

THE FINANCIAL AND SOCIAL IMPACTS OF THE APPROVED PROJECTS IN THE AREA OF DIGITAL AND GREEN TRANSITION ON THE CROATIAN SMES

Dražen Ćučić, PhD, Associate Professor

Josip Juraj Strossmayer University of Osijek, Faculty of Economics and Business in Osijek
Trg Ljudevita Gaja 7, Osijek, Croatia
drazen.cucic@efos.hr

Mladen Pancić, PhD, Associate Professor

Josip Juraj Strossmayer University of Osijek, Faculty of Economics and Business in Osijek
Trg Ljudevita Gaja 7, Osijek, Croatia
mladen.pancic@efos.hr

Hrvoje Serdarušić, PhD, Assistant Professor

Josip Juraj Strossmayer University of Osijek, Faculty of Economics and Business in Osijek
Trg Ljudevita Gaja 7, Osijek, Croatia
hrvoje.serdarusic@efos.hr

ABSTRACT

On our way of living and doing business digital technologies have a profound impact. The research and innovation strategy is crucial to a more productive, sustainable and green economy. Digital solutions that put people first will open up new opportunities for businesses, encourage the development of trustworthy technology, foster an open and democratic society, enable a vibrant and sustainable economy, help fight climate change and achieve the green transition.

The aim of this paper is to research the literature about digital and green transition, their financial and social impacts on Croatian economy across of the approved projects (for the period 2019 – 2023) to the Croatian micro, small and medium entrepreneurs. Based on these results, the author(s) will contribute to the new knowledge about the green and digital transition and offer recommendations for a sustainable green and digital transition in Croatian and potential finance benefits on Croatian economy.

For the purposes of this work, the author(s) used secondary data, analyzing them using the following methods: descriptive research methods, deductive research methods, analysis methods and compilation methods. Obtained results are visible in the number of approved projects proposal and the total value of the projects. The impacts of project proposals on strengthening the sustainability and competitiveness of project holders and their partners is manifested through the number of newly introduced technological solutions related to green and/or digital goals in the year $m+2$, the projection of the newly employed persons as a result of the implementation of project activities in the year $m+2$, projected increase in sales revenue in year $m+2$, predicted increase in exports revenues in the year $m+2$. On the basis of research of literature and previously conducted secondary data research, the author(s) provide recommendations for the further sustainability of the digital and green transition in micro, small and medium-sized enterprises in Croatia.

Keywords: *economic growth, green and digital transition, micro, small and medium size entrepreneurs*

1. INTRODUCTORY CONSIDERATIONS

The paper is structured through 5 chapters, three sub-chapters and literature review.

First chapter was structured by the author(s) through three sub-chapters. The first sub-chapter relates to the Research subject, in which the author(s) introduce readers to the genesis of the green transition assessment and the transformation of the analog to the digital economy.

The focus of this research is on SMEs.¹ Namely, SMEs are the engine of Europe's economy. Therefore, a quick and efficient transformation of them is necessary, all with the aim of reducing negative impacts on the environment and mitigating climate change in accordance with Europe an Green Deal,² Sustainable Europe to 2030.³ Low-carbon development strategy of the Republic of Croatia until 2030 with a view to 2050,⁴ National development strategy of the Republic of Croatia until 2030.⁵

¹ Accounting Law (Zakon o računovodstvu), Official Gazette No. 78/15, 134/15, 120/16, 116/18, 42/20, 47/20, 114/22.

² European Commission, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, The European Green Deal COM/2019/640 Final, available at: [<https://eurlex.europa.eu/legalcontent/EN/TXT/?qid=1588580774040&uri=CELEX-%3A52019DC0640>], Accessed 04 May 2023.

³ European Commission, Towards a Sustainable Europe by 2030, available at: [https://commission.europa.eu/system/files/2019-02/rp_sustainable_europe_30-01_en_web.pdf], Accessed 03 May 2023.

⁴ Low-carbon development strategy of the Republic of Croatia until 2030 with a view to 2050 (Strategija niskougličnog razvoja Republike Hrvatske do 2030. s pogledom na 2050. godinu), Official Gazette No. 63/21.

⁵ National development strategy of the Republic of Croatia until 2030 (Nacionalna strategija razvoja Republike Hrvatske do 2030.godine) Official Gazette No. 13/21.

The second sub-chapter relates to the Research goals, in which the author(s) introduce readers to the main goals of this paper. First goal is to introduce the readers about the sustainable theory and hers effects on environment. The second goal is main goal, during that goal author(s) analyze the financial and social impact of approved projects to the Croatian SMEs projects holders based on the following indicators: the rate of utilization of co-financing of project activities and the number of newly introduced technological solutions related to green and/or digital goals in the year $m+2$, the projection of the newly employed persons in the year $m+2$, projected increase in sales revenue in year $m+2$, predicted increase in exports revenues in the year $m+2$.

Based on these results, the author(s) will contribute to the new knowledge about the green and digital transition and offer recommendations for a sustainable green and digital transition in Croatian SMEs. Author(s) recommendations will also be applicable to consumers in the public sector.

The third sub-chapter relates to the Research methodology. For the purpose of this paper author(s) were analyzed 274 approved projects proposal to the Croatian SMEs projects holders. They analyzed the collected data according to the following indicators: number of newly introduced technological solutions related to green and/or digital goals in the year $m+2$, the projection of the newly employed persons in the year $m+2$, projected increase in sales revenue in year $m+2$, predicted increase in exports revenues in the year $m+2$. For the purpose of this paper author(s) were used the following methods: descriptive research methods, deductive research methods, analysis methods and compilation methods.

The second chapter refers to Existing knowledge and hypothesis.

One of the central priorities of the European Commission is to make sure that people and businesses can take full advantage of the new opportunities that this green trans and digital revolution offers. The European Commission invests significant efforts in the form of drafting strategic documents, engaging human resources, and financial resources in the green and digital transition. Following guidelines and recommendations of the European Commission, membership countries in cooperation with contractual bodies, and within the framework of the program periods, announce public calls in the specified areas for the SMEs.

The current linear economic model is unsustainable, and the necessity of introducing innovative sustainable business models is the priority of the current generation. For the purpose of more effective introduction of innovative sustainable models in EU SMEs, European Commission create a several key strategic documents for the implementation of the green and digital transition until 2050.

Under this chapter author(s) form 1 main and 2 auxiliary hypotheses.

The third chapter is structured through three sub-chapters. First sub-chapter refers to the challenges of the green and digital transition of Croatian society and economy. In this sub-chapter the author(s) provide an overview of strategic goals: SG 8. Ecological and energy transition for climate neutrality and his performance index (Greenhouse gas emission, Municipal waste recycling rate, Share of renewable energy sources in gross total energy consumption), SG 9. Self-sufficiency in agriculture and the development of the bio-economy and his performance index (Labor productivity in agriculture), SG 10. Sustainable mobility and his performance index (Global Competitiveness Index (GCI), Infrastructure component), SC 11. Digital transition of society and economy and his performance index (DESI index of economic and social digitization) and Development directions (Sustainable economy and society, Strengthening resistance to crisis, Green and digital transition, Balanced regional development).

Second sub-chapter refers to the analysis of the digital transition of Croatian society and economy from 2019 to 2023. In this sub-chapter author(s) provide some statistical data on the position of Croatia in the category Integration of digital technology, position of Croatian SMEs in level of digital intensity, percentage of using e-innovice etc.

Third sub-chapter refers to the analysis of financial and social impacts approved projects in the area of digitization and green transformation on the Croatian SMEs. In this sub-chapter author(s) provide the main financial and social indicators that affected and still affect on Croatian SMEs. The subject of analysis were: Number of approved projects Total value of projects (in euros) Amount of grants (in euros) in sector of Manufacturing on the sample of 274 SMEs. They also analyzed these parameters: Number of newly introduced technological solutions related to green and/or digital goals, Increased income from exports (in euros), Increased sales revenue (in euros) and Employment growth (estimated number of new employees as a direct consequence of project implementation).

The fourth chapter refers to the Conclusion remarks. Author(s) are convinced that SMEs are important for green growth as key drivers of eco-innovation and key players in new green industries. In this chapter author(s) define key limitations in this research and pose several research questions. Further, in this chapter author(s) test the main and auxiliary hypotheses, gave a detailed overview of the scientific contribution of this paper and recommendations for Croatian SMEs and other stakeholders who are directly or indirectly related to the green and digital transition.

Last chapter in this paper is References.

1.1. Research subject

In this paper the subject of research are Croatian SMEs projects holder, in the area of green and digital transition, and the direct and indirect impacts of approved projects on the applicant's financial and social component. The total number of active SMEs (according to NKD 2007)⁶ in Croatia 2023 was 177,582⁷ with 178,892⁸ employs. For the purpose of this research author(s) analyze sector C (Manufacturing). In 2023 in Croatia was 23,772⁹ active SMEs in that sector. The author(s) analyzed the data on a sample of 274 active SMEs.

1.2. Research goals

The aim of this paper is to research the literature about digital and green transformation, hers financial and social impacts on Croatian economy across of the approved projects (for the period 2019 – 2023) to the Croatian SMEs.

Based on these results, the author(s) will contribute to the new knowledge about the green and digital transition and offer recommendations for a sustainable green and digital transition in Croatian SMEs. Author(s) recommendations can also be consumed in the public sector.

1.3. Research methodology

For the purposes of this work, the author(s) used secondary data. Secondary data are collected by the author(s) in cooperation with the Ministry of Economy and Sustainable Development¹⁰ and Croatian Agency for Small Business, innovations

⁶ Decision on the National Classification of Activities 2007 - NKD 2007 (Odluka o Nacionalnoj klasifikaciji djelatnosti 2007. - NKD 2007.), Official Gazette No. 58/07.

⁷ Bureau of Statistics, Broj i struktura poslovnih subjekata u ožujku 2023, pp. 1-8, available at: [<https://podaci.dzs.hr/2023/hr/58271>], Accessed 3 May 2023.

⁸ *Ibid.*

⁹ *Ibid.*

¹⁰ Ministry of Economy and Sustainable Development, Jačanje konkurentnosti poduzeća ulaganjima u digitalnu i zelenu tranziciju, Referentna oznaka: KK.11.1.1.01., available at: [<https://mingor.gov.hr/jacanje-konkurentnosti-poduzeca-ulaganjima-u-digitalnu-i-zelenu-tranziciju-referentna-oznaka-kk-11-1-1-01/8188>], accessed 4 May 2023.; *Ibid.*, Jačanje održivosti te poticanje zelene i digitalne tranzicije poduzetnika u sektoru turizma, available at: [<https://mint.gov.hr/javni-pozivi-i-natjecaji-22753/jacanje-odrzivosti-te-poticanje-zelene-i-digitalne-tranzicije-poduzetnika-u-sektoru-turizma/23234>], accessed 4 May 2023.; *Ibid.*, Poboľšanje konkurentnosti i učinkovitosti MSP-a kroz informacijske i komunikacijske tehnologije (IKT) – 2, Referentna oznaka: KK.03.2.1.19., available at:

and investments¹¹ (HAMAG BICRO) through a written request for access to information and publicly available data on the web site of contracting authority. The author(s) were used the following methods for data analysis: descriptive research methods, deductive research methods, analysis methods and compilation methods. Obtained results are visible in the number of approved projects proposal and the total value of the projects.

2. LITERATURE REVIEW AND HYPOTHESIS CREATION

Digital technology is changing our lives, she revolutionized almost every aspect of our daily life, from basic shopping, through banking, to security, education and the way we work.¹² One of the central priorities of the European Commission is to make sure that people and businesses can take full advantage of the new opportunities that this digital revolution offers – in other words, building a Europe fit for the digital age.¹³ Commission priorities for 2019-2024 are: European Green Deal, Europe fit for the digital age, Economy that works for people, stronger Europe in the world, Promoting our European way of life, New push for European democracy.¹⁴ In this paper author(s) are primarily focus on first and second priority.

The EU's digital strategy aims to make this transformation work for people and businesses, while helping to achieve its target of a climate-neutral Europe by 2050.¹⁵

Sustainability transition and digitization constitute cornerstones of the European policy agenda prioritizing the digital transformation, especially of the SMEs.¹⁶

[<https://mingor.gov.hr/poboljsanje-konkurentnosti-i-ucinkovitosti-msp-a-kroz-informacijske-i-komunikacijske-tehnologije-ikt-2-referentna-oznaka-kk-03-2-1-19-15-studenog-2018/7664>], Accessed 4 May 2023.

¹¹ Croatian Agency for SMEs, Innovations and Investments - HAMAG-BICRO, available at: [<https://hamagbicro.hr/>], Accessed 4 May 2023.

¹² European Commission, Analogue to digital - and back, available at: [<https://culture.ec.europa.eu/hr/creative-europe/projects/priorities-2019-2024/digital-europe>], Accessed 4 May 2023.

¹³ European Commission, A Europe fit for the digital age, available at: [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age_en], Accessed 4 May 2023.

¹⁴ *Ibid.*

¹⁵ *Ibid.*

¹⁶ European Commission, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, The European Green Deal COM/2019/640 Final, available at: [<https://eurlex.europa.eu/legalcontent/EN/TXT/?qid=1588580774040&uri=CELEX-%3A52019DC0640>], Accessed 4 May 2023.

Specifically, the digital transformation through the Digital Europe Programme brings digital technology to businesses.¹⁷

The EU's long-term budget, coupled with NextGenerationEU (NGEU), the temporary instrument designed to boost the recovery, form the largest stimulus package ever financed in Europe.¹⁸ The EU wants to step up investment in areas such as research and innovation, digital transformation, strategic infrastructure and the single market, as they will be key to unlocking future growth. Programmes under this heading will help tackle shared challenges such as decarbonation and demographic change, and boost the competitiveness of enterprises, including small and medium-sized companies.¹⁹

Over the almost last two decade, a frequent claim has been that the linear economic models need to be reformed in order to address climate change and at the same time daily key economic and social challenges. The current linear economic model takes energy or materials, transforms them into goods or services, and then passes them to businesses or consumers who use them. The outcome is financial gain for the agents involved, but the original resources disappear and waste is generated as a by product. Take-make-waste is not a sustainable model because economic growth is outpacing available resources while the constant depletion of non-renewable energy sources leads to natural, economic and social breakdown.²⁰

Aware of the unsustainability of the linear model, the European Union and its members, together with the supporting bodies (European Parliament, Council of the European Union of the EU, European Commission) created the strategic document European Green Deal.

The Green Plan is an integral part of the Commission's strategy for the implementation of the United Nations Program to 2030 and the Sustainable development goals and other priorities. The European Commission will with the Green Plan

¹⁷ Chatzistamoulou, N., *Is digital transformation the Deus ex Machina towards sustainability transition of the European SMEs?*, Ecological Economics, Volume 206, 2023, available at: [<https://www.sciencedirect.com/journal/ecological-economics>], Accessed 4 May 2023.

¹⁸ European Commission, Recovery plan for Europe, available at: [https://commission.europa.eu/strategy-and-policy/recovery-plan-europe_en], Accessed 4 May 2023.

¹⁹ Publication Office of the European Union, The EU's 2021-2027 long-term budget and NextGenerationEU, available at: [<https://op.europa.eu/en/publication-detail/-/publication/d3e77637-a963-11eb-9585-01aa75e-d71a1>], Accessed 4 May 2023.

²⁰ Net impact, Trash the Take-Make-Waste Model of Industry and Embrace the Regenerative Economy, available at: [<https://netimpact.org/blog/Regenerative-Economy-Model>], Accessed 4 May 2023.

redirect the macroeconomic coordination process within the European Semester²¹ to integrate the United Nations Sustainable Development Goals²² and placed the sustainability and well-being of citizens at the heart of economic policy and sustainable development goals at the heart of EU policy-making and action.²³

The first reasonable definition of the “Green New Deal” was the idea that with “green” (clean and sustainable) technologies and products, a thorough structural change of the global economy that could prevent dangerous climate change and mitigate the consequences of climate change.²⁴

The concept of the Green New Deal was formulated on the basis of a figurative rhetorical question: “Do we want to justify overcoming the crisis by reviving the existing ‘brown’ global economy, or do we want to promote global revitalization toward a ‘green’ economy that avoids ecological damage in the first place?”²⁵

The European Climate Law²⁶ writes into law the goal set out in the European Green Deal for Europe’s economy and society to become climate-neutral by 2050. The law also sets the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.

SMEs are also important for green growth as key drivers of eco-innovation and key players in emerging green industries. Reducing the environmental impact of

²¹ Council of the EU and the European Council, How the European Semester works, available at: [<https://www.consilium.europa.eu/en/policies/european-semester/how-european-semester-works/>], Accessed 4 May 2023.

²² United Nations, What are the Sustainable Development Goals?, available at: [https://www.undp.org/sustainable-development-goals?gclid=CjwKCAjw9pGjBhBEiwAa5jI3EG-m6dn4Rq_afbUuK8AJPLqn6GBkKg2KjABqJyMGaKYpV7aMSN_U-hoCJgAQAvD_Bw], Accessed 4 May 2023.

²³ European Commission, The European Commission and the SDGs, available at: [<https://s3platform.jrc.ec.europa.eu/documents/20125/585217/Carlos+Berrozpe+Garcia+2021+11+09+SDGs+and+VdL+Commission+INTPA.pdf/78cd18fe-af9c-5d64-85bc-9778fa-fa60a5?t=1636989890132>], Accessed 4 May 2023.

²⁴ Galvin, R.; Healy, N., *The Green New Deal in the United States: What it is and how to pay for it*, Energy Research & Social Science, Volume 67, 2020, available at: [<https://www.sciencedirect.com/science/article/pii/S2214629620301067>], Accessed 4 May 2023.

²⁵ Barbier, E., *A Global Green New Deal: Rethinking the Economic Recovery*, Cambridge: Cambridge University Press, 2010, pp. 1-2.

²⁶ European Commission, European Climate Law, available at: [https://climate.ec.europa.eu/eu-action/european-green-deal/european-climate-law_en], Accessed 4 May 2023.

SMEs through achieving and going beyond environmental compliance in both manufacturing and services is a key success factor in greening the economy.²⁷

Understanding the opportunities and challenges of green/sustainable entrepreneurship is the key to finding new business solutions for this development. Sustainability and technological entrepreneurship are strongly interrelated, e.g., by using technology and innovation to create new products, services, and processes that address environmental and social sustainability challenges.²⁸ A significant body of scientific evidence shows how companies tackle climate change by implementing innovative and advanced technologies, including digitizing business processes. Companies are increasingly investing in renewable energy, energy efficiency, and carbon capture and storage technologies [8,9]. Additionally, companies are implementing innovative technologies such as electric vehicles, battery storage, and green buildings to reduce greenhouse gas emissions.²⁹

Such being the case, author(s) form and test the following hypothesis:

H1: The financial intensity of the support of the reference call KK.11.1.1.01 granted to micro and small entrepreneurs was used for the maximum intensity of the call

H2: The financial intensity of the support of the reference call KK.11.1.1.01 granted to micro and medium entrepreneurs was used for the maximum intensity of the call

3. DIGITALIZATION AND GREEN TRANSFORMATION - CASE OF CROATIAN SMES

3.1. Challenges of digitalization and green transformation

Digital technologies surround us every day and have a profound impact on our way of life and business. A visionary research and innovation strategy is crucial for a sustainable, more productive and greener economy. The fight against climate change and the green transition can only be achieved with digital solutions and developing novel business models. Digital solutions will open up new opportuni-

²⁷ Council of the EU and the European Council, Greening SMEs: Opportunities and challenges in EaP countries, available at:

[https://consiliumeuropa.eu/consilium/primodisplay?docid=cdi_oecd_books_10_1787_9789264293199_4_en&context=PC&vid=32CEU_INST:32CEU_VU1&lang=en&search_scope=MyInst_and_CI&adaptor=Primo%20Central], Accessed 4 May 2023.

²⁸ Kekkonen, A.; Pesor, R.; Täks, M., Stepping towards the Green Transition: Challenges and Opportunities of Estonian Companies, Sustainability 2023, Vol. 15, No. 5., 4172, available at: [<https://www.mdpi.com/2071-1050/15/5/4172>], Accessed 4 May 2023.

²⁹ *Ibid.*

ties for micro, small and medium-sized enterprises (SMEs),³⁰ encourage the development of reliable technology, encourage an open and sustainable economy.

SMEs are the engine of Europe's economy. They represent 99% of all businesses in the EU, account for more than half of Europe's GDP and employ around 100 million people. SMEs bring innovative solutions to challenges like climate change, circular economy, sustainability and resource efficiency resource, social cohesion and help spread this innovation throughout Europe's regions. They are key factor to the EU's twin transitions to a sustainable and digital economy. They are crucial to Europe's competitiveness and sustainability economic and technological sovereignty, industrial ecosystems and resilience to external challenges.

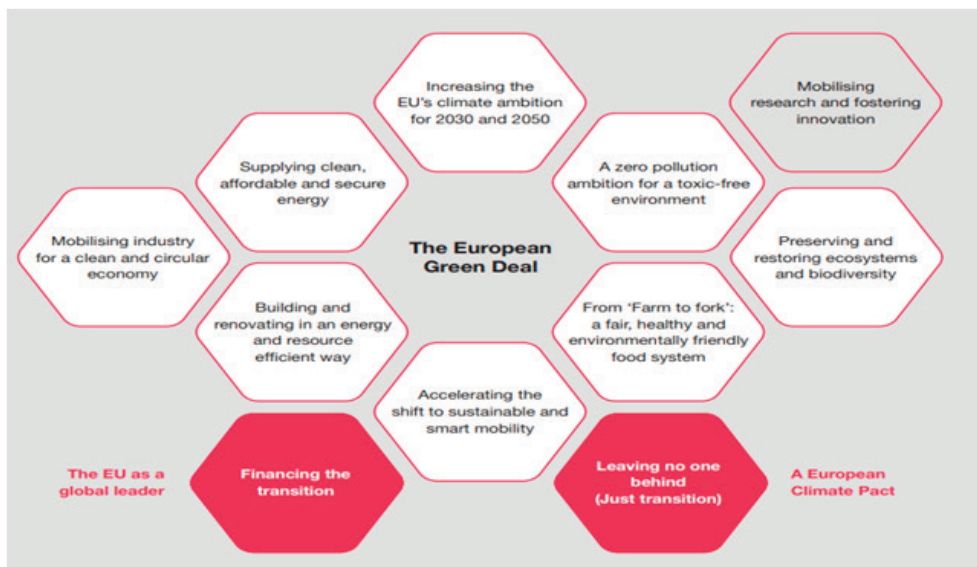
SMEs have the potential to become eco-innovators by enhancing their environmental performance through lean and green improvement measures.³¹ Environmental and resource issues become a very challenging when we talk about of the sustainable theory and hers effects become very challenge for the sustainability of human community. In addition to humans, the main source of carbon pollution and environmental pollution are companies (micro, small, medium and large companies).

In order to implement the transformation of the economy for a sustainable future, Croatia, like other member states of the European Union, is implementing structural reforms directing its economy towards the fulfillment of all 9 strategic goals (for more details see Picture 1.).

³⁰ The Croatian Chamber of Economy - Centar za EU, Vodič za definiciju malog i srednjeg poduzetništva u natječajima za dodjelu sredstava iz fondova EU, p. 3., available at: [<https://www.hgk.hr/documents/vodiczadefinicijumalogisrednjegpoduzetnistvaunatjecajimazadodjelusredstavaizfondovaeuhgkanaliza0120144457b5747dec0a7.pdf>], accessed 5 April 2023.

³¹ Dey, P.K.; Malesios, C.; Chowdhury, S.; Saha, K.; Budhwar, P.; De, D., *Adoption of Circular Economy Practices in Small and Medium-Sized Enterprises: Evidence from Europe*. Int. J. Prod. Econ., 2022, pp. 248.

Picture 1. Transforming the EU's economy for a sustainable future



Source: Author(s) processed and adapted to: PwC PwC EU, *Green Deal Survey. Are Europe's Businesses Ready for the EU Green Deal?*, pp. 3-22., available at:

[<https://www.pwc.com/gx/en/tax/publications/assets/eu-green-deal-tax-report.pdf>], accessed 5 April 2023.

According to the National Development Strategy of the Republic of Croatia until 2030, Croatia has defined four development directions (for the more details see Picture 2.), and the focus of this paper is Development direction 3. Green and digital transition and on Strategic Goals:

SG 8. Ecological and energy transition for climate neutrality

SG 9. Self-sufficiency in food and the development of the bio economy

SG 10. Sustainable mobility

SG 11. Digital transition of society and economy

Picture 2. Development directions - case of Croatia

DEVELOPMENT DIRECTION 1.
Sustainable economy and society



DEVELOPMENT DIRECTION 2.
Strengthening resistance to crisis



DEVELOPMENT DIRECTION 3.
Green and digital transition



DEVELOPMENT DIRECTION 4.
Balanced regional development



Source: Author(s) processed and adapted to: National development strategy of the Republic of Croatia until 2030 (Nacionalna strategija razvoja Republike Hrvatske do 2030.godine) Official Gazette No. 13/23, available at:

[<https://hrvatska2030.hr/#rs>], Accessed 5 April 2023.

Creating a regulatory, investment and tax environment that stimulates technological development and innovation, investing in digital competences frameworks for citizens and increasing the number of experts in information and communication technologies, joint synergy of private and public, and by applying advanced technologies in public and market activities, Croatia in 2032 wants to be a country of digitally and economically competitive companies and digitized public administration with personalized public services.³²

Strategy for Digital Croatia until 2032 defines the guidelines for achieving the targeted transformation of Croatia towards a green and digital way of life as prerequisites for future sustainable economic growth and social development.³³

³² Digital Croatia strategy for the period until 2032 (Strategija digitalne Hrvatske za razdoblje do 2032. godine), Official Gazette No. 13/23.

³³ *Ibid.*

Table 1. Development direction 3. Green and digital transformation

STRATEGIC GOAL OF NDS - 2030	PERFORMANCE INDICATORS	INITIAL VALUE	TARGET VALUE 2030	EU AVERAGE
SG 8. Ecological and energy transition for climate neutrality	Greenhouse gas emissions (base year 1990)	75,23% (2018)	65%	79,26% (2018)
	Municipal waste recycling rate	25,30% (2018)	55%	47,40% (2018)
	Share of renewable energy sources in gross total energy consumption	28,02% (2018)	36,40%	18,88% (2018)
SG 9. Self-sufficiency in agriculture and the development of the bio-economy	Labor productivity in agriculture	6.107 euro/GJR (2019)	10.000,00 euro/GJR*	20.120 euro/GJR (2019)
SG 10. Sustainable mobility	Global Competitiveness Index (GCI), Infrastructure component	32nd position	< 28th position	-
SC 11. Digital transition of society and economy	DESI index of economic and social digitization	47,60 (20th position in EU) (2020)	Reach the EU average	52,57% (2020)

GJR (eng. Annual Work Unit)

Source: Author(s) processed and adapted to: Digital Croatia strategy for the period until 2032 (Strategija digitalne Hrvatske za razdoblje do 2032. godine), Official Gazette No. 13/23.

According to the Table 1. Development direction 3. Green and digital transformation, Croatia strives to achieve Target value 2030 in Strategic goal of NDS 2030;³⁴ SG 8. Ecological and energy transition for climate neutrality and his performance index (Greenhouse gas emission, Municipal waste recycling rate, Share of renewable energy sources in gross total energy consumption), SG 9. Self-sufficiency in agriculture and the development of the bio-economy and his performance index (Labor productivity in agriculture), SG 10. Sustainable mobility and his performance index (Global Competitiveness Index (GCI), Infrastructure component), SC 11. Digital transition of society and economy and his performance index (DESI index of economic and social digitization).

In accordance with the above, we are aware of the impact of external factors such as the post-pandemic period, current climate changes, continuous negative impacts on the environment and human health, the turbulent environment for the work and business of legal entities, the war environment (Russia against Ukraine), the high rate of inflation, demographic policies and constant outflow of the working-age population, sustainable management of the green and digital transition in

³⁴ NDS is National Development Strategy 2030.

Croatia primarily requires comprehensive solutions, long-term planning, significant financial investments, and adequate human resources.

3.2. Analysis of the digital transition of the Croatian society and economy from 2019 to 2023

According to the latest available data regarding the Index of Economic and Social Digitization - DESI, which refers to the year 2022, the Republic of Croatia in the category “Integration of digital technology” was above the point average of EU countries, in the middle position on the list among EU countries (in 14th place out of 27 countries). Namely, DESI indicates that among Croatian SMEs, 50% of them have at least a basic level of digital intensity, which is slightly below the EU average of 55%. When it comes to the application of ICT for the purpose of environmental sustainability, 75% of Croatian companies record a medium/high intensity of green measures using ICT, which is significantly higher than the EU average (66%).³⁵

Croatia records worsens results for the sub-objectives “Electronic sharing of information” (24%) and “Use of social networks for business purposes” (24%), which indicates a weaker acceptance of highly advanced and integrated IT solutions in the work of companies.³⁶

Croatian companies take advantage of the opportunities offered by online commerce: 29% of SMEs sell online (above the EU average of 18%), while 13% of all small and medium-sized companies sell across borders, and 13% of turnover comes from the online sales segment. Advanced digital technologies are increasingly popular among Croatian SMEs, so 35% of them use cloud solutions, 43% use e-invoices, and 9% use disruptive technologies based on artificial intelligence (AI), according to which Croatia is above all three indicators of the EU average.³⁷

According to the IMD (World Digital Competitiveness Rankings) for 2020, Croatia ranked 52nd out of 63 countries. According to the same source, Croatia lags behind other countries, especially in the field of international experience, employee training, the regulatory framework for the development and application of technology, and the ability of companies to quickly respond to opportunities and threats. In the “e-Invoices” subcategory, Croatia surpassed the EU average by 10.8% points in 2021, which was significantly influenced by the con tactless way

³⁵ Digital Croatia strategy for the period until 2032 (Strategija digitalne Hrvatske za razdoblje do 2032. godine), Official Gazette No. 13/23.

³⁶ *Ibid.*

³⁷ *Ibid.*

of doing business during the Covid-19 pandemic, as well as the beginning of the application of the Law on Electronic Invoicing in public procurement (“Narodne novine”, number 94/18.).³⁸

Also, very important economic factor in the further digitization of Croatian society is the strength of the national IT industry. Namely, the Croatian IT industry is continuously growing and, according to the latest available data, in 2019 it accounted for 4.48% of the national GDP, and in 2021 it contributed 5.8% to the total exports of the Republic of Croatia.³⁹

3.3. Analysis of approved projects in the area of digitization and green transformation on the Croatian SMEs from 2019 to 2023

According to the calls KK.03.2.1.19 and KK.11.1.1.01 the projection of number of new jobs, sales revenue, export revenue in year $m + 2$ (the projection of new jobs) through the KK.03.2.1.19 call is 2.631 new employees, while the projection through the KK.11.1.1.01 call is 2.105 new employees. The projection of realized revenues in the approved 1018 project proposals from the KK.03.2.1.19 call is 317,875,438.38 euros while the projection of realized revenues in the approved 596 project proposals from the KK.11.1.1.01 call is 303,448,150.19 euros. According to the call KK.11.1.1.01 projection of export revenue is 110,315,682.83 euros. Share of private contribution according to the KK.03.2.1.19 call is 42,497,141.88 euros and under the KK.11.1.1.01 call is 294,605,544 euros. The total value of grants Strengthening the competitiveness of companies by investing in digital and green transformation, KK.11.1.1.0 earmarked for this call for proposals is 132,569,125 euros, and we estimate that the investment cycle worth more than 427,174,669 euros will be completed with the beneficiaries funds. It follows that 0,13 cents of non repayable funds of this type of calls will increase the investment cycle by another 0,40 cents to the original value.⁴⁰

The subject of this analysis are digital and green transition, their financial and social impacts on Croatian economy across of the approved projects (for the period

³⁸ *Ibid.*

³⁹ *Ibid.*

⁴⁰ Ćučić, D.; Pancić, M.; Zavišić, Ž., Green and digital transition in the function of growth and development of Croatia, Economic and Social Development, 88 th International Scientific Conference on Economic and Social Development – “Roadmap to NetZero Economies and Businesses”, 2022, p. 400, available at: [https://www.esdconference.com/upload/book_of_proceedings/Book_of_Proceedings_esdDubai2022_Online.pdf], Accessed 4 May 2023.

2019 – 2023) to the Croatian SMEs. The analysis includes a data sample of 274⁴¹ Croatian SMEs in the sector of Manufacturing that is co-financed under reference call KK.11.1.1.0 and is publicly available by Ministry of Economy and Sustainable Development.

The authors have expanded the available data in terms of the location of the headquarters of small and medium-sized enterprises, they have also divided them into categories of small and medium-sized enterprises and tried to show the geographical dispersion of cofinancing in terms of the category of entrepreneurs and NUTS2 or NUTS3 region.

A detailed presentation of the impacts is visible in Table 2., Table 3., Table 4., Table 5 and Table 6.

⁴¹ Pursuant to the State aid award program for strengthening the competitiveness of companies through investments in digital and green transition from April 20, 2021 (CLASS: 910-04/21-01/98, UR NO: 517-

11-03-01-01-21-3) state grants were awarded to micro, small and medium enterprises in the form of grants through:

1) Regional investment grants referred to in Article 14 of Commission Regulation (EU) no. 651/2014

2) Aid for process innovation and business organization referred to in Article 29 of Commission Regulation (EU) no. 651/2014

3) Grants for training referred to in Article 31 of Commission Regulation (EU) no. 651/2014

4) Subsidies for advisory services for the benefit of SMEs referred to in Article 18 of Commission Regulation (EU) no. 651/2014

Pursuant to the Program for granting small-value grants to strengthen the competitiveness of companies through investments in digital and green transition from April 16, 2021 (CLASS: 910-04/21-01/110, UR NO:

517-11-03-01-01-21-1) small-value grants were awarded to SMEs in the form of grants as a supplement to private financing.

The subsidies were granted in accordance with the Regulation of the European Commission (EU) no. 1407/2013 of December 18, 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to small aid values. Details on: Ministry of Economy and Sustainable Development, Jačanje konkurentnosti poduzeća ulaganjima u digitalnu i zelenu tranziciju, available at:

[<https://strukturnifondovi.hr/natjecaji/jacanje-konkurentnosti-poduzeca-ulaganjima-u-digitalnu-i-zelenu-tranziciju/>, Informacije o potpisanim ugovorima-22.2.2022.pdf], Accessed 4 April 2023.

Table 2. Distribution of approved projects of small and medium-sized enterprises from the call (KK.11.1.1.01) by NUTS2 regions

NUTS2 Region	Micro and small enterprise	%	Medium enterprise	%	Total	%	$\lambda_{\text{micro and small}}$	λ_{medium}
	1	2	3	4	5	6	7(2-6)	8(4-6)
North Croatia	56	28.28	31	40.79	87	31.75	-3,47	9,04
City of Zagreb	53	26.77	16	21.05	69	25.18	1,59	-3,68
Panonian Croatia	52	26.26	15	19.74	67	24.45	1,81	-4,71
Adriatic Croatia	37	18.69	14	18.42	51	18.61	0,08	-0,19
Total	198	100	76	100	274	100	0	0

Source: Author(s) calculation

The regional distribution by the number of signed co-financing contracts (see Table 2), shows that most contracts were signed by entrepreneurs in North Croatia 87 (31.75%), followed by entrepreneurs in the City of Zagreb with 69 (25.18%), in Panonian Croatia 67 (24.45%) and entrepreneurs in Adriatic Croatia 51 (18.61%). Looking at the categories of entrepreneurs by the total number of approved projects, the results differ somewhat from the average. Thus, the absolute number of small entrepreneurs in the sample of 56 is highest in North Croatia. However, if we consider their relative ratio to the average of the region, we find a negative deviation of $\lambda_{\text{micro and small}} -3.47\%$. In all other regions, the share of the leader Panonian Croatia is relatively higher, $\lambda_{\text{micro and small}} +1.81\%$, followed by the City of Zagreb $\lambda_{\text{micro and small}} +1.59\%$ and Adriatic Croatia $\lambda_{\text{micro and small}} +0.08\%$. Medium entrepreneurs by absolute number also follow the trend of the sample so that the North Croatia region has the most 87 of them (40.79%) and records the highest deviation in relation to the overall structure of the sample of $\lambda_{\text{medium}} +9.04\%$, in the region of Adriatic Croatia the deviation is negligible $\lambda_{\text{medium}} -0.19\%$, while all other regions record significant deviations from the relative average in the sample, City of Zagreb $\lambda_{\text{medium}} -3.68\%$ Panonian Croatia $\lambda_{\text{medium}} -4.71\%$. Thus, we can conclude that the region of Adriatic Croatia is the most balanced when considering the relative shares and their deviations according to the number of SME entrepreneurs, followed by the City of Zagreb, Panonian Croatia and North Croatia.

Table 3. Distribution of total value in € of approved projects of small and medium-sized enterprises from the call (KK.11.1.1.01) by NUTS2 regions

NUTS2 Region	Micro and small enterprise	%	Medium enterprise	%	Total	%	$\lambda_{\text{micro and small}}$	λ_{medium}
	1	2	3	4	5	6	7(2-6)	8(4-6)
North Croatia	24.777.624	28,39	19.035.091	42,01	43.812.714	33,05	-4,65	8,96
City of Zagreb	24.046.518	27,56	11.728.205	25,89	35.774.723	26,99	0,57	-1,10
Panonian Croatia	20.803.457	23,84	8.686.223	19,17	29.489.680	22,24	1,60	-3,07
Adriatic Croatia	17.633.430	20,21	5.858.577	12,93	23.492.007	17,72	2,49	-4,79
Total	87.261.028	100	45.308.097	100	132.569.125	100	0	0

Source: Author(s) calculation

Looking at the total amount of co-financing achieved, €132,569,125 (see Table 3), one third was awarded to entrepreneurs in North Croatia: €43,812,714 (33.05%), €24,777,624 to micro and small enterprises $\lambda_{\text{micro and small}}$ -4.65% and €19,035,091 to medium enterprises λ_{medium} +8.96%, followed by the City of Zagreb €35,774,723 (26.99) €24,046,518 to micro and small enterprises $\lambda_{\text{micro and small}}$ +0.57% and 11,728,205 to medium enterprises λ_{medium} -1.1%. The value of support in Panonian Croatia is €29,489,680 (22.24%), with the following structure: €20,803,457 (27.56%) for micro and small enterprises $\lambda_{\text{micro and small}}$ +1.6% and €8,686,223 (19.17%) λ_{medium} -3.07. The lowest amount of co-financing in absolute terms was achieved in Adriatic Croatia with €23,492,007 (17.72). Micro and small enterprises accounted for € 17,633,430 (20.21%) $\lambda_{\text{micro and small}}$ +2.49% and € 5,858,577 for medium enterprises λ_{medium} -4.79%. Looking at the value, the most balanced region is the City of Zagreb, followed by Panonian Croatia, Adriatic Croatia and North Croatia.

The total value allocation in the call (KK.11.1.1.01) was € 151,304,002. According to the information on the concluded contracts Table 4, the approved co-financing amount was € 132,569,125, i.e. 87.62% of the total allocation, and € 18,734,877 (12.38%) of the planned funds from the call remained unused. Looking at the value of co-financing, € 87,261,028 (65.82%) was allocated to projects of small entrepreneurs and € 45,308,097 (34.18%) to projects of medium-sized entrepreneurs. Under this call for proposals, the co-financing of a total of 274 projects was approved, of which 198 (72.18%) of the total financed projects, worth € 256,404,407, were awarded to small entrepreneurs and 76 projects (27.82%), worth € 170,770,262, were awarded to medium-sized entrepreneurs.

According to the data the relative ratio of the average amount of realized subsidies in relation to the value of the project is 31.03% in the category of micro and small enterprises 34.03%, while for medium enterprises it is 26.53%.

Table 4. Approved SMEs projects proposal (in 2022 year - reference call KK.11.1.1.0)

Size of SMEs	Number of approved projects	%	Total value of projects (€)	%	Amount of grants (€) SL Average subvention level %	%
Micro and small enterprise	198	72.18	256,404,407	59.10	87,261,028 (34.03%)	65.82
Medium enterprise	76	27.82	170,770,262	40.90	45,308,097 (26.53%)	34.18
Grand Total	274	100.00	427,174,669	100.00	132,569,125 (31.03%)	100.00

Source: Author(s) calculated and adapted to: Ministry of Economy and Sustainable Development., *Jačanje konkurentnosti poduzeća ulaganjima u digitalnu i zelenu tranziciju*, available at: [<https://strukturnifondovi.hr/natjecaji/jacanje-konkurentnosti-poduzeca-ulaganjima-u-digitalnu-i-zelenu-tranziciju/>, Informacije-o-potpisanim-ugovorima-22.2.2022.pdf], Accessed 4 May 2023.

According to the call KK.11.1.1.0, all SME entrepreneurs may receive grants in the following categories: Regional Grants, Support for Process Innovation and Business Organization, Support for Training, Grants for Consulting Services, and De Minimis aid. The maximum limit for co-financing micro and small enterprises was regional grants (45%), support for process innovation and business organization (50%), support for training, grants for advisory services (70%), and de minimis state aid (75%). The ceiling for co-financing of medium enterprises was regional grants (35%), support for process innovation and business organization (50%), support for training, grants for advisory services (70%), and de minimis aid (75%).

Grants to micro and small enterprises (see Tables 5 and 7) averaged €440,712 (median: €350,413) and regional grants averaged Avg. 362,788, median €270,192, Avg. 24,786, median €11.878 Support for process innovation and business organization, Avg. €10,552, median €763 Support for training, Avg. €17,863, median €13,936 Grants for advisory services and €24,722, median €16,176 in the de minimis aid category.

Medium-sized companies (see Tables 6 and 7) received an average of €596,159, median €573,190. The funding structure is as follows Support for regional grants, Avg. 482.240, median €395,753, mean €51,841, median €18,199 Support for process innovation and business organization, mean €14,802, median €1,818 Support for training, mean €20,456, median €17,851 Grants for consultancy services and €26,821, median €19,447 in the de minimis aid category.

Table 5. Data for small enterprises (in 2022 year - reference call KK.11.1.1.0)

NUTS 2 Region	NUTS 3 County	Total value of the project (€)	Grants awarded (€)	Regional grants (€)	Support for process innovation and business organization (€)	Support for training (€)	Grants for advisory services (€)	De minimis aid (€)
SUM OF								
NORTH CROATIA	KOPRIVNICA-KRIŽEVCI	1.490.422	516.868	440.026	0	219	21.301	55.323
	KRAPINA-ZAGORJE	14.412.337	4.989.130	4.389.557	64.126	122.698	207.299	205.450
	MEĐIMURJE	17.077.701	6.136.518	5.447.269	165.422	64.915	176.654	282.259
	VARAŽDIN	4.867.763	1.749.520	1.415.377	85.265	52.447	95.793	100.638
	ZAGREB	33.202.067	11.385.588	9.479.100	692.226	360.322	334.291	519.648
CITY OF ZAGREB	THE CITY OF ZAGREB	73.925.318	24.046.518	18.990.743	2.199.508	544.187	1.140.653	1.171.428
PANONIAN CROATIA	BJELOVAR-BILOGORA	3.267.858	1.130.373	988.540	67.608	0	44.462	29.763
	BROD-POSAVINA	10.963.423	3.812.656	3.192.991	233.450	16.907	176.951	192.358
	KARLOVAC	9.291.506	2.723.956	2.377.154	26.942	102.913	101.837	115.110
	OSIJEK-BARANJA	9.913.641	3.570.820	2.837.797	97.222	154.580	146.311	334.910
	POŽEGA-SLAVONIA	4.892.434	1.689.329	1.468.989	41.296	12.078	77.177	89.788
	SISAK-MOSLAVINA	6.670.952	2.438.341	2.091.252	119.874	20.233	105.006	101.976
	VIROVITICA-PODRAVINA	689.698	257.927	218.868	0	5.574	18.183	15.302
VUKOVAR-SRIJEM	14.725.828	5.180.055	4.061.998	149.425	81.659	178.203	708.770	
ADRIATIC CROATIA	DUBROVNIK-NERETVA	387.332	138.139	125.862	0	5.110	3.783	3.384
	ISTRA	9.906.039	3.472.335	2.716.600	191.745	258.818	180.523	124.650
	LIKA-SENJ	6.341.333	2.223.587	1.947.567	24.326	1.059	49.204	201.431
	PRIMORJE-GORSKI KOTAR	8.632.295	2.993.446	2.517.614	85.701	41.185	128.648	220.297
	SPLIT-DALMATIA	15.400.685	5.417.473	4.231.759	464.565	163.113	264.899	293.137
	ŠIBENIK-KNIN	1.657.817	516.351	369.704	103.975	1.594	13.207	27.872
	ZADAR	8.687.959	2.872.099	2.523.283	95.028	79.746	72.500	101.543
Grand Total €		256.404.407	87.261.028	71.832.050	4.907.704	2.089.355	3.536.884	4.895.035

Source: Author(s) calculated and adapted to: Ministry of Economy and Sustainable Development, Jačanje konkurentnosti poduzeća ulaganjima u digitalnu i zelenu tranziciju, available at:

[<https://strukturnifondovi.hr/natjecaji/jacanje-konkurentnosti-poduzeca-ulaganjima-u-digitalnu-i-zelenu-tranziciju/>, Informacije-o-potpisanim-ugovorima-22.2.2022.pdf], accessed 4 May 2023.

Table 6. Data for medium-sized enterprises (in 2022 year - reference call KK.11.1.1.0)

NUTS 2 Region	NUTS 3 County	SUM OF						
		Total value of the project (€)	Grants awarded (€)	Regional grants (€)	Support for process innovation and business organization (€)	Support for training (€)	Grants for advisory services (€)	De minimis aid (€)
NORTH CROATIA	KOPRIVNICA-KRIŽEVCI	5.954.009	1.601.271	1.495.726	0	2.113	39.427	64.006
	KRAPINA-ZAGORJE	20.766.521	5.952.610	4.948.684	296.228	211.916	255.163	240.619
	MEĐIMURJE	20.231.646	5.057.792	4.414.983	267.074	37.906	141.514	196.316
	VARAŽDIN	9.892.822	2.713.454	2.465.749	54.134	70.674	33.048	89.849
	ZAGREB	13.992.897	3.709.964	2.884.460	422.479	183.814	115.602	103.609
CITY OF ZAGREB	THE CITY OF ZAGREB	43.387.217	11.728.205	9.305.905	1.142.975	421.579	416.800	440.946
PANONIAN CROATIA	BJELOVAR-BILOGORA	14.036.528	3.485.705	2.634.139	531.217	2.703	105.378	212.269
	BROD-POSAVINA	1.993.679	538.874	364.255	91.719	32.586	18.712	31.603
	KARLOVAC	5.781.890	1.512.089	1.043.825	274.655	33.977	68.551	91.081
	OSIJEK-BARANJA	3.219.090	857.483	585.763	58.620	29.990	60.055	123.054
	POŽEGA-SLAVONIA	3.690.524	995.421	914.792	0	0	40.812	39.817
	SISAK-MOSLAVINA	2.569.627	683.665	556.716	72.759	0	5.335	48.855
	VIROVITICA-PODRAVINA	0	0	0	0	0	0	0
ADRIATIC CROATIA	VUKOVAR-SRIJEM	2.277.204	612.985	540.550	0	10.360	20.240	41.835
	DUBROVNIK-NERETVA	0	0	0	0	0	0	0
	ISTRA	795.225	213.728	138.221	48.299	0	7.300	19.908
	LIKA-SENJ	0	0	0	0	0	0	0
	PRIMORJE-GORSKI KOTAR	6.664.611	1.684.656	1.236.386	203.527	35.003	89.906	119.834
	SPLIT-DALMATIA	6.879.251	1.835.210	1.297.194	327.339	28.748	49.937	131.993
	ŠIBENIK-KNIN	2.068.081	626.238	429.139	77.783	18.713	68.462	32.142
ZADAR	6.569.441	1.498.745	1.393.736	71.122	4.840	18.392	10.655	
Grand Total €		170.770.262	45.308.097	36.650.222	3.939.928	1.124.923	1.554.634	2.038.390

Source: Author(s) calculated and adapted to: Ministry of Economy and Sustainable Development, *Jačanje konkurentnosti poduzeća ulaganjima u digitalnu i zelenu tranziciju*, available at:

[<https://strukturnifondovi.hr/natjecaji/jacanje-konkurentnosti-poduzeca-ulaganjima-u-digitalnu-i-zelenu-tranziciju/>, Informacije-o-potpisanim-ugovorima-22.2.2022.pdf], Accessed 4 May 2023.

Table 7. Descriptive statistics of small enterprise and medium-sized enterprise (in 2022 year - reference call KK.11.1.1.0)

		Total value of the project (€)	Grants awarded (€)	Regional grants (€)	Support for process innovation and business organization (€)	Support for training (€)	Grants for advisory services (€)	De minimis aid (€)
Small entrepreneurs	Mean	1.294.972	440.712	362.788	24.786	10.552	17.863	24.722
	Standard Error	67.667	20.864	18.668	2.971	1.611	1.007	2.067
	Median	1.033.996	350.413	270.192	11.878	763	13.936	16.176
	Mode	#N/A	995.421	74.657	-	-	14.467	-
	Standard Deviation	952.163	293.585	262.684	41.804	22.671	14.172	29.091
	Range	7.188.827	928.399	918.634	340.040	132.607	77.477	175.194
	Min	163.191	67.022	54.649	-	-	-	-
	Max	7.352.019	995.421	973.283	340.040	132.607	77.477	175.194
	Sum	256.404.407	87.261.028	71.832.050	4.907.704	2.089.355	3.536.884	4.895.035
	Count	198	198	198	198	198	198	198
	N of the supported subject	198		198	116	104	191	192
	Max Intensity of support (%)	-		45.00	50.00	70.00	50.00	75.00
	Average intensity of the support achieved (%) (Average intensity of the support achieved All subject)	34.03		44.79 (44.79)	49.74 (29.14)	67.87 (35.65)	50.00 (49.59)	74.03 (71.79)
Medium-sized entrepreneurs	Mean	2.246.977	596.159	482.240	51.841	14.802	20.456	26.821
	Standard Error	139.675	35.989	33.639	8.536	3.499	1.683	3.613
	Median	2.170.573	573.190	395.753	18.199	1.818	17.851	19.447
	Mode	#N/A	995.421	995.421	-	-	8.627	-
	Standard Deviation	1.217.659	313.743	293.259	74.416	30.504	14.675	31.496
	Range	4.285.610	926.729	948.753	346.008	132.628	80.961	185.812
	Min	284.702	68.692	46.668	-	-	-	-
	Max	4.570.312	995.421	995.421	346.008	132.628	80.961	185.812
	Sum	170.770.262	45.308.097	36.650.222	3.939.928	1.124.923	1.554.634	2.038.390
	Count	76	76	76	76	76	76	76
	N of the supported subject	76		76	45	39	74	69
	Max Intensity of support (%)	-		35.00	50.00	70.00	50.00	75.00
	Average intensity of the support achieved (%) (Average intensity of the support achieved All subject)	26.53		34.33 (34.33)	49.03 (29.19)	57.96 (29.75)	49.38 (48.08)	73.86 (67.05)

Source: Author(s) calculation

According to the given data, it is evident that Micro and small entrepreneurs are more represented in this call and make up almost 72,18%, in contrast to Medium-sized entrepreneurs which were 27,82%. Comparing the degree of utilization of the co-financing amount of the project activities, the calculated data (see Table 7) show that the average intensity of support for micro and small enterprises in the category of regional grants (44.79%: max. 45%), support for process innovation and business operation of organizations (49.74%: max. 50%), support for training (67.87%: max. 70%), grants for consulting services (50%: max. 50%), de minimis grants (74.03%: max. 75%). At the same time, data for medium enterprises show that the average intensity of support was achieved in the category of regional support (34.33%: max. 35%), support for process innovation and business organization (49.03%: max. 50%), support for training (57.96%: max. 70%), grants for consulting services (49.38%: max. 50%), de minimis grants (73.86%: max. 75%).

Table 8. Estimated financial and social impact of approved SME project proposals (in m+2 year for 2022 year - reference call KK.11.1.1.0)

Size of SMEs	Number of newly introduced technological solutions related to green and/or digital goals	Increased income from exports (in euros)	Increased sales revenue (in euros)	Employment growth (estimated number of new employees as a direct consequence of project implementation)
Micro, small and Medium enterprises	1,076	110,484,579	304,961,279	2,118
Grand Total	1,076	110,484,579	304,961,279	2,118

Source: Author(s) calculated and adapted to: Ministry of Economy and Sustainable Development, *Jačanje konkurentnosti poduzeća ulaganjima u digitalnu i zelenu tranziciju*, available at:

[<https://strukturnifondovi.hr/natjecaji/jacanje-konkurentnosti-poduzeca-ulaganjima-u-digitalnu-i-zelenu-tranziciju/>, Informacije-o-potpisanim-ugovorima-22.2.2022.pdf], accessed 4 May 2023.

According to the Table 8. Estimated financial and social impact of approved SME project proposals (in m+2 year) the Number of newly introduced technological solutions related to green and/or digital goals is 1076, Increased income from exports is 110.484.579,01 euros, Increased sales revenue is 304.961.279,17 euros and Employment growth (estimated number of new employees) as a direct consequence of project implementation is 2118.

The impacts of project proposals on strengthening the sustainability and competitiveness of project holders and their partners is manifested through the number of newly introduced technological solutions related to green and/or digital goals in the year m + 2, the projection of the net number of jobs as a result of the implementation of project activities in the year m + 2, projected increase in sales revenue in year m+2, predicted increase in export revenues in the year m+2.

Which leads to the conclusion that we will be able to read the first official information about the achieved indicators from the applicant's final report in the second half of 2025.

4. CONCLUDING REMARKS

Reducing the environmental impact of SMEs through achieving and going beyond environmental compliance in both manufacturing and services is a key success factor in greening the economy. SMEs are important for green growth as key drivers of ecoinnovation and key players in emerging green industries. Growing opportunities exist in the services associated with greener manufacturing.⁴²

However, the willingness and capability of SMEs to adopt sustainable practices and seize green business opportunities generally face size-related resource constraints, skill deficit and knowledge limitations. SMEs are often unaware of many financially attractive opportunities for environmental improvement.⁴³

A coherent strategy to reshape supply chains and access funding will require cooperation between all business functions and departments, as well as close collaboration and transparency between companies, suppliers and distributors. In particular, the heads of procurement, finance, tax, manufacturing, ESG, HR and other departments must work together to reshape their supply chains, minimize the impact of carbon taxes and other levies, and access funding opportunities.⁴⁴

In addition to the above, and in accordance with the research of other authors; lack of capital is also a very frequently cited barrier (50%) in the sample, which in many cases refers to lack of initial capital, lack of financial opportunities or alternatives to private funds and traditional bank funding. Under "lack of capital" we also include the indirect (time and human resources) costs related to extra R&D effort needed for the development or improvement of a new green good or service.⁴⁵ The administrative burden and lack of technical know-how are mentioned by around one in five SMEs (21%). The former barrier includes complex systems and long

⁴² OECD, Greening SMEs: Opportunities and challenges in EaP countries, available at: [<https://www.oecd.org/environment/outreach/Greening-SMEs-policy-manual-eng.pdf>], Accessed 4 May 2023.

⁴³ *Ibid.*

⁴⁴ PwC PwC EU, Green Deal Survey. Are Europe's Businesses Ready for the EU Green Deal?, pp. 3-22, available at: [<https://www.pwc.com/gx/en/tax/publications/assets/eu-green-deal-tax-report.pdf>], Accessed 5 May 2023.

⁴⁵ Rizos, V.; Behrens, A.; van der Gaast, W.; Hofman, E.; Ioannou, A.; Kafyeke, T.; Flamos, A.; Rinaldi, R.; Papadelis, S.; Hirschnitz-Garbers, M.; *et al.* *Implementation of Circular Economy Business Models by Small and Medium-Sized Enterprises (SMEs): Barriers and Enablers*, Sustainability, 2016, pp. 8.

procedures that businesses face to obtain certifications and labels, as well as to meet standards and legal obligations. The latter barrier includes a gap in employee skills and lack of knowledgeable people in matters related to circular economy business practices. Lack of information and company environmental culture were two other barriers mentioned by 13% and 8% of SMEs, respectively.⁴⁶

Beyond the above mentioned categories, SMEs note a number of additional barriers, including the absence of a reference point to which SMEs can turn for support, the economic sector in which the SME operates being extremely conservative and reluctant to make the “green” transition, as well as the existence of exogenous factors such as the economic downturn, which dampened interest in green business initiatives.

According to the above, Croatian SMEs share almost the same fate as other EU transition countries. Based on the analyzed reference call (KK.11.1.1.0), the author(s) has been researched the potential benefits of this call, first of all financial and social impacts, but also recognized certain limitations in this research. Limitations are visible in a partial calls for tenders/grants, limited amount of financial resources, limited amount of co-financing rate (Micro and small enterprises up to 45%, medium enterprises up to 35%). Also author(s) have no information about the year of establishment of legal entities, age structure of employees, their level of education and other demographic parameters.

Within the framework of the goals set by the strategic documents until 2030 and 2050, and based on currently available EU financial resources, the authors define the following research questions: are the Croatian SMEs enough financially independent for an effective digital and green transition in future, are the Croatian supporting institutions sufficiently agile, and do the Croatian SMEs responding number of human resources to implement the digital and green solutions?

During the period since 2013 and 2023 Croatian SMEs has opportunity to apply just on three⁴⁷ call for the green and digital transition. First call was open 2019 (Improving the competitiveness and efficiency of SMEs through Informa-

⁴⁶ *Ibid.*

⁴⁷ The fourth call for Digitization Vouchers (Reference number: NPOO.C1.2. R3-I2.01) has been published at the time of writing this paper. This Call will encourage SME investments aimed at implementing digitization and digital transformation of business through training and services to improve digital skills (among others related to cloud technologies), strategies for digital transformation, digital marketing, increasing cyber resilience through system security checks and application of complex digital solutions. The purpose of this Call is to contribute to increasing the level of digital maturity of SMEs through the development of digital business models, strengthening the capacity to implement digitization and digital transformation or improving cyber security, which will ultimately increase the competitiveness and resistance of companies to the use of digital technologies. Deatalis on: Ministry of

tion Communication Technologies (ICT) – 2, Reference code: KK.03.2.1.19),⁴⁸ second call was open 2021 (Strengthening the competitiveness of companies by investing in digital and green transition, Reference code: KK.11.1.1.0), and third call was open 2023 (Strengthening sustainability and encouraging green and digital transition of entrepreneurs in the tourism sector”, Reference code: NPOO.C1.6.R1-I2 .01).

In this paper, author(s) focused their research on the call Strengthening the competitiveness of companies by investing in digital and green transition, Reference code: KK.11.1.1.0., within which they came to the following scientific knowledge.

Regarding hypothesis H1: The financial intensity of support of the reference call KK.11.1.1.01 granted to micro and small entrepreneurs was almost entirely used for the maximum intensity of the call, with minor variations for the support of training of 2.13%

Hypothesis H2: The financial intensity of support of the reference call KK.11.1.1.01 granted to micro and medium entrepreneurs was partially demonstrated for the maximum intensity of the call with the identification of the area of support for training, where the use was recorded at the level of 57.96% with a maximum intensity of support of 70.00% and a relative difference of the average intensity of support of 12.04% (see Table 7).

The scientific contribution of this paper is reflected in the detection of financial impacts (The rate of utilization of co-financing of project activities, Total value of projects, Amount of grants, Increased income from exports, Increased sales revenue), social impacts (Employment growth) and digital and green impacts (Number of newly introduced technological solutions related to green and/or digital goals), which directly and indirectly affect on Croatian SMEs and the Croatian economy and society.

Economy and Sustainable Development, Objava javnog poziva “Vaučeri za digitalizaciju” (Referentni broj: NPOO.C1.1.2. R3-I2.01), available at:

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⁴⁸ Ćucić, D.; Pancić, M.; Zavišić, Ž., Green and digital transition in the function of growth and development of Croatia, Economic and Social Development, 88 th International Scientific Conference on Economic and Social Development – “Roadmap to NetZero Economies and Businesses”, 2022, pp. 389 – 403, available at:

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Analyzing the topic of green and digital transition, the author(s) suggest further primary and secondary research on this topic, directing researchers to towards continuous knowledge about the degree of progress of implemented strategies and compliance of SMEs. Also, future research should be focused on detecting the number of introduced digital solutions and obtaining results on the number of optimized processes. Author(s) suggest to the important stakeholders in Croatian SMEs and to contracting authorities finding a new model of access funding at the national or EU level, building capacity and expertise to understand all the implications of the Green Deal, a coherent strategy to reshape supply chains and tax transparency.

Micro, small and medium-sized enterprises (SMEs) play a central role in the European and Croatian economy. Author(s) think that radical green and digital transition is possible with young SMEs, because they often exploit technological or commercial opportunities which have been neglected by more established companies.

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