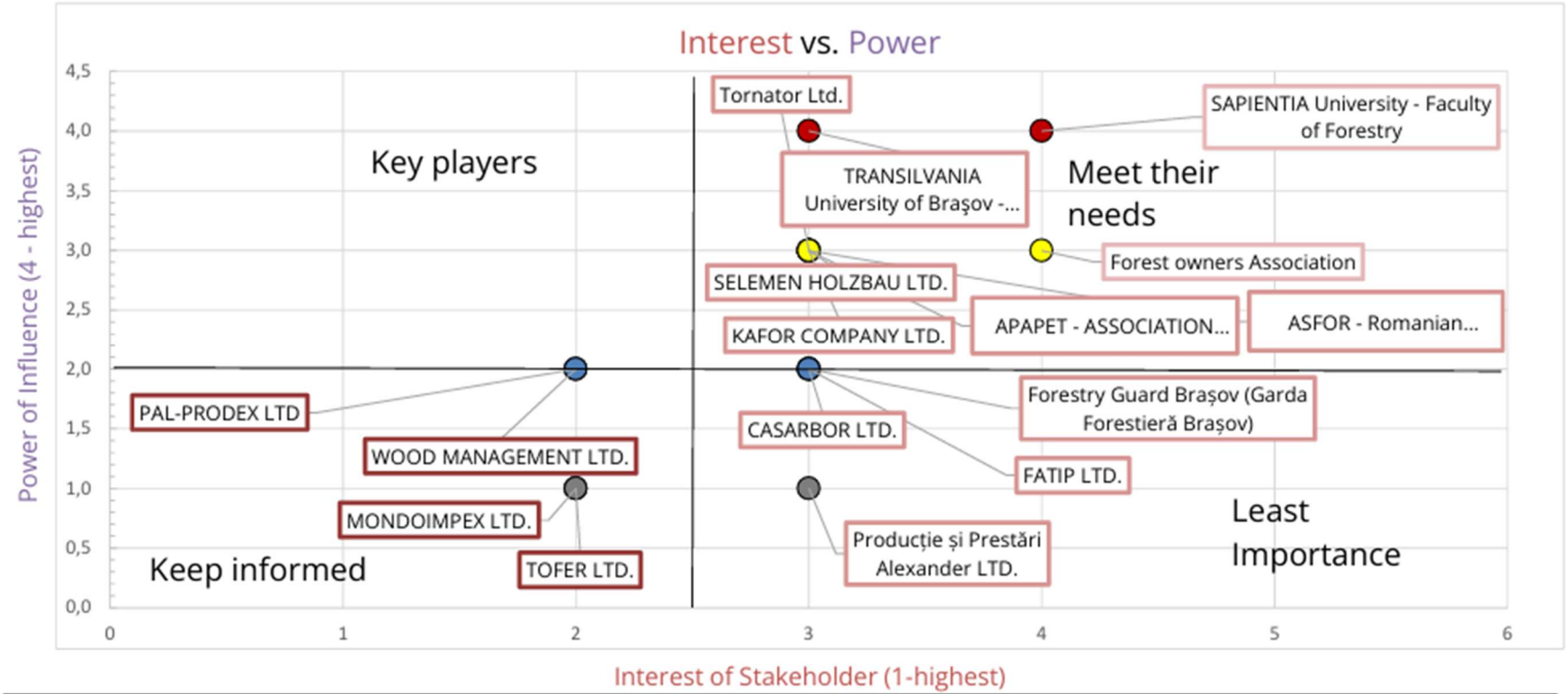


Legend

- Level of Knowledge - Expert
- Level of Knowledge - Familiar
- Level of Knowledge - Uninformed
- Level of Support - Actively supportive
- Level of Support - Somewhat supportive
- Level of Support - Neutral/ undecided
- Level of Support - Somewhat opposed
- Level of Support - Actively opposed

Top-Right Quadrant (High Support/High Knowledge): Advocates – Leverage their influence. **Top-Left Quadrant (Low Support/High Knowledge):** Critics – Engage and address their concerns. **Bottom-Right Quadrant (High Support/Low Knowledge):** Allies – Educate and involve them more. **Bottom-Left Quadrant (Low Support/Low Knowledge):** Uninformed Opponents – Consider how to inform or neutralize their influence.

Mapped stakeholders - Romania

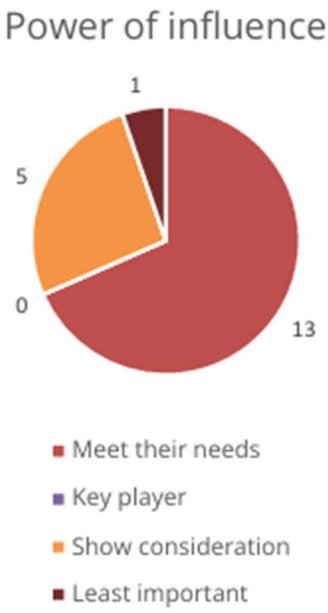


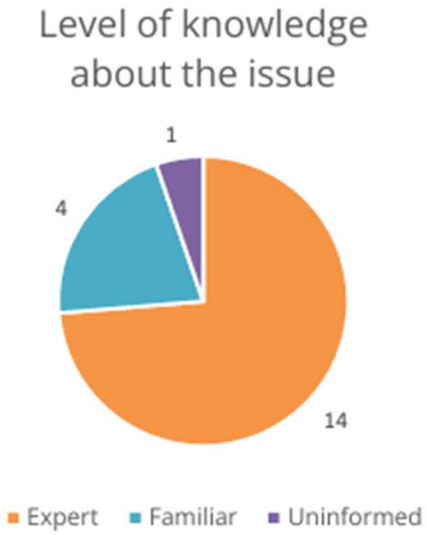
Mapped stakeholders - Slovenia

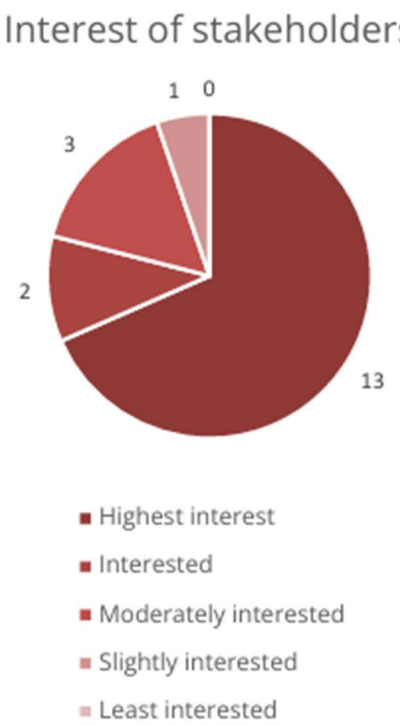
No	Institution	Name of the Person (responsible person / contact person)
1	MAO MUZEJ ZA ARHITEKTURO/CENTER ZA KREATIVNOST	ANJA ZORKO
2	FESTIVAL LESA Z.O.O.	META KAMŠEK
3	HOTENJKA D.O.O.	DAMJAN AHAČIČ
4	KNOF, SO.P.	MOJCA ŽGANEC METELKO
5	ZAVOD BIG SO.P.	ŽIVA NOVAK
6	DRUŠTVO OBLIKOVALCEV SLOVENIJE - ARDI	JURIJ DOBRILA
7	HIT PRELESS D.O.O.	JAKA PREGRAD
8	PODGORJE D.O.O.	DARKO ŠURINA
9	MARLES HIŠE D.O.O.	TADEJ GOSAK
10	ALPLES D.D.	FRANC TOLAR
11	TILA IE D.O.O.	GAL ZABUKOVEC
12	BOBIČ YACHT INTERIOR D.O.O.	JOŽE BOBIČ
13	GONZAGA-PRO D.O.O.	IZTOK BIZJAK
14	RIHTER D.O.O.	JANEZ RIHTER
15	MURALES, D.O.O.	ALBIN ŠKALIČ
16	MAREMICO, D.O.O.	MONIKA ADRINEK
17	GAŠPER TRŽENJE. D.O.O.	JURIJ GAŠPER
18	PLP, D.O.O.	DAMJAN LESJAK
19	BF	TOMAŽ KUŠAR

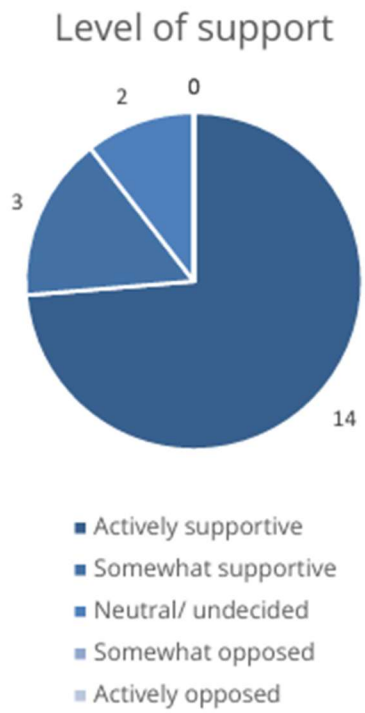
Average value by categorie		
Average interest of stakeholders	2	Interested
Average level of knowledge about issue	3	Expert
Average level of support	5	Actively supportive

Mapped stakeholders - Slovenia

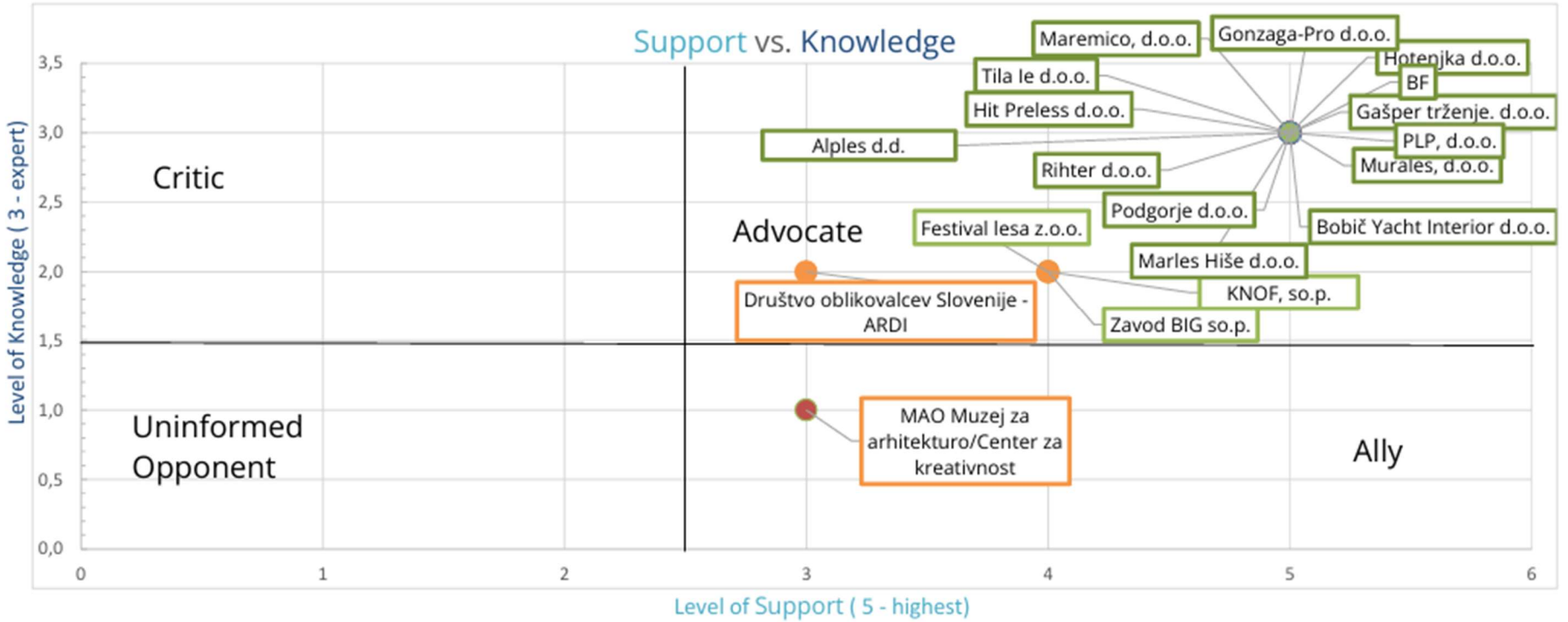








Mapped stakeholders - Slovenia

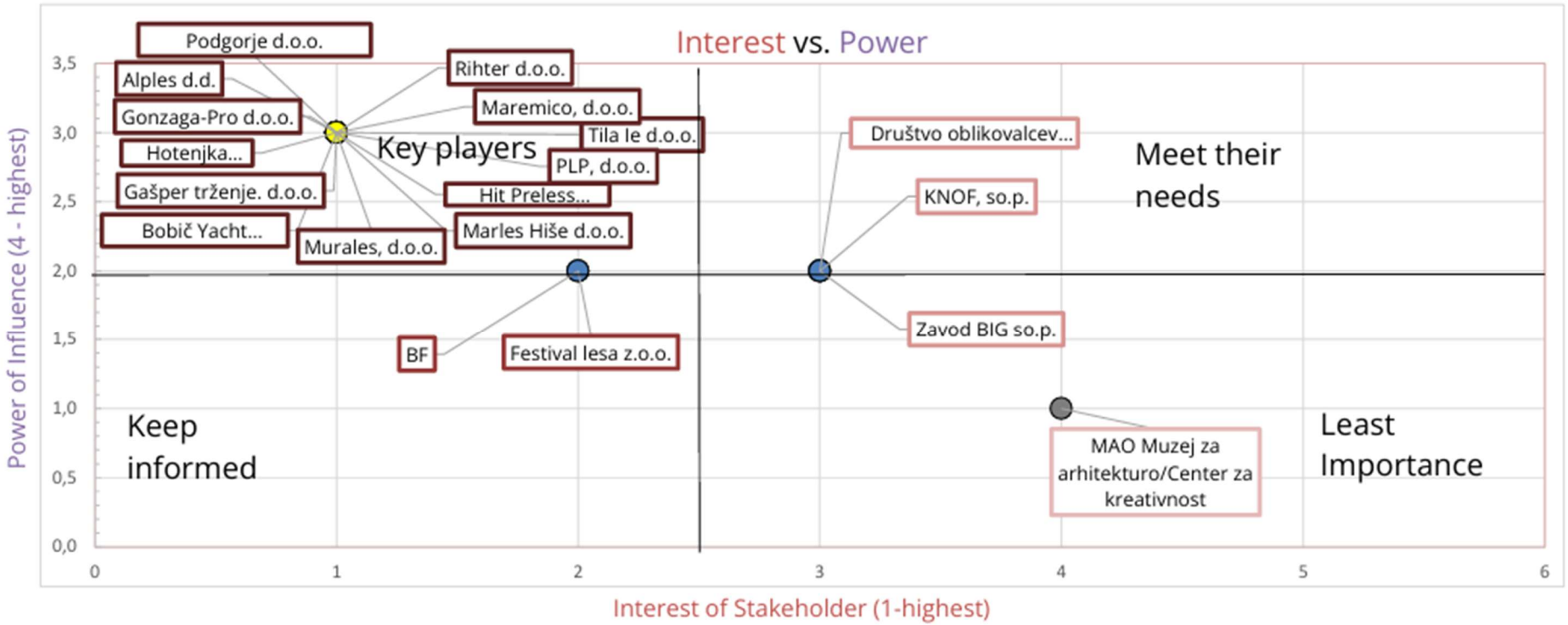


Legend

- Level of Knowledge - Expert
- Level of Knowledge - Familiar
- Level of Knowledge - Uninformed
- Level of Support - Actively supportive
- Level of Support - Somewhat supportive
- Level of Support - Neutral/ undecided
- Level of Support - Somewhat opposed
- Level of Support - Actively opposed

Top-Right Quadrant (High Support/High Knowledge): Advocates – Leverage their influence. **Top-Left Quadrant (Low Support/High Knowledge):** Critics – Engage and address their concerns. **Bottom-Right Quadrant (High Support/Low Knowledge):** Allies – Educate and involve them more. **Bottom-Left Quadrant (Low Support/Low Knowledge):** Uninformed Opponents – Consider how to inform or neutralize their influence.

Mapped stakeholders - Slovenia



Legend

- Power of Influence - Key player
- Power of Influence - Meet their needs
- Power of Influence - Show Consideration
- Power of Influence - Least Important
- Interest of Stakeholder - Highest interest
- Interest of Stakeholder - Interested
- Interest of Stakeholder - Moderately interested
- Interest of Stakeholder - Slightly interested
- Interest of Stakeholder - Least interested

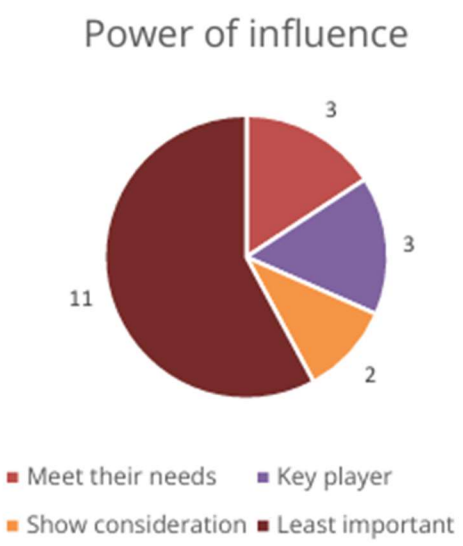
Top-Left Quadrant (High Interest/High Power): Key players – Leverage their influence. **Top-Right Quadrant (Low Interest/High Power):** Meet their needs – Engage and address their concerns. **Bottom-Left Quadrant (High Interest/Low Power):** Keep informed – Educate and involve them more. **Bottom-Right Quadrant (Low Interest/Low Power):** Least Importance – Consider how to inform or neutralize their influence.

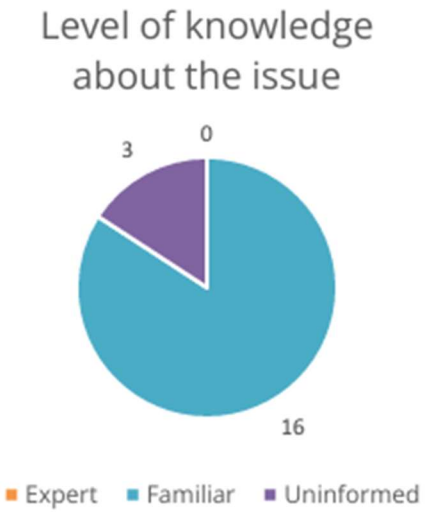
Mapped stakeholders - Hungary

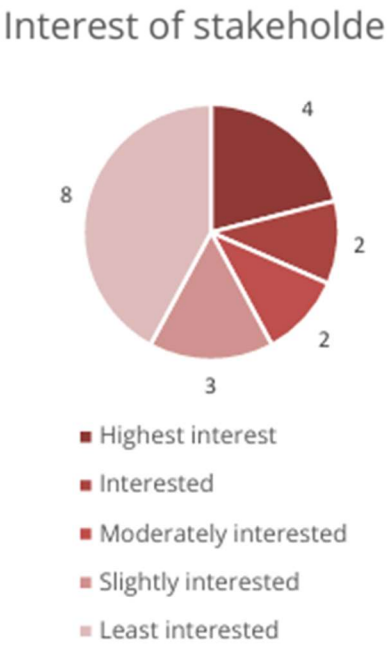
No	Institution	Name of the Person (responsible person / contact person)
1	AGRO-VARGA KFT	VARGA ZSOLT
2	BALÁZSBARRELS	NAGY BALÁZS
3	BARK BT.	LAMBERT EDIT
4	BAYER-CENTER KFT.	ZENTAI DIANA
5	BIOMASSZA KFT.	LENTI ÁKOS
6	DUPLEX ROTA KFT.	KECSKÉS PÉTER
7	FAKTUM BÚTOR KFT.	VAS MÁTÉ
8	FOREST SHR KFT.	KISS GYULA ISTVÁN
9	GYURASICS KFT.	GYURASICS JÓZSEF
10	HORVÁTH BALÁZS E.V.	HORVÁTH BALÁZS
11	KRONOSPAN MOFA	IGOR ILIC
12	MECSEKERDŐ ZRT.	RIPSZÁM ISTVÀN
13	NE BÁNTSD AZ ERDŐT EGYESÜLET	KISS GYULA ISTVÁN
14	REVOTICA MATRAC ÉS BÚTORGYÁR	BENEDEK GÁBOR
15	SCHROTH ÉS FIA MŰHELY	SCHROTH ZOLTÁN
16	SEFAG ZRT.	BOGDÁN BALÁZS
17	SELLA&DECOR KFT.	HORVÁTHNÉ NÁDASDI VERONIKA
18	SZABÓ BÚTOR KFT.	SZABÓ GÁBOR
19	TRUST HUNGARY ZRT.	SZAKÁCS KRISZTIÁN

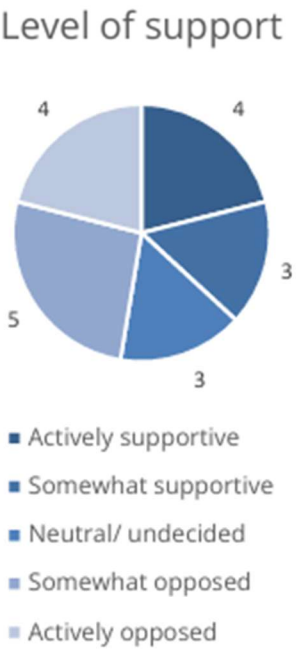
Average value by categorie		
Average interest of stakeholders	3	Moderately Interested
Average level of knowledge about issue	2	Familiar
Average level of support	3	Neutral/undecided

Mapped stakeholders - Hungary

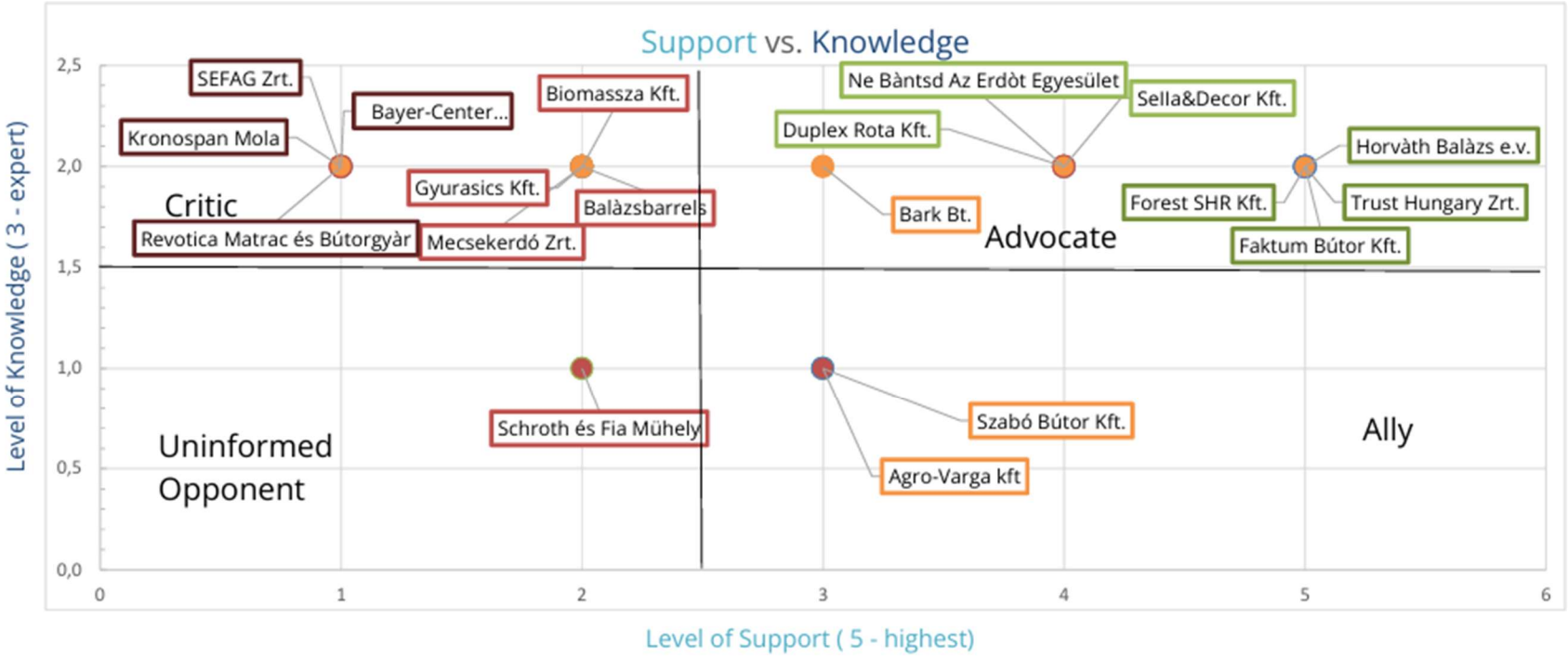








Mapped stakeholders - Hungary

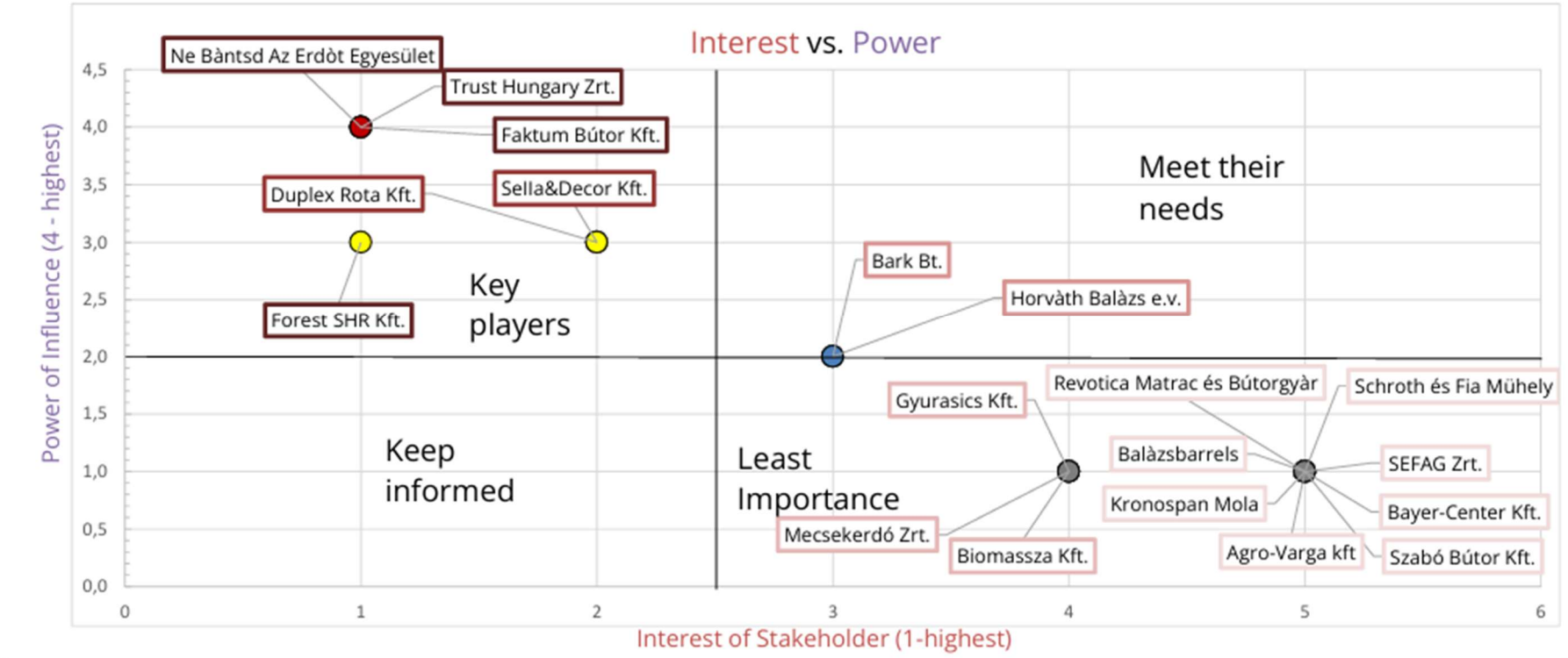


Legend

- Level of Knowledge - Expert
- Level of Knowledge - Familiar
- Level of Knowledge - Uninformed
- Level of Support - Actively supportive
- Level of Support - Somewhat supportive
- Level of Support - Neutral/ undecided
- Level of Support - Somewhat opposed
- Level of Support - Actively opposed

Top-Right Quadrant (High Support/High Knowledge): Advocates – Leverage their influence. **Top-Left Quadrant (Low Support/High Knowledge):** Critics – Engage and address their concerns. **Bottom-Right Quadrant (High Support/Low Knowledge):** Allies – Educate and involve them more. **Bottom-Left Quadrant (Low Support/Low Knowledge):** Uninformed Opponents – Consider how to inform or neutralize their influence.

Mapped stakeholders - Hungary



Legend

- Power of Influence - Key player
- Power of Influence - Meet their needs
- Power of Influence - Show Consideration
- Power of Influence - Least Important
- Interest of Stakeholder - Highest interest
- Interest of Stakeholder - Interested
- Interest of Stakeholder - Moderately interested
- Interest of Stakeholder - Slightly interested
- Interest of Stakeholder - Least interested

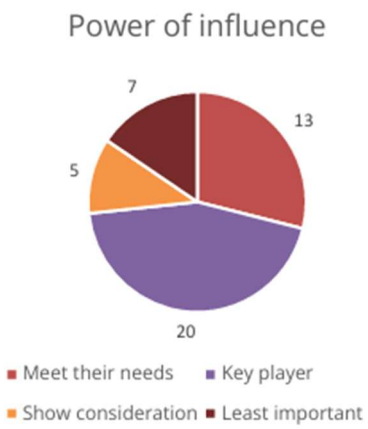
Top-Left Quadrant (High Interest/High Power): Key players – Leverage their influence. **Top-Right Quadrant (Low Interest/High Power):** Meet their needs – Engage and address their concerns. **Bottom-Left Quadrant (High Interest/Low Power):** Keep informed – Educate and involve them more. **Bottom-Right Quadrant (Low Interest/Low Power):** Least Importance – Consider how to inform or neutralize their influence.

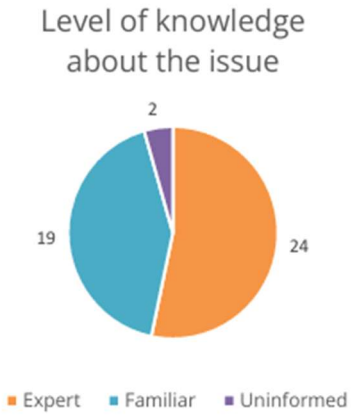
Mapped stakeholders - Bulgaria

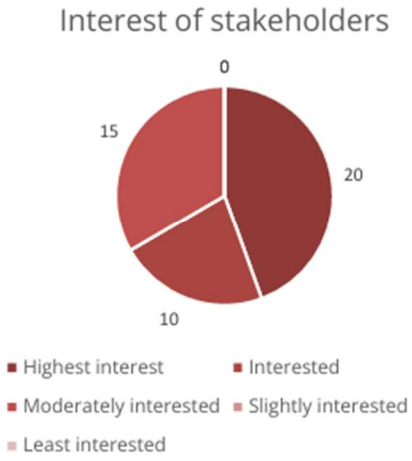
No	Institution	Name of the Person (responsible Person / contact person)
1	BULGARIAN SME PROMOTION AGENCY	DR. BOYKO TAKOV
2	BULGARIAN BRANCH CHAMBER OF WOODWORKING AND FURNITURE INDUSTRY	DANIELA PETROVA
3	BULGARIAN CHAMBER OF COMMERCE AND INDUSTRY	TSVETAN SIMEONOV
4	CLEANTECH BULGARIA	MARIYANA HAMANOVA
5	SOFIA TECH PARK	TODOR MLADENOV
6	ESG ACADEMY - SOFIA UNIVERSITY	ASSOC. PROF. PHD MARIANA
7	LEAN INSTITUTE BULGARIA	VASIL PETROV
8	UNIVERSITY OF FORESTRY, DEPARTMENT OF INTERIOR AND FURNITURE DESIGN	PROF. PHD VASIL JIVKOV
9	UNIVERSITY OF NATIONAL AND WORLD ECONOMY, INSTITUTE OF INTELLECTUAL PROPERTY AND TECHNOLOGY TRANSFER "PROF. DR. BORISLAV BORISOV"	DR. IVAN NACHEV
10	TECHNICAL UNIVERSITY, DEPARTMENT OF ECONOMICS, INDUSTRIAL ENGINEERING AND MANAGEMENT	ASSOC. PROF. PHD GERGANA HRISTOVA
11	MONTANA REGIONAL ADMINISTRATION	ENG. KALIN HAITOV
12	CLEANTECH BULGARIA	JOANNA KOLEVA
13	JUNIOR ACHIEVEMENT BULGARIA	IRINA ILIEVA
14	BRAIT - BULGARIAN EMPLOYER'S ASSOCIATION INNOVATIVE TECHNOLOGIES	DOBROSLAV DIMITROV
15	BULGARIAN INDUSTRIAL ASSOCIATION	DOBRI MITAREV
16	BULGARIAN INDUSTRIAL CAPITAL ASSOCIATION	VASIL VELEV
17	DIBLA ASSOCIATION	GENCHO GOEV
18	BCC-95 LTD.	KRASIMIRA PETROVA
19	ESTE MEBELI LTD.	SVETOSLAV TERZIJSKI
20	MEBELI DIMOV LTD.	PAVEL DIMOV
21	K2 LTD.	IVAN MILEV
22	ACADO LTD.	MIHAIL ZAHARIEV
23	KRONOSPAN BULGARIA LTD.	BLAGOVESTA DIMENCHEVA
24	VALIAN LTD.	VALENTIN GEORGIEV
25	LAMINA LTD.	NIKOLAJ CHERKEZOV
26	TED BED JSC	FILIP PUHALEV
27	TRABNA MEBEL LTD.	GALIN GOSPODINOV
28	DZHANO LTD.	STOJKA GLUSHKOVA
29	NIKI LTD.	MIGLENA KOPCHEVA
30	LIGNA GROUP LTD.	ANELIA KASSABOVA
31	STUDIO MOUSTACHE LTD.	BORIANA RADENKOVA
32	HERALD LTD.	EVGENI KAZAKOV
33	IKIS SI LTD.	FILIP SHKEMBOV
34	LIGNATER LTD.	VELIZAR KOPCHEV
35	MATRAX JSC.	MARIO TALVI
36	FANTASTIKO MEBEL LTD.	ANGEL NEDELCHEV
37	MIG LTD	DIANA BILYAROVA
38	MATERIA LTD.	VESELIN STOEV
39	DECENS PLUS LTD.	GENCHO GOEV
40	TERASTONE LTD.	IVO MICHEV
41	IMPACT NEST	GALINA VUCHEVA
42	QUARKXR	KRASIMIR NIKOLOV
43	STUDIO BLEND	MIHAIL KONSTANTINOV
44	MINISTRY OF INNOVATION AND GROWTH	ROSEN KARADIMOV
45	MINISTRY OF ECONOMY	PETKO NIKOLOV

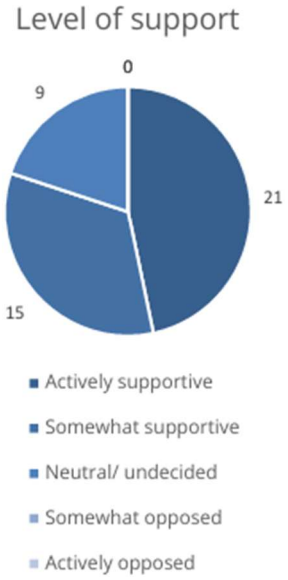
Mapped stakeholders - Bulgaria

Average value by categorie		
Average interest of stakeholders	2	Interested
Average level of knowledge about issue	2	Familiar
Average level of support	4	Somewhat supportive

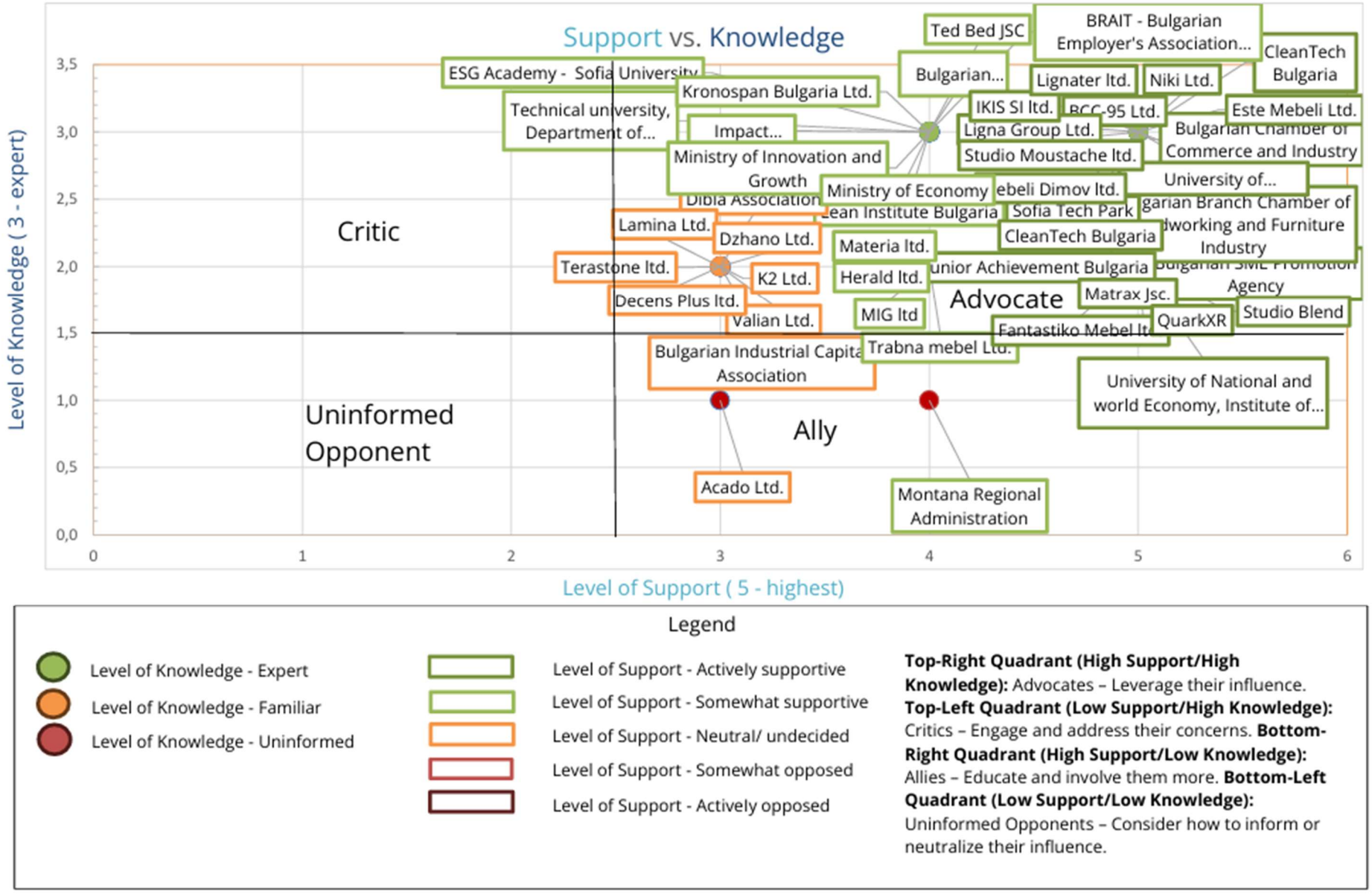








Mapped stakeholders - Bulgaria

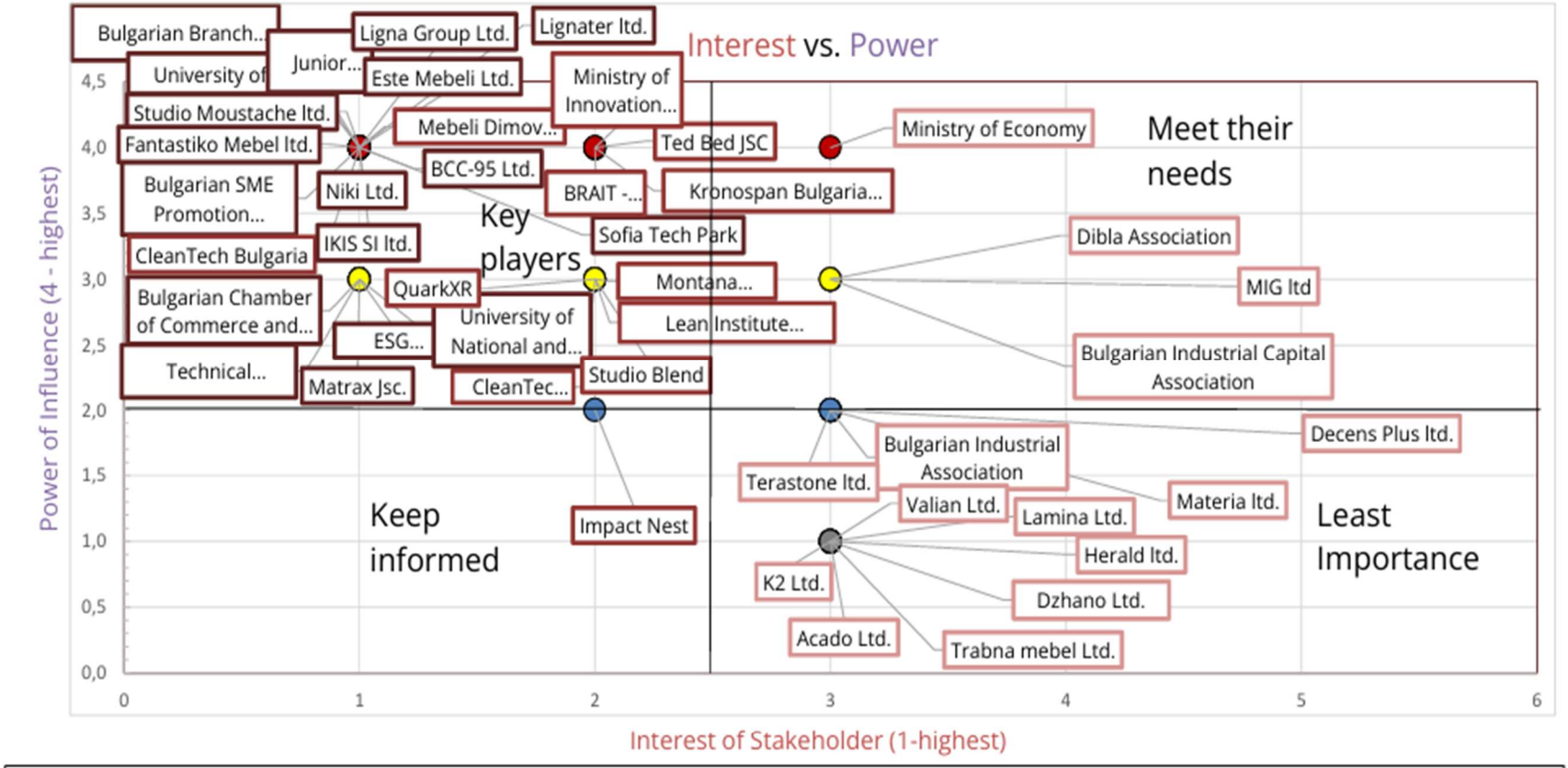


Legend

- Level of Knowledge - Expert
- Level of Knowledge - Familiar
- Level of Knowledge - Uninformed
- Level of Support - Actively supportive
- Level of Support - Somewhat supportive
- Level of Support - Neutral/ undecided
- Level of Support - Somewhat opposed
- Level of Support - Actively opposed

Top-Right Quadrant (High Support/High Knowledge): Advocates – Leverage their influence. **Top-Left Quadrant (Low Support/High Knowledge):** Critics – Engage and address their concerns. **Bottom-Right Quadrant (High Support/Low Knowledge):** Allies – Educate and involve them more. **Bottom-Left Quadrant (Low Support/Low Knowledge):** Uninformed Opponents – Consider how to inform or neutralize their influence.

Mapped stakeholders - Bulgaria



Legend

- Power of Influence - Key player
- Power of Influence - Meet their needs
- Power of Influence - Show Consideration
- Power of Influence - Least
- Interest of Stakeholder - Highest interest
- Interest of Stakeholder - Interested
- Interest of Stakeholder - Moderately interested
- Interest of Stakeholder - Slightly interested
- Interest of Stakeholder - Least interested

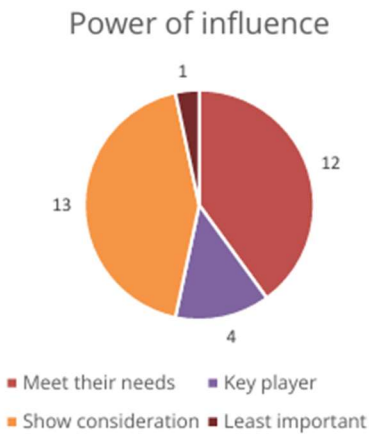
Top-Left Quadrant (High Interest/High Power): Key players – Leverage their influence. **Top-Right Quadrant (Low Interest/High Power):** Meet their needs – Engage and address their concerns. **Bottom-Left Quadrant (High Interest/Low Power):** Keep informed – Educate and involve them more. **Bottom-Right Quadrant (Low Interest/Low Power):** Least Importance – Consider how to inform or neutralize their influence.

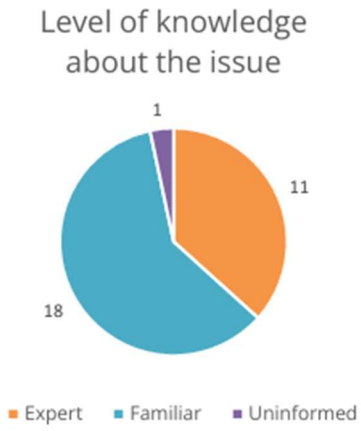
Mapped stakeholders - Czech Republic

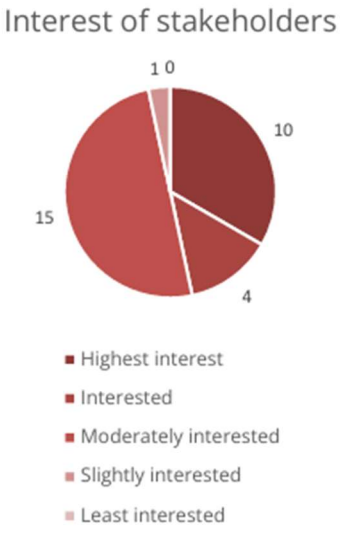
No	Institution	Name of the Person (responsible person / contact person)
1	ATRIUM, S.R.O.	sluka@atrium.cz
2	BENLEMI S.R.O.	Michal Pomp/michal.pomp@benlemi.cz
3	BLANÁR NÁBTEK, A.S.	Roman Blanar/roman.blanar@blanar.cz
4	DREVODÍLO ROUSÍNOV, VÝROBNÍ DRUŽSTVO	Michal Navrátil/michal.navratil@drevodilo.cz
5	DREVOJAS, VÝROBNÍ DRUŽSTVO	Zdeněk Blažek/blazek@drevojas.cz
6	DREVOTVAR.COM DRUŽSTVO	Radek Brychta/radek@brychta.org
7	DREVOTVAR DRUŽSTVO, JABLONNÉ NAD ORLICÍ	Martin Beran/martin.beran@drevotvar.cz
8	DČEVOZPRACUJÍCÍ DRUŽSTVO LUKAVEC	David Roll/roll@ddl.cz
9	EMBRE, S.R.O.	Jaroslav Pehal/jaroslavpehal@embre.cz
10	FLÖTOTTO	Jaroslava Bečváčová/jaroslava.becvarova@floetotto.cz
11	GERBRICH S.R.O.	info@gerbrich.com
12	GRENA, A.S.	Jan Ficek/ficek@grena.cz
13	INTERIORS MANUFACTURE & DESIGN A.S.	Luboš Červený/lubos.cerveny@nteriors-mnd.com
14	KLAUS TIMBER A.S.	Vaclav Motejzik/vaclav.motejzik@klaustimber.cz
15	LARIX-TOZ	Renata Prokopiusova/renata.prokopiusova@larix-toz.cz
16	NADOP- VÝROBA NÁBYTKU, A.S.	Jan Pehal/janpehal@nadop.cz
17	PFEIFER HOLZ S.R.O.	Vendula Motejzikova/Vendula.motejzikova@pfeifergroup.com
18	VEGA FURNITURE	Iveta Strnadová/ivetastrnadova@vega.cz
19	VLABO, S.R.O.	Vladimir Petr/vladimir.pet@vlabo.cz
20	WILDCROC	support@wildcroc.cz
21	WOOD4EVER, S.R.O.	Monika Slabá/monika.slaba@wood4ever.cz
22	UDESIGN	info@udesign.cz
23	MENDEL UNIVERSITY IN BRNO	Milan Gall/milan.gaff@mendelu.cz
24	CEDEG, Z.S.	Ivo Říha/riha@cedeg.eu
25	VÚTS, A.S.	Jaromír Ficek/info.vuts@vuts.cz
26	REDAMP SECURITY S.R.O.	Dominik Malčík/hello@redamp.io
27	CERMITECH SPOL. S R.O.	Jan KožíšekY/info@cermitech.com
28	AGERIT S.R.O.	Michal Kamas/kamas@agerit.cz
29	CZECHINVEST	Pavlina Slepickova/Pavlina.Slepickova@czechinvest.org
30	MINISTRY OF INDUSTRY AND TRADE	Katečina Píclová/piclova@mpo.cz

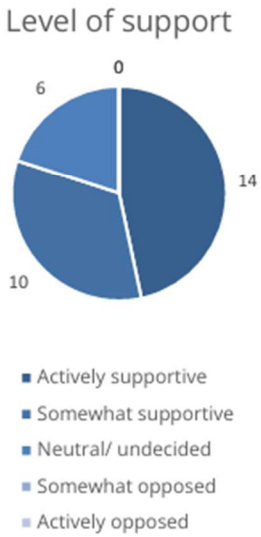
Mapped stakeholders - Czech Republic

Average value by categorie		
Average interest of stakeholders:	2	Interested
Average level of knowledge about issue:	2	Familiar
Average level of support:	4	Somewhat supportive

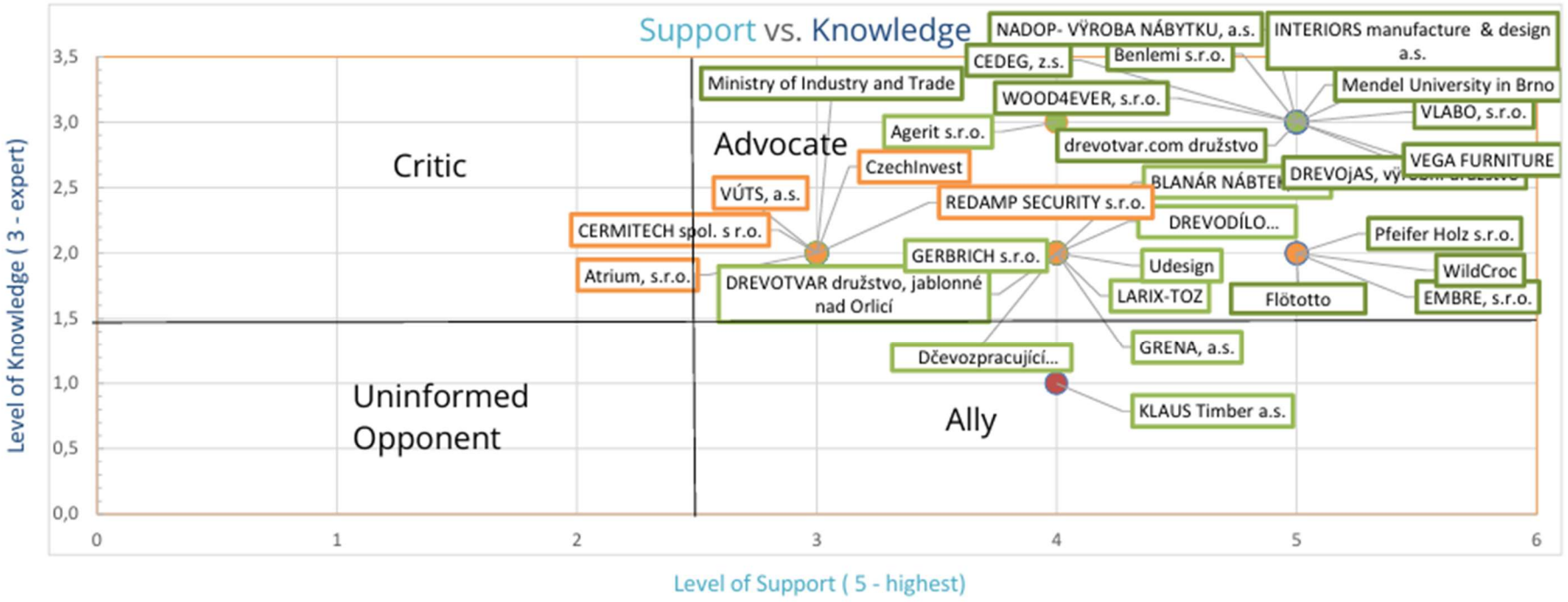








Mapped stakeholders - Czech Republic



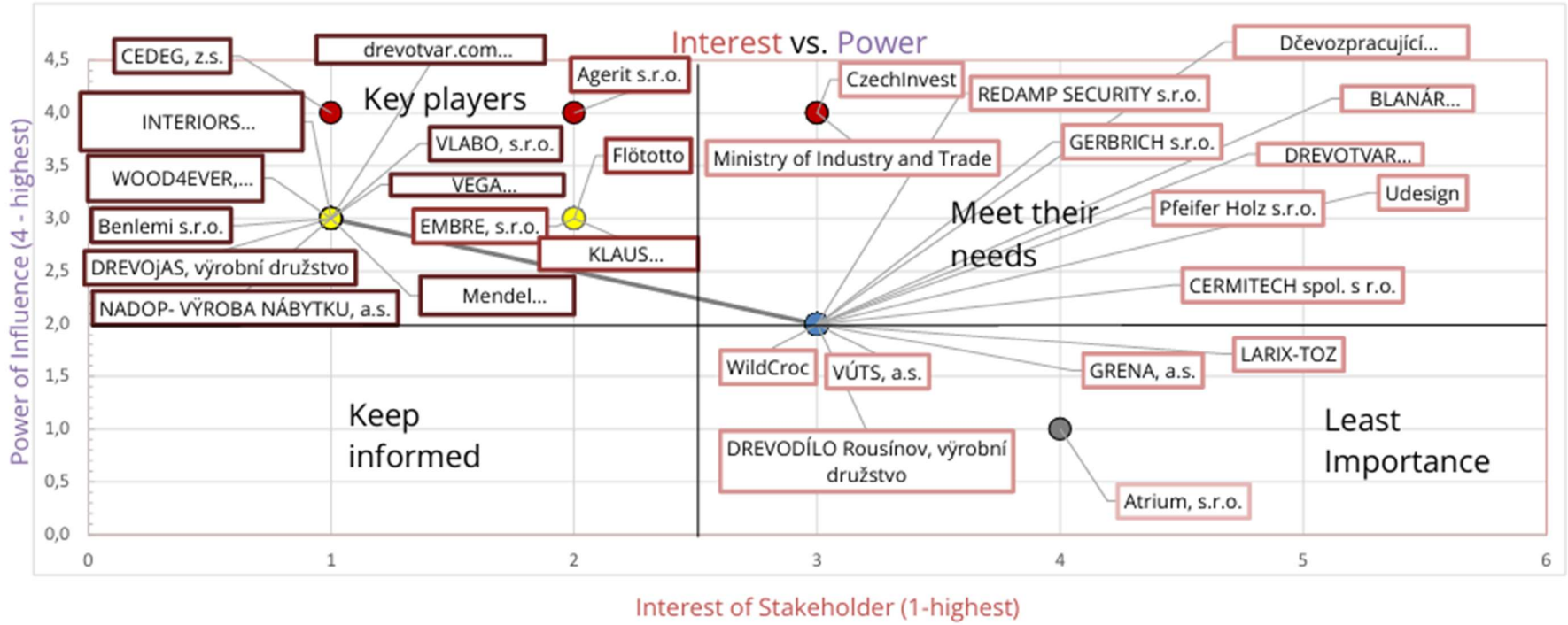
Legend

- Level of Knowledge - Expert
- Level of Knowledge - Familiar
- Level of Knowledge - Uninformed

- Level of Support - Actively supportive
- Level of Support - Somewhat supportive
- Level of Support - Neutral/ undecided
- Level of Support - Somewhat opposed
- Level of Support - Actively opposed

Top-Right Quadrant (High Support/High Knowledge): Advocates – Leverage their influence. **Top-Left Quadrant (Low Support/High Knowledge):** Critics – Engage and address their concerns. **Bottom-Right Quadrant (High Support/Low Knowledge):** Allies – Educate and involve them more. **Bottom-Left Quadrant (Low Support/Low Knowledge):** Uninformed Opponents – Consider how to inform or neutralize their influence.

Mapped stakeholders - Czech Republic



Legend

- Power of Influence - Key player
- Power of Influence - Meet their needs
- Power of Influence - Show Consideration
- Power of Influence - Least Important
- Interest of Stakeholder - Highest interest
- Interest of Stakeholder - Interested
- Interest of Stakeholder - Moderately interested
- Interest of Stakeholder - Slightly interested
- Interest of Stakeholder - Least interested

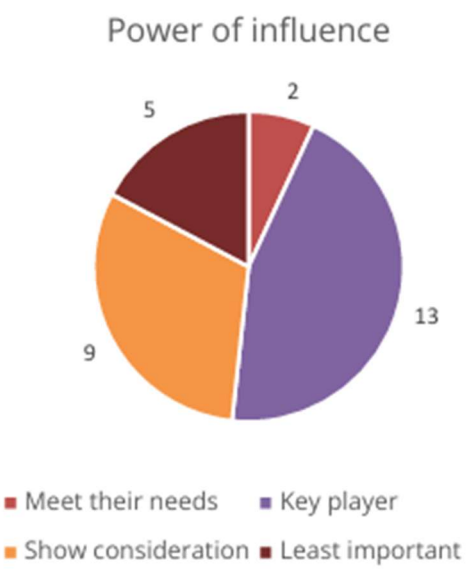
Top-Left Quadrant (High Interest/High Power): Key players – Leverage their influence. **Top-Right Quadrant (Low Interest/High Power):** Meet their needs – Engage and address their concerns. **Bottom-Left Quadrant (High Interest/Low Power):** Keep informed – Educate and involve them more. **Bottom-Right Quadrant (Low Interest/Low Power):** Least Importance – Consider how to inform or neutralize their influence.

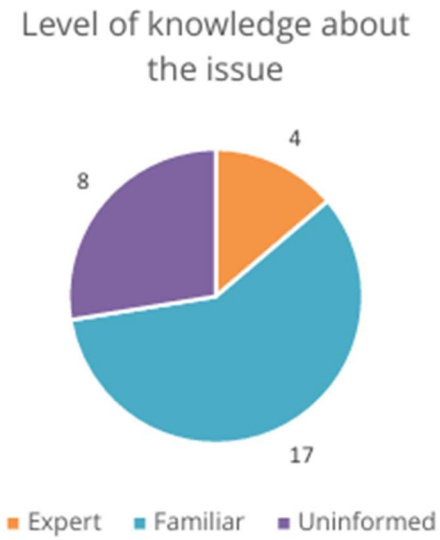
Mapped stakeholders - Serbia

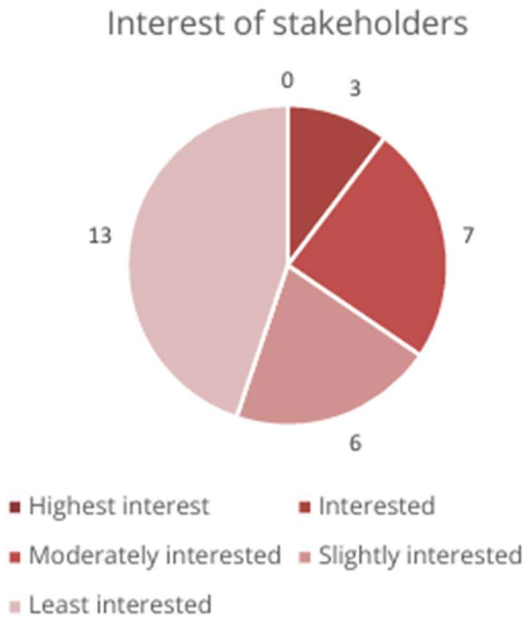
No	Institution	Name of the Person (responsible person / contact person)
1	KEYIT	RADOVAN OSTOJIĆ
2	VEDELT	ANA MIJAČIĆ
3	TARKETT D.O.O.	DRAGAN NIKOLIĆ
4	MATIS D.O.O.	RAŠKO KODŽOPELJIĆ
5	LIGNUMTECH	BRATISLAV BOJOVIĆ
6	PINOLES D.O.O	VLADIMIR ČAPRIĆ
7	FORMA IDEALE D.O.O.	ALEKSANDAR PANTOVIĆ
8	MEGA DRVO	STEFAN OSTOJIĆ
9	ENTERIJERPRO	DRAGOLJUB IVKOVIĆ
10	ENTERIJER JANKOVIĆ	BILJANA VUČINIĆ
11	DIPO D.O.O.	BOJAN BABOČADIĆ
12	NIGOS ELECTRONIK	MILOŠ DINIĆ
13	ZOV COMMERCE D.O.O.	DRAGAN OSTOJIĆ
14	ARTINVEST D.O.O.	DEJAN JAJIĆ
15	TOP TECH WOODWORKING	PREDRAG OURDEVIĆ
16	PKS — SERBIAN CHANBER COMMERCE	NATAŠA GOVEDARICA
17	STANDAR FURNITURE	MIODRAG PEROVIĆ
18	TRGOPROMET	DRAGAN LEPOSAVIĆ
19	MICRO TRI	IRINA MATIĆ
20	DRVOKOMPANI ĐORDEVIĆ	ALEKSANDAR ĐORĐEVIĆ
21	GIR D.O.O.	BOGDAN BUKARA
22	SAVOX GROUP	SLAVIŠA LUKIĆ
23	GINKO D.O.O.	MILOMIR ZIRIKOVIĆ
24	SIMPO	SAŠA POPOVIĆ
25	KRONOŠPAN	LANA MOŠIĆ
26	IKEA	MLADEN GRKOVIĆ
27	VLADIVA	DOBRICA ŽIVANČEVIĆ
28	UNIVERSITY OF BELGRADE FACULTY OF FORESTRY	GORAN MILIĆ
29	UNIVERSITY OF BELGRADE FACULTY OF MECHANICAL ENGINEERING	ŽIVANA JAKOVLJEVIĆ

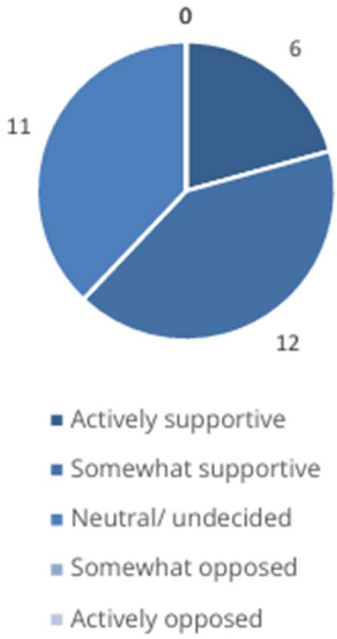
Average value by categorie		
Average interest of stakeholders	4	Slightly Interested
Average level of knowledge about issue	2	Familiar
Average level of support	4	Somewhat supportive

Mapped stakeholders - Serbia

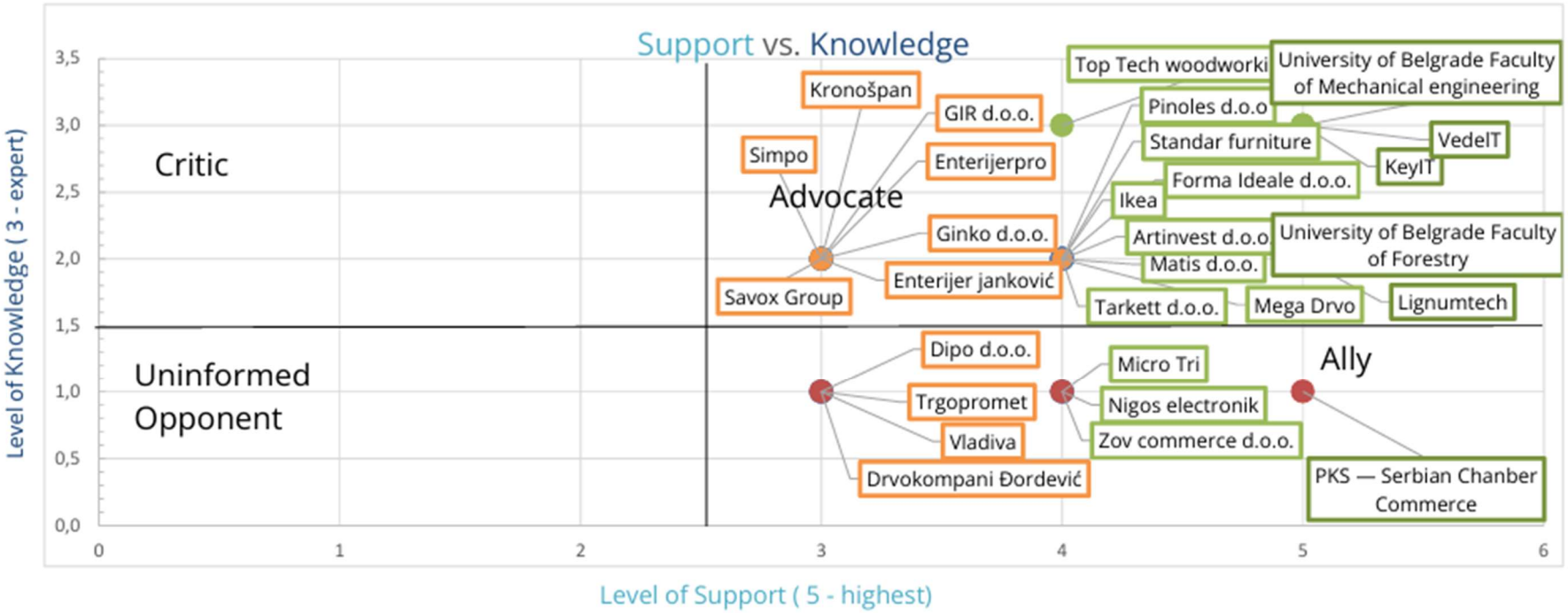


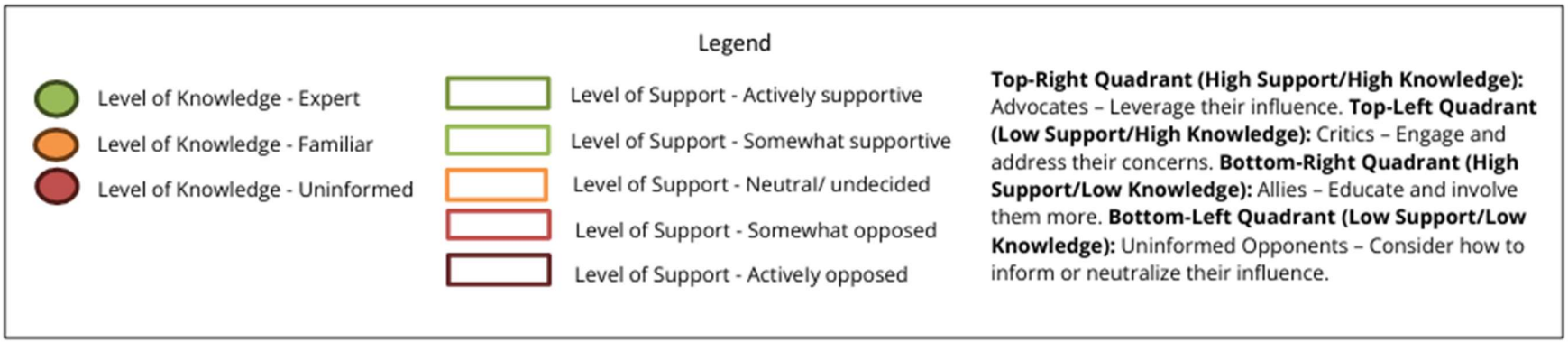




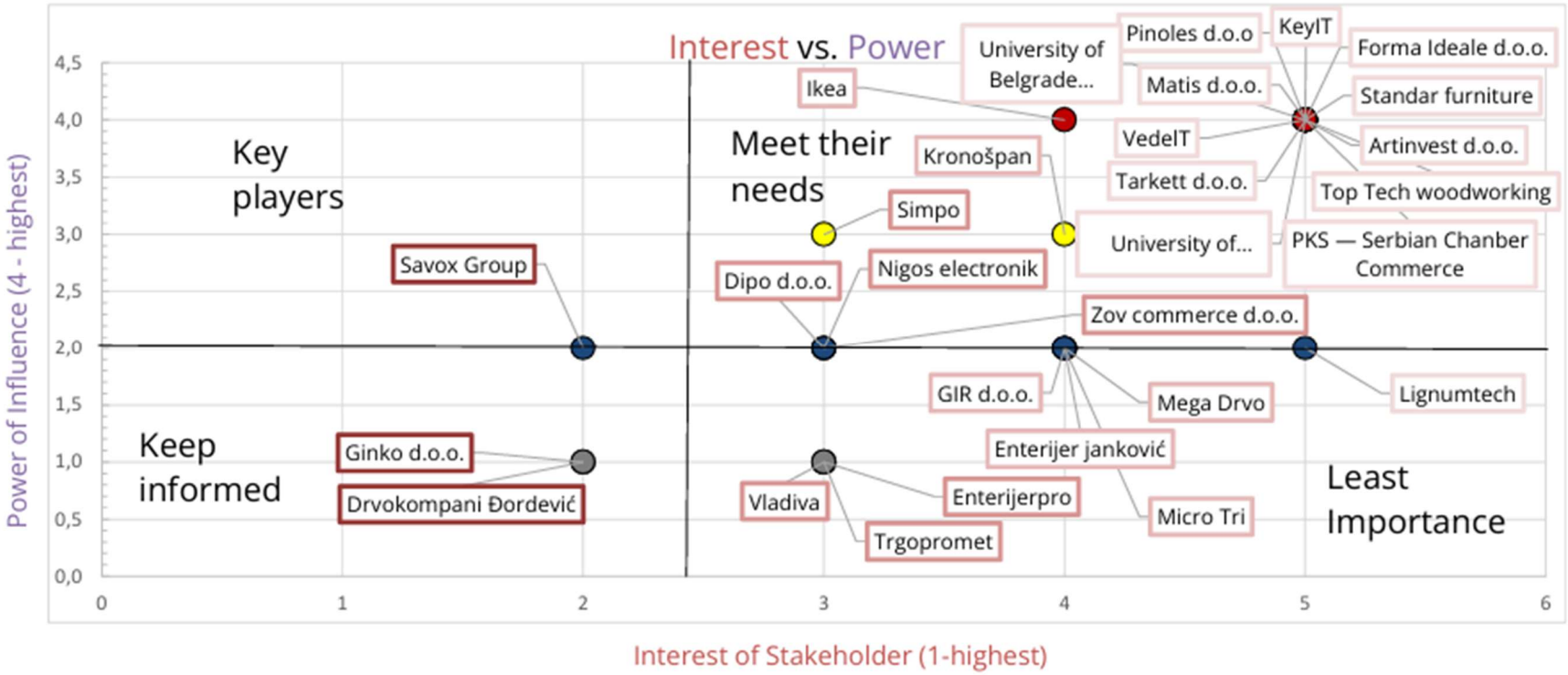


Mapped stakeholders - Serbia





Mapped stakeholders - Serbia



Legend

- Power of Influence - Key player
- Power of Influence - Meet their needs
- Power of Influence - Show Consideration
- Power of Influence - Least Important

- Interest of Stakeholder - Highest interest
- Interest of Stakeholder - Interested
- Interest of Stakeholder - Moderately interested
- Interest of Stakeholder - Slightly interested
- Interest of Stakeholder - Least interested

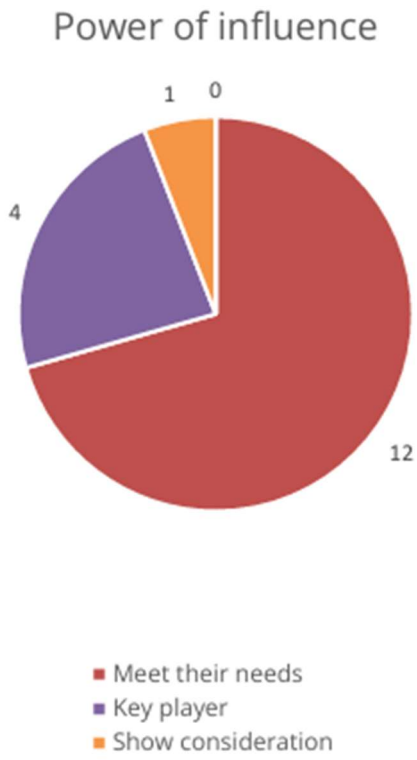
Top-Left Quadrant (High Interest/High Power): Key players – Leverage their influence. **Top-Right Quadrant (Low Interest/High Power):** Meet their needs – Engage and address their concerns. **Bottom-Left Quadrant (High Interest/Low Power):** Keep informed – Educate and involve them more. **Bottom-Right Quadrant (Low Interest/Low Power):** Least Importance – Consider how to inform or neutralize their influence.

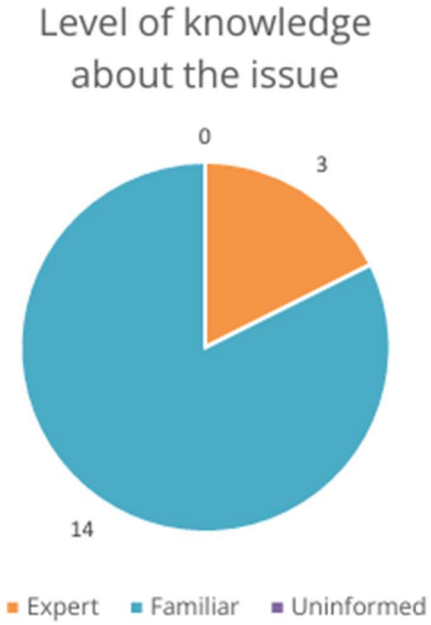
Mapped stakeholders - Bosnia and Herzegovina

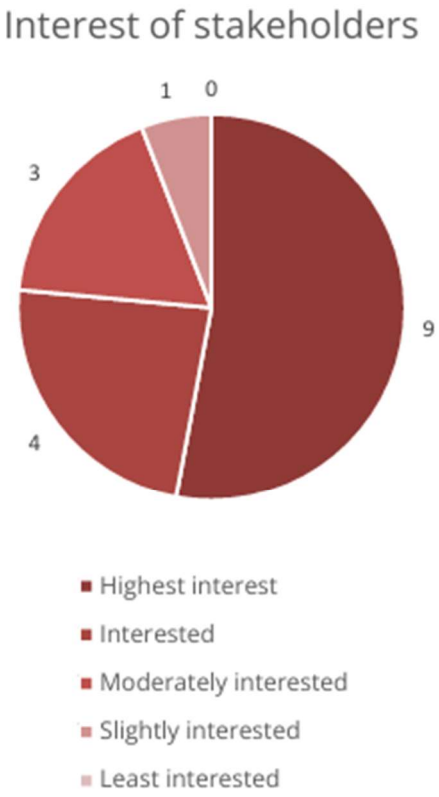
No	Institution	Name of the Person (responsible person / contact person)
1	DEPARTMENT FOR ECONOMY AND ENTERPRENEURS HIP OF THE CITY OF PRIJEDOR	RADE ROSIĆ
2	WOOD AND FURNITURE CLUSTER"DRVO-PD"	DRASKO LAJIĆ
3	CHAMBER OF COMMERCE OF THE REPUBLIC SRPSKA (BRANCH OF FORESTRY AND WOOD PROCESSING)	IGOR ANDRIĆ
4	AGENCY FOR SMES DEVELOPMENT- EDA	ZDRAVKO MIOVČIĆ
5	ASSOCIATION OF FORESTRY AND WOOD PROCESSING	ZORAN VUKOVIĆ
6	INNOVATION CENTRE BANJALUKA -ICBL	DRAGO GVERO
7	MINISTRY OF AGRICULTURE, FORESTRY AND WATER MANAGEMENT OF RS	SAVO MINIĆ
8	MINISTRY OF ECONOMY AND ENTREPRENEURS HIP	VOJIN MITROVIĆ
9	UNIVERSITY OF BANJA LUKA, REPUBLIC OF SRPSKA	RADOSLAV GAJANIN
10	DEVELOPME NT AGENCY OF GRADISKA RAGA	BOGDAN VICANOVIĆ
11	DEVELOPMENT AGENCY ZENICA-ZEDA	SENAD PAŠLIĆ
12	LTD "AGROFLORA"	ZORAN SUBOTIĆ
13	KARPENTERI VITOROG ITD	BOŽIDAR CUMBO
14	FORESTA ITD	SVETOZAR STANISAVLJEVIĆ
15	CIMMS LTD	IRFAN CEPIĆ
16	LIPA DRVO LTD	ZORICA SAVIĆ
17	GAVRANOVIC LTD	PERO GAVRANOVIĆ

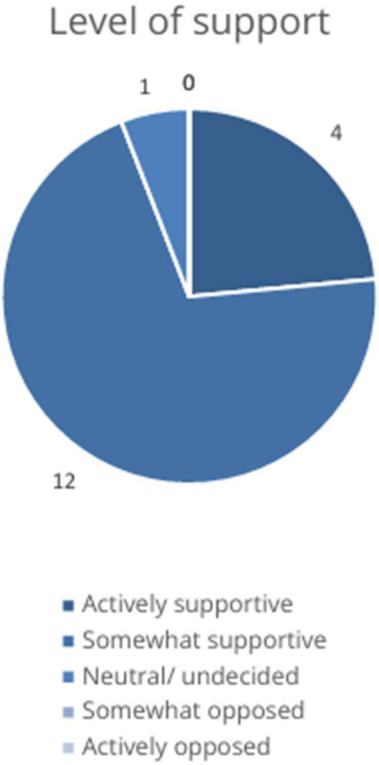
Average value by categorie		
Average interest of stakeholders	2	Interested
Average level of knowledge about issue	2	Familiar
Average level of support	4	Somewhat supportive

Mapped stakeholders - Bosnia and Herzegovina

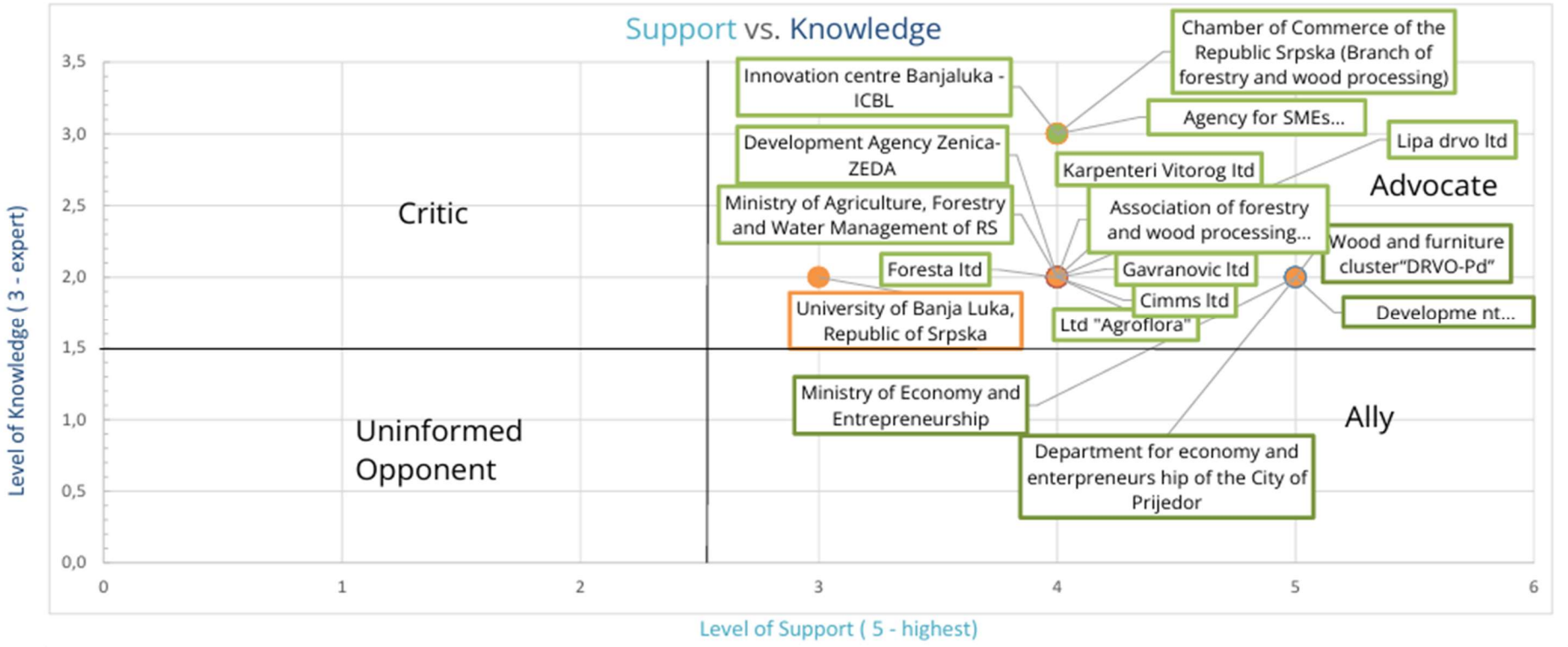








Mapped stakeholders - Bosnia and Herzegovina

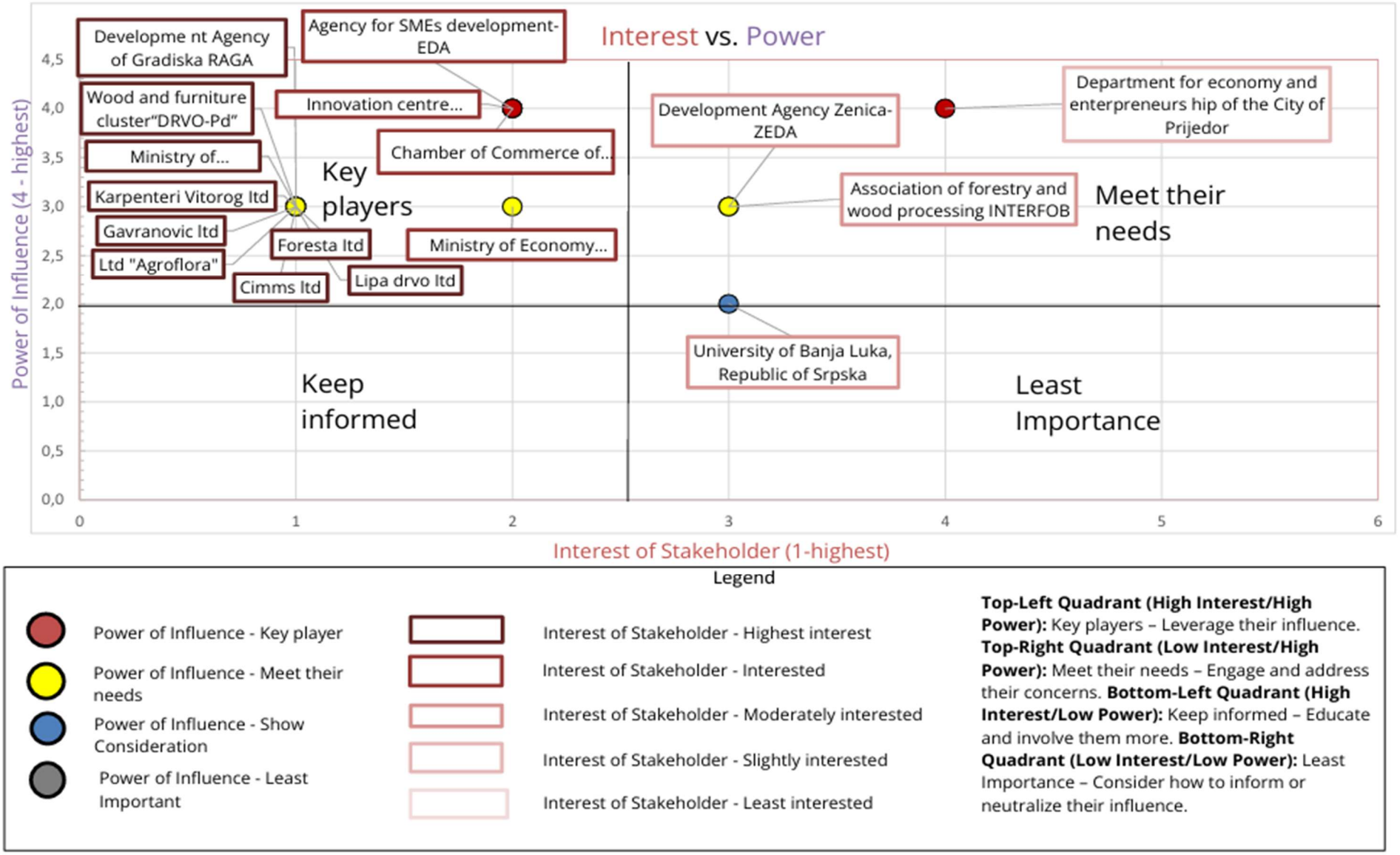


Legend

- Level of Knowledge - Expert
- Level of Knowledge - Familiar
- Level of Knowledge - Uninformed
- Level of Support - Actively supportive
- Level of Support - Somewhat supportive
- Level of Support - Neutral/ undecided
- Level of Support - Somewhat opposed
- Level of Support - Actively opposed

Top-Right Quadrant (High Support/High Knowledge): Advocates – Leverage their influence. **Top-Left Quadrant (Low Support/High Knowledge):** Critics – Engage and address their concerns. **Bottom-Right Quadrant (High Support/Low Knowledge):** Allies – Educate and involve them more. **Bottom-Left Quadrant (Low Support/Low Knowledge):** Uninformed Opponents – Consider how to inform or neutralize their influence.

Mapped stakeholders - Bosnia and Herzegovina



Legend

- Power of Influence - Key player
- Power of Influence - Meet their needs
- Power of Influence - Show Consideration
- Power of Influence - Least Important
- Interest of Stakeholder - Highest interest
- Interest of Stakeholder - Interested
- Interest of Stakeholder - Moderately interested
- Interest of Stakeholder - Slightly interested
- Interest of Stakeholder - Least interested

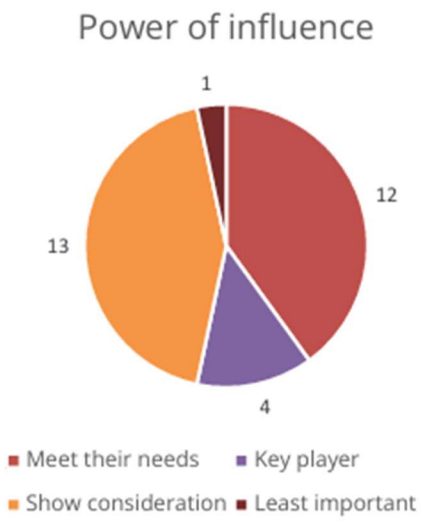
Top-Left Quadrant (High Interest/High Power): Key players – Leverage their influence. **Top-Right Quadrant (Low Interest/High Power):** Meet their needs – Engage and address their concerns. **Bottom-Left Quadrant (High Interest/Low Power):** Keep informed – Educate and involve them more. **Bottom-Right Quadrant (Low Interest/Low Power):** Least Importance – Consider how to inform or neutralize their influence.

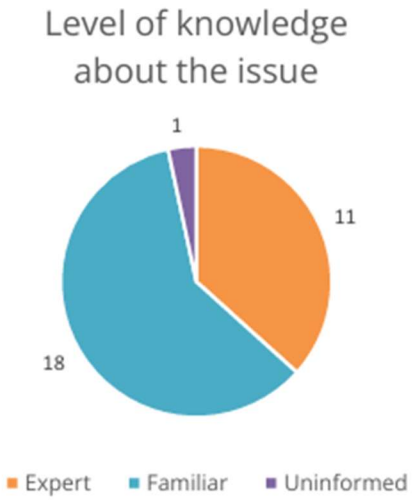
Mapped stakeholders - Moldova

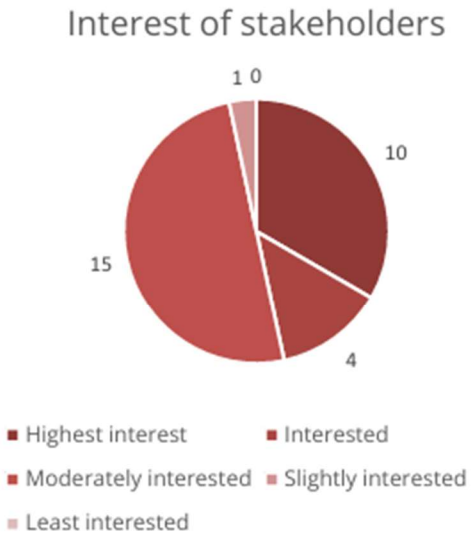
No	Institution	Name of the Person (responsible person / contact person)
1	CAHUL DISTRICT COUNCIL	PAVEL GROZA, THE PRESIDENT
2	CAHUL MUNICIPALITY COUNCIL	NICOLAE DANDIS, MAYOR
3	ROSU VILLAGE TOWN HALL	SAVILENCU NICOLAE
4	STATE COMPANY FORESTRY ENTERPRISE SILVA- SUD CAHUL	GHEORGHE BOGHEAN
5	MINISTERY OF ENVIRONMENT OF THE REPUBLIC OF MOLDOVA	SERGIU LAZARENCU
6	MINISTRY OF AGRICULTURE AND FOOD INDUSTRY	GRIGORE BALTAG
7	AGRICULTURAL AND RURAL ADVISORY CENTER	OLESEA COJOCARI
8	AGENCY “MOLDSILVA”	VICTOR DURBALA
9	EUROATLANT LTD	ALEXANDRU COVALI
10	INTERSTEPCOM LTD	MARINA TEAHARI
11	NICO ART LTD	NICOLAE DUNAS
12	RENAISSANCE — PODVALENKO LTD	NATALIA PODVALENCO
13	VICAUR-C LTD	VICTOR CAZACU
14	LLC GEBHARDT· CONSTRUCT SRL	DUMITRU SUSANU
15	INTERFOREST LTD	EUGEN ALBUR
16	SERVAUTO-SUD LTD	ION STEFANITA
17	PERIMETRU LTD	GHEORGHE ALBUR
18	TEXITEH LTD	MIHAI BALAN
19	VICOLEMN LTD	VICTOR CEPOI
20	AGRICULTURE INVEST LTD	FLORIN POPOV
21	MELNIC PRIM LTD	SERGIU TOHILAT
22	VAS-AGRO-FARM LTD	VASILE HARITON
23	MODERNUS JSC	LIUBOVI GANGAN
24	CLUSTER FURNITURE & MORE	ALEXANDRU COVALI
25	TOURISM CLUSTER VIA CAHUL	LURIE STRELCIUC
26	TABLE GRAPES CLUSTER FROM CAHUL REGION	SERGIU TUTOVAN
27	CAHUL LIVESTOCK CLUSTER	DOMNICA CAPATINA
28	THE CHAMBER OF COMMERCE AND INDUSTRY OF THEREPUBLIC OF MOLDOVA	SERGIU HAREA, PRESIDENT OF THE MOLDOVAN CHAMBER OF COMMERCE AND INDUSTRY
29	CHAMBER OF COMMERCE AND INDUSTRY, BRANCH CAHUL	OLGA VANTEVICI, DIRECTOR OF THE CHAMBER OF COMMERCE AND INDUSTRY, BRANCH CAHUL
30	CAHUL STATE UNIVERSITY	SERGIU CORNEA
31	TECHNICAL UNIVERSITY OF MOLDOVA	VIOREL BOSTAN
32	NATIONAL CENTER FOR RESEARCH AND SEED PRODUCTION	DR. BORIS BOINCEAN - THE HEAD OF THE DEPARTMENT OF SUSTAINABLE FARMING SYSTEMS
33	CAHUL BUSINESS INCUBATOR	ARTUR NEBUNU
34	FARM - FEDERATION OF AGRICULTURAL PRODUCERS FROM MOLDOVA	AURELIA BONDARI
35	ASSOCIATION OF VEGETABLE EXPORTERS AND PRODUCERS FROM THE REPUBLIC OF MOLDOVA	LURIE HURMUZACHI
36	ECOLOGICAL COUNSELING CENTER CAHUL	VIORICA PETROV
37	NIS - AGROINFORM	PETRU LONEL
38	AGRO-CONS	TUDOR DARIE
39	CEA-HINCESTI	MARIA ROTARU
40	ASSOCIATION OF BUSINESS WOMEN FROM THE RURAL SECTOR	NATALIA GUTU
41	ASSOCIATION "TERAGRONORD ASSOCIATION OF AGRICULTURAL PRODUCERS" FROM SOROCA	MARIA MARCHITAN
42	ASSOCIATION “CUTEZATORUL”, FALESTI	VITALIE CIMPOES

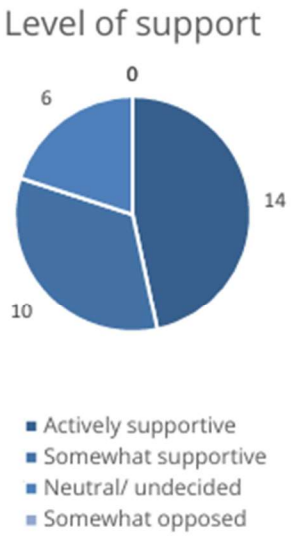
Mapped stakeholders - Moldova

Average value by categorie		
Average interest of	1	Highest interest
Average level of knowledge about issue	2	Familiar
Average level of support	5	Actively supportive

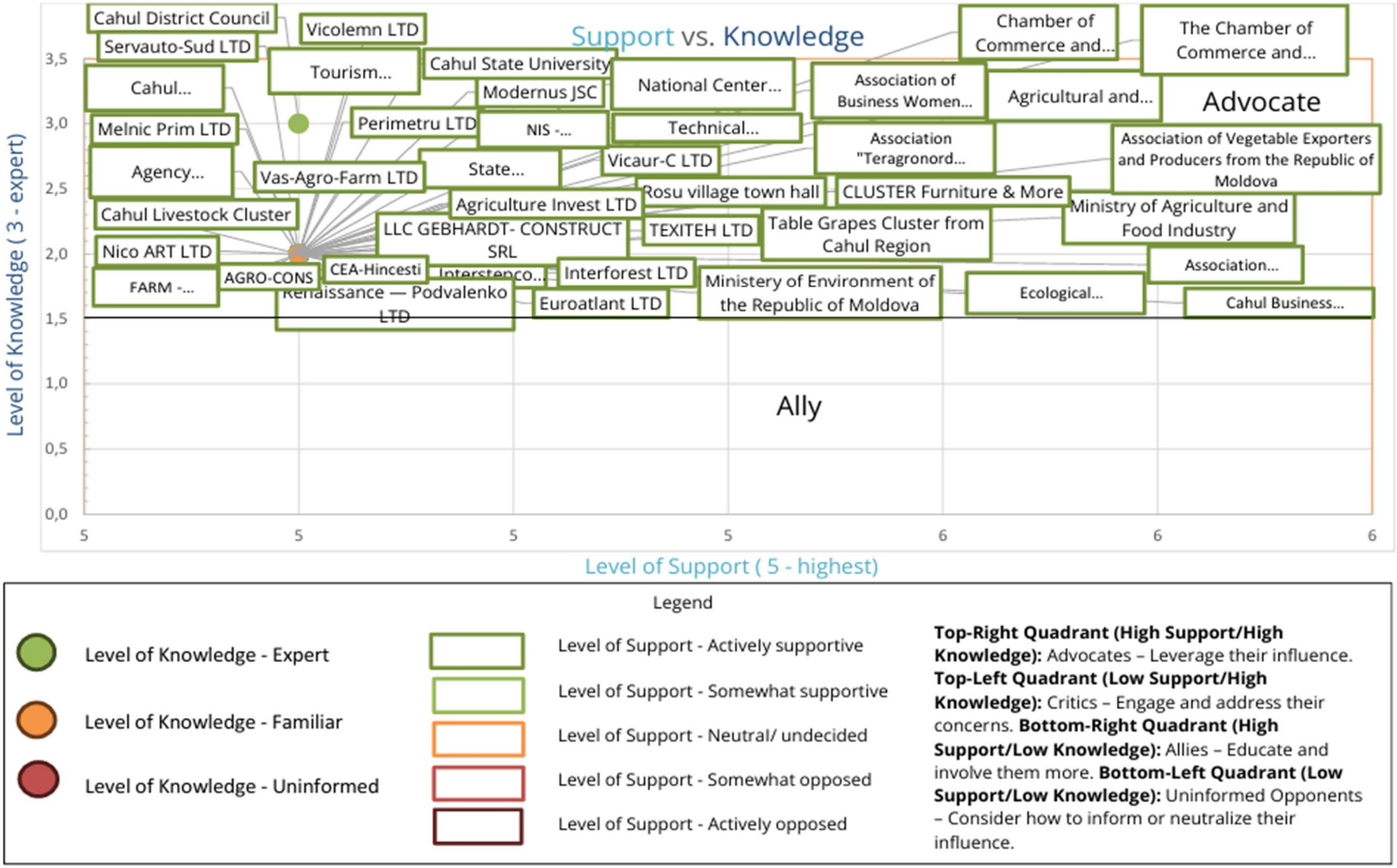




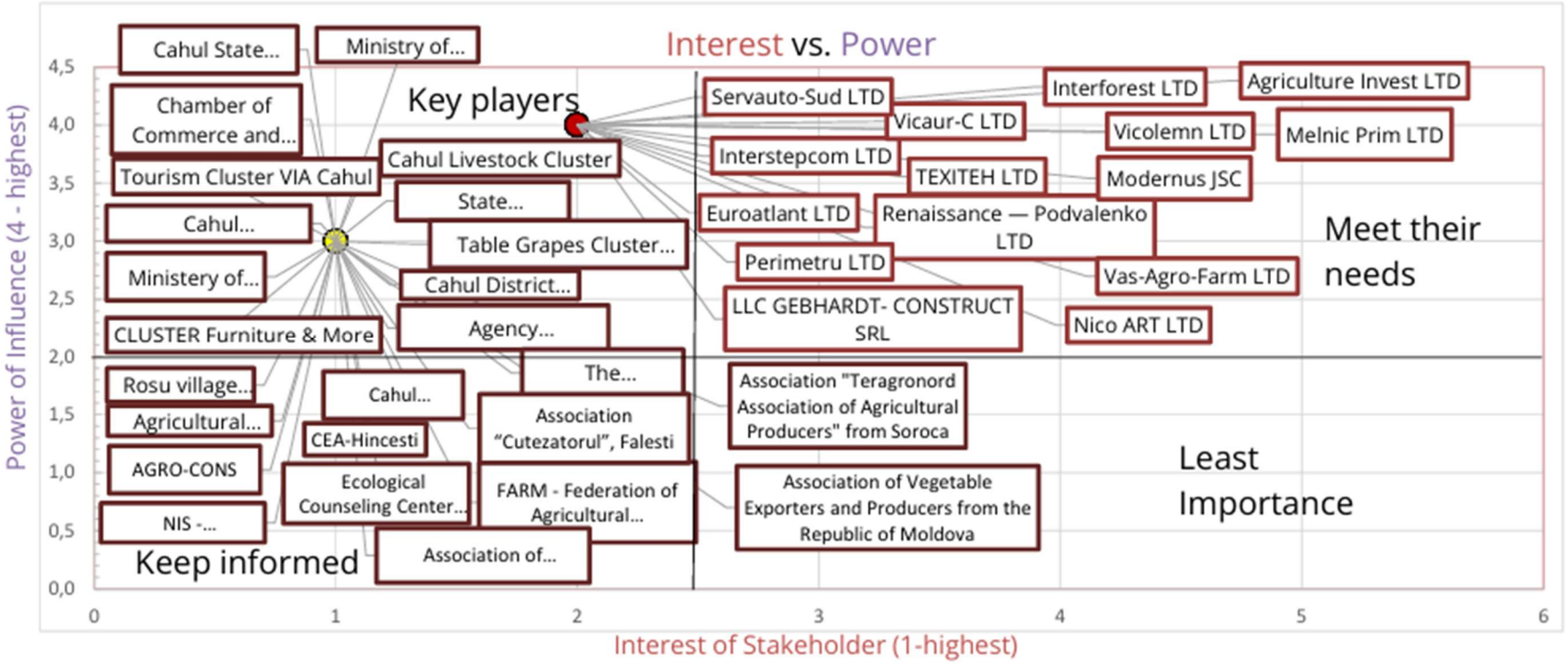




Mapped stakeholders - Moldova



Mapped stakeholders - Moldova



Legend

- Power of Influence - Key player
- Power of Influence - Meet their needs
- Power of Influence - Show Consideration
- Power of Influence - Least Important
- Interest of Stakeholder - Highest interest
- Interest of Stakeholder - Interested
- Interest of Stakeholder - Moderately interes
- Interest of Stakeholder - Slightly interested
- Interest of Stakeholder - Least interested

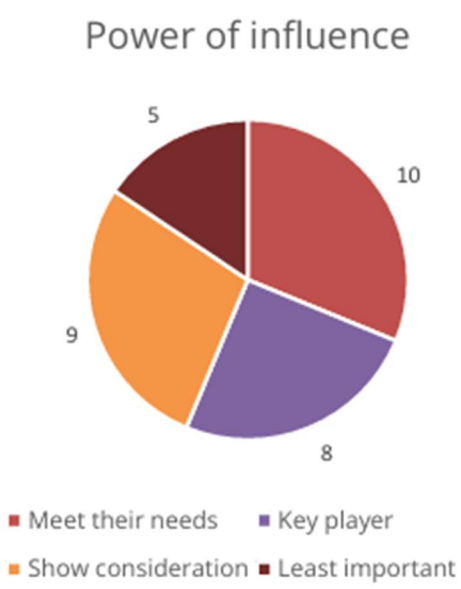
Top-Left Quadrant (High Interest/High Power): Key players – Leverage their influence. **Top-Right Quadrant (Low Interest/High Power):** Meet their needs – Engage and address their concerns. **Bottom-Left Quadrant (High Interest/Low Power):** Keep informed – Educate and involve them more. **Bottom-Right Quadrant (Low Interest/Low Power):** Least Importance – Consider how to inform or neutralize their influence.

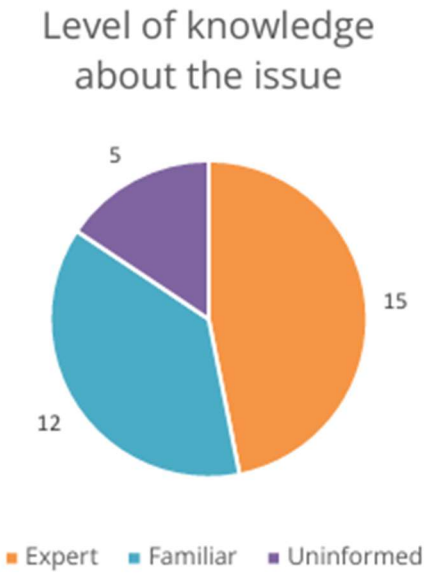
Mapped stakeholders - Ukraine

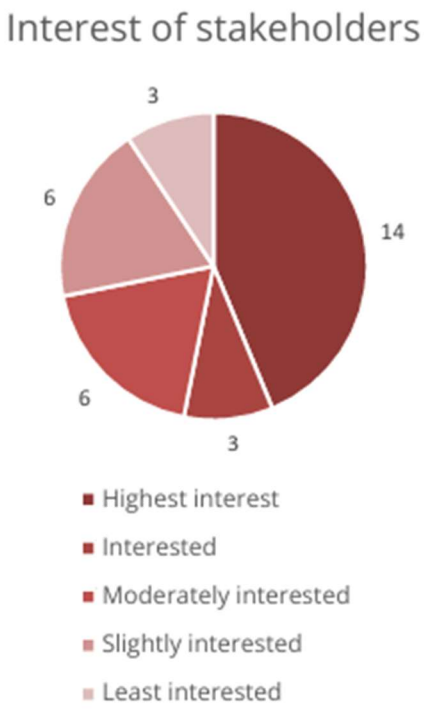
No	Institution	Name of the Person (responsible person / contact person)
1	VGSM	ANONYMIZED
2	SHIIK	ANONYMIZED
3	ESCADA-M	ANONYMIZED
4	EKRAN (KARPATSKIYE OKNA), LVIV	ANONYMIZED
5	ATLANT	ANONYMIZED
6	CLUSTER "WOODWORKING INDUSTRY" (PART OF LVIV INDUSTRY HUB)	ANONYMIZED
7	STOLYARUS	ANONYMIZED
8	SAMWER	ANONYMIZED
9	AGRODEREW	ANONYMIZED
10	UAFM UKRAINIAN FURNITURE	ANONYMIZED
11	UABIO UKRAINIAN BIOENERGY ASSOCIATION	ANONYMIZED
12	UKRAINIAN ASSOCIATION OF WINDOWS AND FACADES	ANONYMIZED
13	LVIV FURNITURE CLUSTER	ANONYMIZED
14	UKRAINIAN CLEAN PRODUCTION CENTER PEHB	ANONYMIZED
15	TRANSCARPATHIAN CHAMBER OF COMMERCE FURNITURE	ANONYMIZED
16	FIX VPO	ANONYMIZED
17	CHUMAK	ANONYMIZED
18	WOODLUCK WORKSHOP	ANONYMIZED
19	HAUS-MOBEL	ANONYMIZED
20	K'LEN LTD	ANONYMIZED
21	PAVLYK LTD	ANONYMIZED
22	ROMANNA LTD	ANONYMIZED
23	KROKWOOD LTD	ANONYMIZED
24	LAMELLA LTD	ANONYMIZED
25	ANSHAR GROUP	ANONYMIZED
26	WOODWERK	ANONYMIZED
27	MONKA.BELOVED.FURNITURE	ANONYMIZED
28	MAKSIMEBLI	ANONYMIZED
29	TARASOV	ANONYMIZED
30	FURNIKOM	ANONYMIZED
31	UKRAINIAN NATIONAL FORESTRY UNIVERSITY	ANONYMIZED
32	UZHHOROD NATIONAL UNIVERSITY	ANONYMIZED

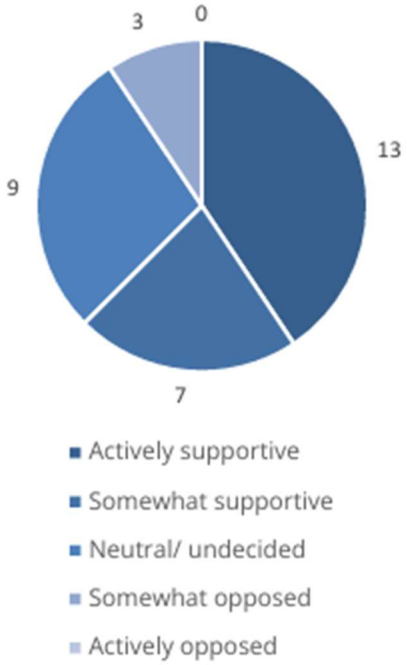
Average value by categorie		
Average interest of stakeholders	2	Interested
Average level of knowledge about issue	2	Familiar
Average level of support	4	Somewhat supportive

Mapped stakeholders - Ukraine

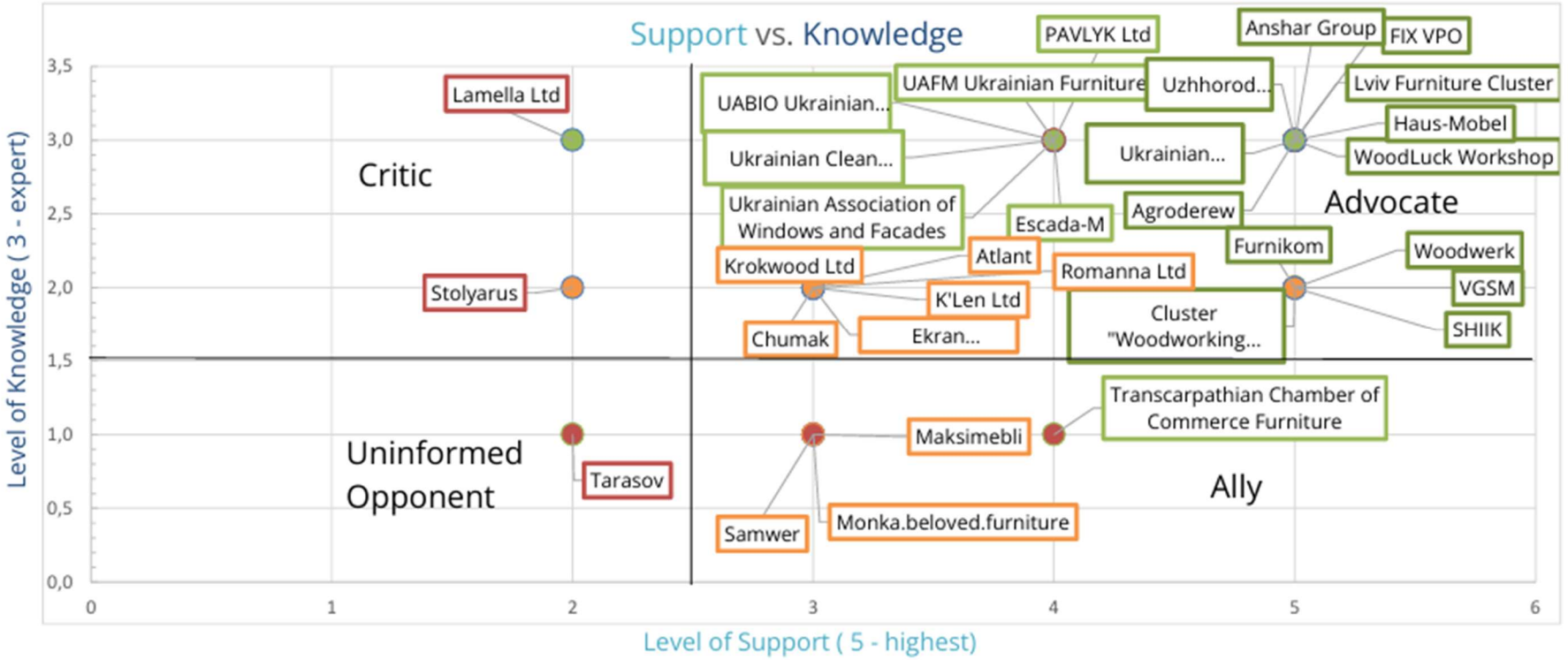








Mapped stakeholders - Ukraine

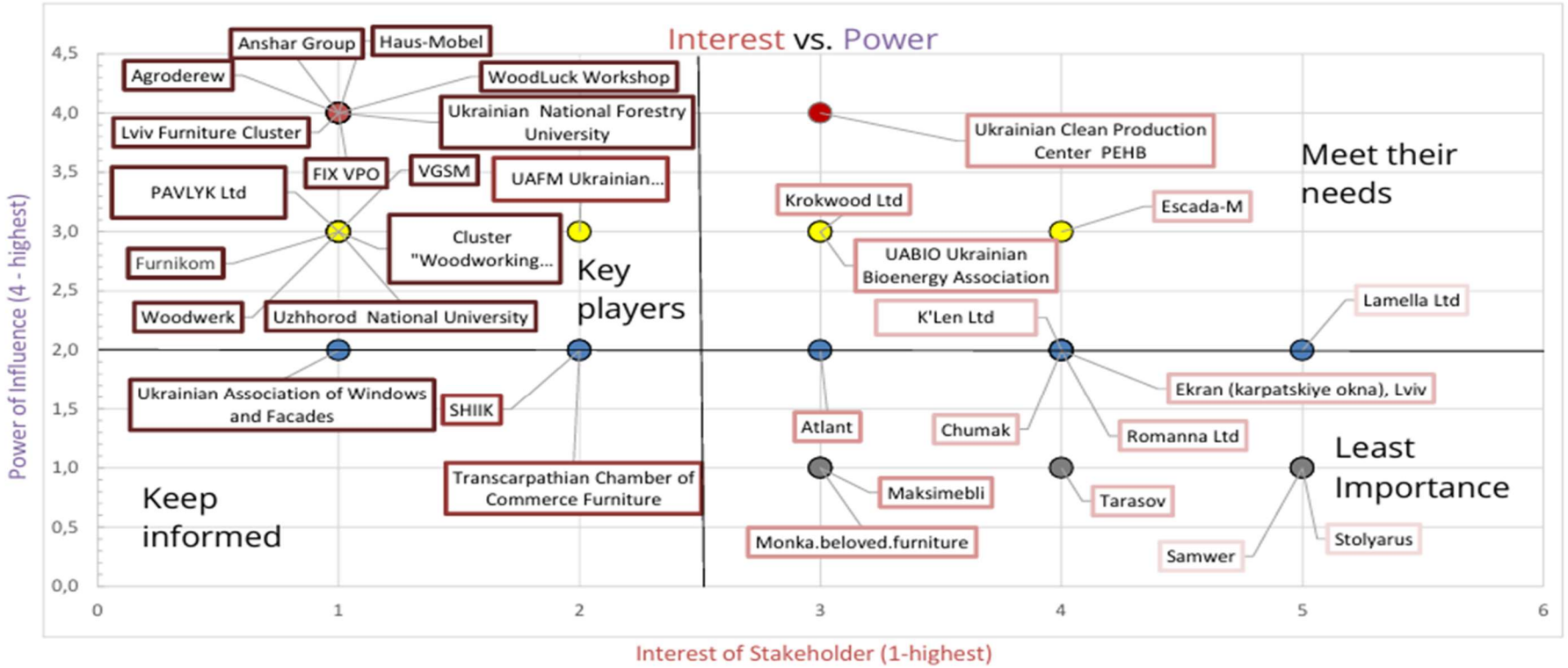


Legend

- Level of Knowledge - Expert
- Level of Knowledge - Familiar
- Level of Knowledge - Uninformed
- Level of Support - Actively supportive
- Level of Support - Somewhat supportive
- Level of Support - Neutral/ undecided
- Level of Support - Somewhat opposed
- Level of Support - Actively opposed

Top-Right Quadrant (High Support/High Knowledge): Advocates – Leverage their influence. **Top-Left Quadrant (Low Support/High Knowledge):** Critics – Engage and address their concerns. **Bottom-Right Quadrant (High Support/Low Knowledge):** Allies – Educate and involve them more. **Bottom-Left Quadrant (Low Support/Low Knowledge):** Uninformed Opponents – Consider how to inform or neutralize their influence.

Mapped stakeholders - Ukraine



Legend

- Power of Influence - Key player
- Power of Influence - Meet their needs
- Power of Influence - Show Consideration
- Power of Influence - Least Important
- Interest of Stakeholder - Highest interest
- Interest of Stakeholder - Interested
- Interest of Stakeholder - Moderately interested
- Interest of Stakeholder - Slightly interested
- Interest of Stakeholder - Least interested

Top-Left Quadrant (High Interest/High Power): Key players – Leverage their influence. **Top-Right Quadrant (Low Interest/High Power):** Meet their needs – Engage and address their concerns. **Bottom-Left Quadrant (High Interest/Low Power):** Keep informed – Educate and involve them more. **Bottom-Right Quadrant (Low Interest/Low Power):** Least Importance – Consider how to inform or neutralize their influence.

Interreg Danube Region

Co-funded by the European Union

DRWO4.0

DRWO4.0

Annex 2 - Assessment of the baseline status of the Danube Region forest – based industry according to the I4.0 standards – Questionnaire

Danube Region Wood Industry Transformation Model towards Industry 4.0

Culmena
Innovation. Development. Consulting.

INSTRUCTIONS

Below is the questionnaire for the assessment of stakeholders' potential for transformation into Smart factories, based on key elements of Industry 4.0[1]. The questionnaire is answered by a team of company employees. The team should include those people who know the processes, goals, development direction and strategy of the company best, as well as people from the company'smanagement.

Each question can be answered with a score of 1-5. For each question, descriptions of grades 1, 3and 5 are given, to facilitate the evaluation of the grade of one's own company. If the estimatedscore is between the described scores 1 and 3 (or 3 and 5), it is possible to give a score of 2 (or 4)(it is not mandatory that all scores are 1, 3 or 5).

The company's readiness for transformation into a Smart factory is calculated as the average ofreadiness for three transformations according to the Culmena's Culis methodology: Lean, Digitaland Green transformation.

The grade of readiness for each transformation is calculated as the average of the grades of all questions for that type of transformation, and the overall readiness as the average of the gradesof three transformations.

[1] Industry 4.0 refers to the integration of advanced digital technologies such as IoT, AI, and robotics into manufacturing processes, creating smart factories with enhanced interconnectivity, automation, and data-driven decision-making.

Lean Manufacturing

Lean manufacturing is a systematic approach to minimizing waste within a manufacturingsystem without sacrificing productivity. By focusing on value creation for the end customer and eliminating non-value-added activities, Lean principles drive efficiency and cost reduction. Key Lean tools include 5S, Value Stream Mapping, Continuous Improvement (Kaizen), SMED (Single-Minute Exchange of Die), Poka Yoke, Visual Management, and Standardized Work. Lean manufacturing emphasizes the importance of empowering employees and fostering a culture of continuous improvement. When transforming into a smart factory, Lean principles are enhanced by advanced technologies, enabling more precise control over production processes and further reducing waste. The real-time data and interconnected systems of a smart factory support Lean methodologies by providing deeper insights into process inefficiencies and opportunities for continuous improvement.

Digitalization

Digitalization refers to the adoption of digital technologies to transform business processes and operations. In manufacturing, this involves the integration of advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), and cloud computing to create a connected, intelligent production environment. Digitalization enables real-time data collection and analysis, predictive maintenance, and enhanced automation. As manufacturers transform into smart factories, digitalization plays a crucial role by enabling seamless connectivity and real-time analytics, which are essential for advanced automation and decision-making. The integration of digital technologies ensures that all aspects of manufacturing, from supply chain management to productionfloor operations, are optimized for greater flexibility, responsiveness, and efficiency, ultimately supporting the continuous evolution towards smarter manufacturing.

Green Manufacturing

Green manufacturing focuses on sustainable production processes that minimize environmental impact and reduce resource consumption. This approach includes the use of renewable energy sources, waste minimization, recycling, and the implementation ofenvironmentally friendly materials and practices. In the context of a smart factory, green manufacturing principles are integrated with advanced technologies to create an eco- efficient production system. Smart factories utilize real-time monitoring and optimization of energy use, emissions, and resource consumption, ensuring that sustainability goals are met alongside operational efficiency. By incorporating green manufacturing into thesmart factory transformation,

manufacturers can achieve a harmonious balance between technological innovation, operational excellence, and environmental stewardship,contributing to a sustainable future while maintaining competitive advantage.

COMPANY INFORMATION

Basic Company Information

Company name: _____

Country: _____

Number of employees: _____

Company size: _____

Industry: _____

Contact Information

Contact e-mail: _____

Phone number: _____

Website: _____

Headquarters address: _____

LEAN TRANSFORMATION

1.QUESTION			
Has the company ever held a Lean workshop, implementation of Lean or any Lean tool?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	No Lean implementationhas been done	Partial Lean implementation has been done (or some Lean tools)	Lean implementationwas carried out
Rating of the company for the given question			

2.QUESTION			
How familiar is the company's management and the company in general with the Lean methodology?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Company management is not familiar with the concept of Lean management	Company management is familiar with the concept of Lean management	The managementof the company is familiar with the concept of Lean management and implements it in the company
Rating of the company for the given question			

3.QUESTION			
Did the employees undergo training where they were introduced to the Lean methodology and its tools?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Employees did not undergo Lean training	Employees have not undergone Lean training, but it is planned	Employees have undergone Lean training
Rating of the company for the given question			

4.QUESTION			
Do and to what extent do employees have the skills necessary to implement Lean methodology in their daily work?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Employees do not have the skills necessary to implement Lean tools in business	Employees have some skills needed to implement Lean tools in business	Employees have the skills necessaryto implement Lean tools in business
Rating of the company for the given question			

5.QUESTION			
Does the company have a process optimization department or, if not, at least certain practices?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	There is no business process optimization department in the company	There is no business process optimization department, but there are certain practices	There is a department for optimizing business processes in the company
Rating of the company for the given question			

6.QUESTION			
Which Lean tools do the management and workers of the company know? Which of them do they use in their daily work?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Employees and management do not know Lean tools	Employees and management know at least 3 Lean tools	Employees and management know at least 5 Lean tools
Rating of the company for the given question			

7.QUESTION			
Are certain Lean tools applied in the company's daily work?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Lean tools are not applied in the company	At least 3 lean tools are used in the company	At least 5 lean tools are applied in the company
Rating of the company for the given question			

8.QUESTION			
Does management encourage employees to solve problems in the workplace? In what way is it done, how actively?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Management does not encourage solving problems at work	Management encourages individuals to solve their own problems	Management encourages employees to solve problems in groups
Rating of the company for the given question			

9.QUESTION			
Is there a culture of continuous improvement in the company? Is the continuous improvement strategy clearly communicated to employees?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	A culture of continuous improvement does not exist	A culture of continuous improvement exists, but employees are not involved in it	Employees are partof a culture of continuous improvement and actively participatein it by making suggestions for improvement
Rating of the company for the given question			

10.QUESTION			
Are Key Performance Indicators defined in the company and to what extent? In which departments and in which not? What are the KPIs?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	No KPIs have been defined in the company	Certain KPIs are defined	All KPIs are clearly defined
Rating of the company for the given question			

11.QUESTION			
How does the company carry out planning?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Planning is done manually and reactively	Planning is carried out in Excel, and the processes are not ready for the introduction of planning tools	Planning is carried out using planning tools
Rating of the company for the given question			

12.QUESTION			
What is the quality of the supplier's goods (%)? In what percentage of cases do suppliers deliver goods on time?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Quality and on-time delivery > 50%	Quality and on-time delivery > 75%	Quality and on-time delivery > 95%
Rating of the company for the given question			

13.QUESTION			
Is the operation of the production facility monitored and in what way?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Production data is not tracked	Production data is tracked via standard forms, butthis data is not analyzed	Production data is monitored through standard forms and regularly analyzed
Rating of the company for the given question			

14.QUESTION			
In your opinion, is there a problem in the exchange of information and information flows?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	In the processes, there are many errors in communication and information exchange, information is not available on time	Good communication and availability of information has been established in the processes, but errors still occur that affect the quality of the process	There are no problems in the exchange of information, all information is always available on time
Rating of the company for the given question			

15.QUESTION			
Are there KPIs for monitoring information flows?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	No KPIs have been defined in the company	Certain KPIs are defined	All KPIs are clearly defined
Rating of the company for the given question			

16.QUESTION			
Are company leaders actively involved in company processes and change processes?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Company leaders do not spend time in the company and are not involved in day-to-day activities	Company leaders are involved in the work of the company, but do not encourage change and keep their distance	Company leaders are actively involved in the work and show by example why change is important
Rating of the company for the given question			

17.QUESTION			
Are the responsibilities of employees in the change process defined?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Responsibilities of employees in the change process are not defined	Responsibilities are defined but not assigned or adhered to	Responsibilities are clearly defined and distributed
Rating of the company for the given question			

18.QUESTION			
Do employees understand the company's goals and how their work contributes to those goals?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	The goals set for employees are not precisely defined and clear, employees do not understand their importance	The goals set for employees are precisely determined, but they are not clear,nor is their importance	The goals set for employees are precisely defined and clear, employees understand their importance
Rating of the company for the given question			

19.QUESTION			
Are there KPIs for monitoring the realization of goals?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	No KPIs have been defined in the company	Certain KPIs are defined	All KPIs are clearly defined
Rating of the company for the given question			

Sum of grades of all questions	
Number of questions answered	
AVERAGE GRADE OF LEAN TRANSFORMATION READINESS	

DIGITAL TRANSFORMATION

QUESTION			
Is the company oriented towards the introduction of new technologies?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	The company is not oriented towards the implementation of new technologies	The company wants to implement new technologies, but does not know how and where	The company is oriented towards the introduction of new technologies and has defined the places of application and the type of technology
Rating of the company for the given question			

QUESTION			
What is the company's goal in the next few years regarding Industry 4.0?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	There are no goals for the applicationof Industry 4.0 technologies	The goal is to apply some practices, if there is a need for them	The goal is to fully utilize the benefits of digital transformation and Industry 4.0
Rating of the company for the given question			

QUESTION			
Why did the company decide to transform into a Smart Factory?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	The company did not decide to transform itself intoa Smart Factory	The decision was imposed by the market	The decision is a consequence of the pursuit of process and product excellence and market growth
Rating of the company for the given question			

QUESTION			
Have certain projects already been launched as part of the digital transformation?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	No transformation projects have been launched so far	Certain transformation projects are planned	Transformation projects are regularly implemented
Rating of the company for the given question			

QUESTION			
Are there limiting factors in the implementation of digital transformation?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	There are many limiting factors	There are limiting factors, but they can be overcome	The company has no limiting factorsin implementing the transformation
Rating of the company for the given question			

QUESTION			
What is the financing plan for projects related to the transformation into a Smart Factory?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	There is no financial plan	The financial plan is based on own funds	The financial plan is based on own funds, incentives and grants
Rating of the company for the given question			

QUESTION			
Is there a clearly defined and announced digital strategy of the company?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	There is no digital strategy	A digital strategy has been created, but employees are not familiar with it and it is not implemented	A digital strategy has been created, employees are familiar with it andit is being implemented
Rating of the company for the given question			

QUESTION			
Is the collected data necessary for the development of a digital strategy?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	No data is collected	The data is partially collected	Data has been collected
Rating of the company for the given question			

QUESTION			
How much has been invested in Industry 4.0, i.e. in its tools and methods, in the last 5 years?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	0 – 50 000 EUR	50 000 – 150 000 EUR	> 150 000 EUR
Rating of the company for the given question			

QUESTION			
What is the employee's attitude towards digital transformation?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Employees have an aversion to digital transformation	Employees want digital transformation, but fear its consequences	Employees accept and want digital transformation
Rating of the company for the given question			

QUESTION			
Do employees have the necessary skills for digital transformation? What proportion of employees have these skills?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Employees do not have the necessary skills	Some of the employees have the necessary skills	Employees have the necessary skills
Rating of the company for the given question			

QUESTION			
Is data collected from machines? How are they collected? What data is collected? Howis the collected data entered into the system? Has it been defined what data is to be collected from the machines?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Data is collected manually	Data is collected from sensors and manually analyzed	Data is collected from sensors in real time and analyzed in software
Rating of the company for the given question			

QUESTION			
Is an ERP[2] system used?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	The ERP system is not used	The ERP system is used, but not fully exploited	The ERP system is used and fully exploited
Rating of the company for the given question			

QUESTION			
Has the MES[3] system been implemented?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	The MES system has not been implemented	The MES system is in the process of implementation	MES system has been implemented
Rating of the company for the given question			

[2] Enterprise Resource Planning (ERP) is software that integrates and manages core business processes such as finance, human resources, manufacturing, supply chain, and procurement in real-time using a common database.

[3] A Manufacturing Execution System (MES) is software that monitors, tracks, and controls production processes in real-time, ensuring efficient execution of manufacturing operations andimproving production output.

QUESTION			
How many Industry 4.0 technologies have been implemented in company?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	1-3	4-6	>7
Rating of the company for the given question			

Sum of grades of all questions	
Number of questions answered	
AVERAGE GRADE OF DIGITAL TRANSFORMATION READINESS	

GREEN TRANSFORMATION

QUESTION			
Is information on waste management provided to customers? Is it done efficiently and transparently?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	No information is provided to customers	Information is provided, but not transparently	Information is provided transparently
Rating of the company for the given question			

QUESTION			
Has the company researched related companies and their waste management practices?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	No related companies were investigated	Research has started but not completed	Related companies were investigated
Rating of the company for the given question			

QUESTION			
Is the company familiar with the concept of circular economy[4]? Does the company apply the circular economy in its work? To what extent is it applied?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	The company is not familiar with the concept of circular economy	The company is familiar with the term, but does not apply the circular economy in its work	The company applies circular economy in its work
Rating of the company for the given question			

[4] A circular economy is an economic system that focuses on eliminating waste and continuously using resources through practices like recycling, reusing, and regenerating products and materials.

QUESTION			
Does the company use recycled materials in its products or as energy sources? To what extent?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	The company does not use recycled materials in its products or as energy sources	The company uses recycled materials in products or as energy sources	The company uses recycled materials in products and as energy sources
Rating of the company for the given question			

QUESTION			
To what extent is paper used to transfer information?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	Paper is used to transfer information	he transmission of information is partially digital	Data transfer is a digital, paper free enterprise
Rating of the company for the given question			

QUESTION			
Regarding the use of resources, is it being reviewed? Does the company consider and explore new possibilities and new ways of using resources, which would reduce their consumption?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	The company does not consider new ways to reduce the use of resources	The company plans to reduce the use of resources	The company continuously looks for new ways to reduce the use of resources
Rating of the company for the given question			

QUESTION			
How easy is it to recycle the products that the company produces?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	The products are not suitable for recycling	The products can be recycled, but they are difficult to disassemble	The products are easily disassembled and recyclable
Rating of the company for the given question			

QUESTION			
Does the company monitor its water footprint? Is the company trying to reduce that footprint? Have ways been explored to reduce the water footprint? What actions were taken?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	The company does not monitor its water footprint	The company monitors its water footprint, but makes no effort to reduce it	The company monitors its water footprint and tries to reduce it
Rating of the company for the given question			

QUESTION			
Does the company monitor its greenhouse gas emissions? Is the company trying to reduce this emission? Have ways been explored to reduce this emission? What actions were taken?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	The company does not monitor its greenhouse gas emissions	The company monitors its greenhouse gas emissions, but does not try to reduce them	The company monitors its greenhouse gas emissions and tries to reduce them
Rating of the company for the given question			

QUESTION			
Does the company use renewable energy sources? What percentage of energy does the company get from renewable energy sources?			
ASSESSMENT INSTRUCTIONS			
Grade	1	3	5
Description	The company does not use renewable energy sources	The company partly uses renewable energy sources	The company gets most of its energy from renewable energy sources
Rating of the company for the given question			

Sum of grades of all questions	
Number of questions answered	
AVERAGE GRADE OF GREEN TRANSFORMATION READINESS	

SMART FACTORY READINESS

LEAN TRANSFORMATION READINESS	
DIGITAL TRANSFORMATION READINESS	
GREEN TRANSFORMATION READINESS	
SMART FACTORY READINESS (AVERAGE)	