

NATIONAL REPORT ON EXISTING STRUCTURES FOR SUPPORT OF ECO- INNOVATION – HUNGARY



WP3	Strategy for eco-knowledge
ACTIVITY 3.2	Analysing the environment for ecoinnovation in partner countries
DELIVERABLE 3.2.3	National report on existing structures for support of Ecoinnovation

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1. Abstract

Hungary is a well-developed post-industrial country located in Central Europe and its history is a typical post socialist regarding environmental issues, which greatly determines the extent to eco-innovation can prevail. Since the constitutional change of 1989 the country made great steps forward in the field of environmental protection, land reclamation and eco-innovation but new challenges emerge in the XXI. century requiring further progress especially in eco-innovation and the associated business development and support.

The government has recognized the importance of green economy by creating the National Environmental Technology Innovation Strategy (approved by Government Decision No. 1307/2011. (IX. 6.)). The half-hearted approach in the realization of this strategy could not be credited to the lack of political will but what really ties the hands of the government is the economic reality in terms of the direction of the business development support. The demand for eco-innovation is lacking as lower costs are generally a competitive advantage of the Hungarian economy in a European comparison and the high share of international businesses in the GDP and the high amount of working capital investments tend to overshadow ecological matters. Labour shortage in jobs where high skills and specialized expertise required hinders innovation thus eco-innovation faces serious limits.

The general state of business development is overall hindered by convoluted administrative requirements (slow processes, complex and confusing paperwork, continuously changing taxation system) and the taxation system which could be unclear in places making it hard to cope with. Starting a business in advanced sectors is difficult in some aspects: skilled workforce is hard to come by. The amount of loans given to SMEs only stagnates at best, and the Funding for Growth Scheme of the National Bank of Hungary could only achieve a cosmetic boost, but the overall numbers did not improve to a huge extent. Due to the high amount of venture capital in the country it could be viewed as an issue which is relatively easy to mitigate, the minimum entry requirements however might be a bit higher for certain businesses which do not attract venture capital. Innovative, ecologically conscious businesses however should be able to find plenty of opportunities to raise capital with relative ease.

The support schemes for starting a business are usually not sector-specific, but are commonly limited to job-seekers which implies that a realistic goal should be self-employment. There are different schemes at national and subnational levels. That depends on which public body calls for applications because their organizational structure and the area of

responsibility of their regional subdivisions can be different. There are a limited amount of sector-specific business development tools, but not for eco-innovation. Energy efficiency, renewable energy sources, innovation are common keywords in different national and international calls, eco-innovation is relatively new and unknown in Hungary. It will hopefully change in the future, and it should take just a short time to establish the connection between all of the disciplines on which eco-innovation was built.

2. Support

Hungary offers diversified support schemes most of which are not limited to a specific sector but can be perceived as horizontal policies. These are however as important as targeted subsidies and support schemes therefore we will present these support schemes in the following chapters as well.

The most important and most extensive support schemes are the National Operative Programmes which distribute various European funds in a tailored fashion and are being operated in accordance with different national, territorial and sectoral strategies and plans such as the "Research Infrastructures in Hungary", "National Smart Specialisation Strategy (S3)", "National RDI strategy".

Transnational cooperation, EU-funded projects also play a vital role in business support in terms of knowledge transfer. Business try to extend their operation to new field through internal trainings and training allowances and support which is very important in life-long learning and the further education of specialized workforce.

The new, non-conventional ways of business support shows a mixed situation, where venture capital is widely available, but crowdfunding is somewhat weak, which is also true to networking and events if strictly applied to eco-innovation.

2.1 GOVERNMENT SUPPORT

Active labour policies play a vital role in government support which is reflected by the percentage of GDP spent on activation policies in which Hungary scores the 5th in the OECD with 0,9% of the GDP spent on such policies and schemes. This suggests that these tools are diversified, this sum is mostly consumed by the Public Works Scheme however, which is aimed at the inclusion of the unemployed to the community service.

Employment subsidies are more or less frequent and are usually handled by the County Employment Center which is a part of the County Government Offices. These support schemes include wage subsidies which can be claimed by any business which guarantees the employment of the workers for a certain period of time.

Employment subsidies are easy to access, and although not continual usually are issued on a yearly basis. Their impact is hard to determine since they are overshadowed by the Public Works Scheme, which on the other hand offers no real benefits for eco-innovation and circular economy, because the participants are mostly not well educated. All of

the two subsidies are really easy to replicate and employ in other countries since there are no special requirements.

CASE STUDY - Corporate tax

Corporate tax incentives play a huge role in supporting SMEs and bigger companies to realise energy efficiency related investments. The recent changes made by the 176/2017. (VII. 4.) Government resolution allow companies to be granted tax allowance on some investments which are not aimed directly at increasing energy efficiency but have a positive impact on EE. The rate of which it is applied at is generally 30% of the total costs (which can be claimed back), 40% for medium-sized enterprises and 50% for small enterprises, up to a total of 15 million €. The government expects the payback times to be halved. inspiring companies to invest in

Public expenditure on labour market policies account for a total of 1,15% of the GDP 86% of which is spent on direct job creation (Public Works Scheme) and out-of-work income maintenance and support, and just a fraction of this sum, 0,01% and 0,04% of GDP is spent on training and employment incentives as of 2015. These expenses have more than halved since 2004 which shows that the focus of labour policies have been changing considerably.¹

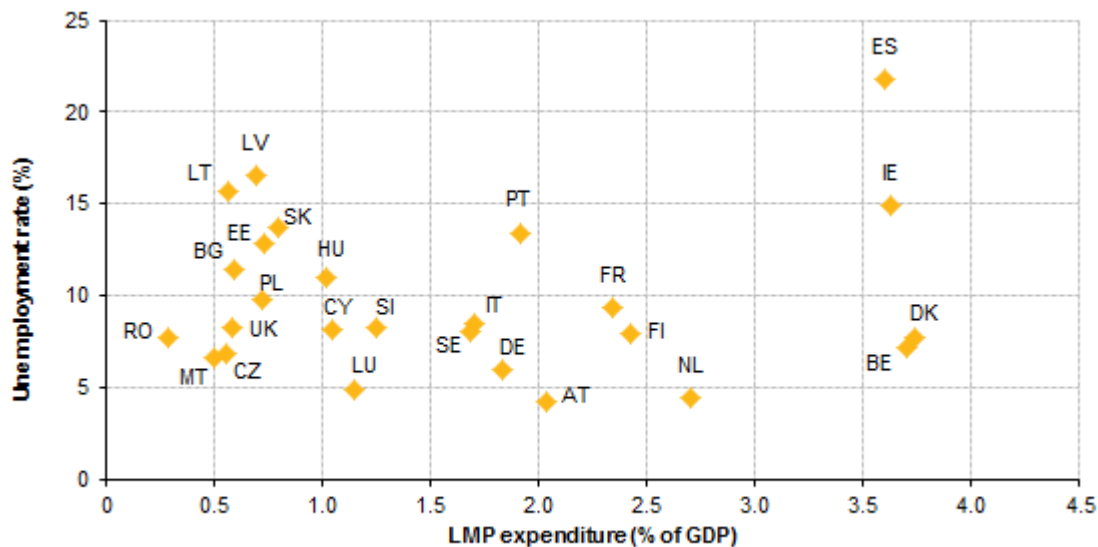


Figure 1. LMP expenditure and unemployment. Source:

http://ec.europa.eu/eurostat/statistics-explained/images/1/1b/LMP_expenditure_and_unemployment_rate%2C_2011.png

Tax incentives are more or less in line with those of the EU.

¹ <http://www.oecd->

[ilibrary.org/deliverdotstat?cid=guest&institution_name=&baseurl=http%3a%2f%2fstats.oecd.org%2fwbos%2fbrandedview.aspx&doi=data-00312-en&return_url=http%3a%2f%2fwww.oecd-ilibrary.org%2femployment%2fdata%2foecd-employment-and-labour-market-statistics%2flabour-market-programmes-expenditure-and-participants_data-00312-en&lang=en&oeecdstat=lfs-data-en&itemId=%2fcontent%2fdata%2fdata-00312-en](http://www.oecd-ilibrary.org/deliverdotstat?cid=guest&institution_name=&baseurl=http%3a%2f%2fstats.oecd.org%2fwbos%2fbrandedview.aspx&doi=data-00312-en&return_url=http%3a%2f%2fwww.oecd-ilibrary.org%2femployment%2fdata%2foecd-employment-and-labour-market-statistics%2flabour-market-programmes-expenditure-and-participants_data-00312-en&lang=en&oeecdstat=lfs-data-en&itemId=%2fcontent%2fdata%2fdata-00312-en)

Development tax allowance is a reduced tax liability which is applied to businesses which meet at least of the following criteria:

- investments valued at 3 Billion HUF or more;
- investments in promoted areas valued at 1 Billion HUF or more;
- investments aimed at job creation;
- investments valued at 100 Million HUF or more that promote environmental protection or film- and video-making projects, basic and applied research, experimental development;
- investments by SMEs valued at 500 Million HUF or more if the business is increasing the number of employees by a certain amount;
- investments promoting the processing and distribution of agricultural products;
- investments valued at 100 Million HUF or more in a free enterprise zone.

The development tax allowance permits the income tax to be deducted by 80% for up to 10 years within a 12-year period beginning from the application at the Ministry for National Economy.

High value-added business are also granted specific tax allowances: the IP (intellectual property) box regime allows business to deduce 50% of profit from royalties from their corporate income tax base. Incomes on the sale or contribution of IP meeting certain reporting requirements may be tax exempt if it is used to acquire royalty-generating IP during the following five years.

Certain R&D expenses can be also deduced from the corporate income tax base up to 200% of the direct costs of fundamental or applied research or experimental development. The HIPO (Hungarian Intellectual Property Office) is responsible for determining if a certain project qualifies as R&D.

Energy efficiency investments are rewarded with tax credits equal to 30% of the investments present value (maximum 15 Million EUR) which can be used in the following five years. ²

As these relatively high numbers indicate, these tax incentives could not offer a great deal of aid for smaller SMEs and start-ups, because their scope is much smaller at first. This means that the entry point has been set relatively high, the considerable reward however might constitute a risk, thus the great requirements. These tax incentives are here to stay and most likely would change if there will be any EU-wide adjustment be made, and the replicability of these

² <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-tax-hungaryguide-2017.pdf>

measure has been also shown by the fact that these tax incentives are more or less the same throughout the EU.

Hungary does not offer a wide variety of eco-innovation related training apart from the odd EU-funded projects (see ECOREGIONS project for more), there are however several formal and informal trainings focused on innovation, ecology, sustainable development and energy efficiency. If we perceive eco-innovation as an interdisciplinary activity and take into account Hungary's relatively low performance in eco-innovation related scientific achievements and the insignificant publicity of the topic, it is no surprise that there are no training schemes in this topic.

2.2 DOMESTIC SUPPORT FUNDS

Human resource development is a tool for helping employees to improve their skills, abilities and knowledge, and from a company perspective it could be perceived as an investment in workforce. One should keep in mind that internal training may or may not appear in statistics.

There are several applications mostly aimed to help vulnerable groups, such as the elderly, the youth and the disabled. These are mostly HRDOP (Human Resource Development Operative Programme) applications and only a handful of EDIOP (Economic Development and Innovation Operative Programme) and EEEOP (Environment and Energy Efficiency Operational Programme) applications and National Research, Development and Innovation Office applications deal with innovation and ecological issues of which there are only a few dealing directly with HR development.

These applications are usually not aimed directly at an eco-innovative approach to HR development but most definitely can be applied to by eco-innovative companies. There are however a limited number of application which are broader in their target group as these are dealing with educating the public about eco-consciousness and eco-innovation (HRDOP-5.4.1) for example.

CASE STUDY - Hiventures: the State Venture Capital Fund and Souldrops, a brand of ecologically conscious cleaning products

Corvinus Venture Capital Fund Management Plc. (CVCFM) – originally founded in 1999 as Regional Fund Management – has created and managed various kinds of venture capital funds in order to provide equity for the innovative, high potential pre-seed or seed staged companies. In 2016 CVCFM was appointed as the State Venture Capital Fund and operates under a new name – Hiventures – with new resources, increased headcount, product portfolio and agenda ever since. Professionally supervised and supported by the **National Research, Development and Innovation Office** and the Hungarian Development Bank Plc. (HDB). Souldrops, an ecologically conscious cleaning product brand received growth funding from Hiventures in order to be able to enter the market. This funding required not only the innovative nature of the company but to be able to provide a sound business plan (<https://www.hiventures.hu/en/about-us/about-us>).

The latter are easily accessible for the public but provide limited insight for professional due to their educative nature. The former require to be applied to which limits the accessibility, especially if there is any restriction among eligible applicants, and special knowledge is furthermore required to apply to a tender. The applications are more or less stable in their frequency but the Operative Programmes are being adjusted to the ever-evolving challenges, we therefore believe that eco-innovation will be a more important priority in the future. These tenders are replicable and can be implemented elsewhere but the local economic and social environment should be taken into account.

There are several scholarships which are mostly seek to boost academic research and aid researchers in their pursue of new scientific results. These range from programmes provided by the Hungarian Academy of Science – of which Momentum Program and Premium Post Doctorate Research Program are worth mentioning – to Doctoral Schools of which mostly economy and a few environmental science and biology doctoral schools accommodate PhD-students doing eco-innovation-related research. These usually have some kind of requirements, doctoral schools require a corresponding masters' degree, while to apply to a postdoctoral scholarship, the applicant have to have a PhD degree in the appropriate field. Since these national scholarships are very common, we think that going detail would be redundant.

Source	Specificity	Budget 2016 (Bn HUF)		Budget 2017 (Bn HUF)	
		non-refundable	refundable	non-refundable	refundable
GINOP	Economic Development and Innovation Operative Programme (EDIOP/GINOP) European funds for the entire country except the Central Hungary region	215.92	110.09	17	80
VEKOP	Competitive Central Hungary Operative Programme (CCHOP/VEKOP) European funds for the Central Hungary region	42.64	-	-	5.49
NKFI Fund	National Research, Development and Innovation Fund made up of the innovation tax paid by enterprises	68.43	-	89.21	-

Table 1. The most important innovation funds by their origin. Source: National Research, Development and Innovation Office (last modified: 17 November 2017)

The most important Hungarian development fund in terms of accessibility for eco-innovation-related activities is the National Research, Development and Innovation Fund, which redistributes innovation tax paid by enterprises. This Fund accounted for 68,43 Billion HUF as of 2016 and for 89,21 Billion HUF in 2017 and 81,85 Billion HUF in 2018. There are no other national fund focusing on eco-innovation, the few remaining funds are minor territorial development funds, such as the Regional Economic Development Indicative Target, but the role of national funds was quickly taken over by EU funds after the accession in terms of being used to achieve similar goals thus making national funding obsolete.

Target areas	Calls for proposals	Budget 2016 (Bn HUF)		Budget 2017 (Bn HUF)	
		non-refundable	refundable	non-refundable	non-refundable
Corporate/ business RDI activities	Support of business RDI activities: GINOP-2.1.1-15; VEKOP-2.1.1-15; VÁLLALATI KFI_16;	22	-	-	-
		19.97	-	-	-
		21	-	35.44	-
	Business RDI, loan GINOP-8.1.1-16	-	40.09	-	-
	Business RDI, combined with loan: GINOP-2.1.2-8.1.4-16	80	40	-	-
	National technology and intellectual property, venture capital programme: GINOP-8.1.3/A-16	-	30	-	-
	Smart specialisation, venture capital programme GINOP-8.1.3/B-17; VEKOP 2.1.2-17	-	-	-	70
		-	-	-	5.49
National Capital Fund GINOP 8.6.3/A-17	-	-	-	10	

	Intellectual property rights GINOP-2.1.3-15; IPARJOG_15	-	-	0.1	-
	Innovation ecosystem (start-up and spin-off) GINOP-2.1.5-15; ÖKO_16	-	-	-	-
	Exportable innovative product development GINOP-2.1.6-16	5	-	-	-
	Support for export oriented R&D activities of domestic businesses: Export_17	-	-	4.83	-
	Prototype, product, technology and service development: GINOP-2.1.7-15; VEKOP-2.1.7-15;	25	-	-	-
	Enhancing the competitiveness of SMEs through adaptive technological innovation GINOP-2.1.8-17	10.35	-	-	-
		-	-	17	-
Know ledge transfer	R&D competitiveness and excellence cooperation programmes GINOP-2.2.1-15; NVKP_16; VEKOP-2.2.1-16	52.92	-	-	-
		2.29	-	-	-
		28	-	-	-
	Competitiveness and excellence cooperation programmes VKE_17	-	-	16.73	-
	Research infrastructure development of Higher Education and Industry Cooperation Centres GINOP-2.3.4-15; FIEK_16	8	-	-	-
Research infrastructure	Excellence of Strategic R&D centres: GINOP-2.3.2-15; VEKOP-2.3.2-16	25.71	-	-	-
		4.02	-	-	-
	Strengthening research infrastructures - internationalisation, networking: GINOP-2.3.3-15; VEKOP-2.3.3-15	5.29	-	-	-
		6.01	-	-	-
Discovery research and postdoctoral programmes	Researcher-initiated research projects: K_15; K_16; K_17	7	-	6.5	-
	Postdoctoral excellence programme PD_16; PD_17	1.8	-	1.5	-
	Research projects initiated by young researchers FK_17	-	-	3	-
	Support of research teams with internationally prominent achievements KH_17	-	-	1	-
	National Excellence Programme NKP_17	-	-	10	-
International RDI cooperation	National support for European Research Council (ERC) programme entries ERC_HU_15 (450 MHUF); ERC_16_MOBIL (200 MHUF)	0.45	-	0.45	-
	Researcher-initiated research projects based on international cooperation	-	-	1	-

<p>NN_17, ANN_17, SNN_17; V4-Japan Joint Research Programme (2015: 45.5 MHUF); KNN_16 (2016: 72 MHUF);</p>				
<p>Promotion of Hungarian participation in programmes and initiatives related to Horizon 2020</p>	1.5	-	2.05	-
<p>National complementary support to Hungarian projects under the Horizon 2020 Teaming Programme</p>	-	-	1.91	
<p>Programme-based bilateral R&D cooperation projects Support of bilateral S&T cooperation projects</p>	0.68	-	3.2	-

Table 1. The most important national business support funds by target areas.
Source: National Research, Development and Innovation Office (last modified: 17 November 2017)

2.3 TRANSNATIONAL SUPPORT FUNDS

These Programmes are responsible for distributing a total of 14,241,507,702 € European financing and additional 2,227,864,516 € of national co-financing. Cohesion funds are distributed among EU members which do not reach 90% of the average GNP and can be spent on environmental protection, transportation projects and on technical support. The Managing Authority for the Cohesion Fund is responsible for the coordination of projects supported and also in charge of ensuring consistency between the Cohesion Fund Framework Strategy and certain operative programmes, validating the effectiveness of European Community directives amongst many other administrative tasks.

These investments are mostly utility projects concerned with waste water treatment, waste management and the improvement of drinking water quality. The scale of these projects is substantial: the extent can range from county towns via whole counties to the capital, Budapest. The funds are only accessible for cities, counties and other public bodies selected by intermediate bodies which operate as a branch of certain Ministries, therefore accessibility is limited. The Cohesion Funds will provide support for Hungary as long as the country does not reach the 90% of the EU average GNP, until that it will be used as a tool for reaching environmental and transportation goals.

CASE STUDY – VegaAlga Project

VegaAlga is a research and development project, which is aimed at establishing a sustainable farming system by using locally grown algae. It is an innovative technological solution for environmentally conscious and economical farming. The goal of VegaAlga project is to develop a sustainable farming system that can provide farmers having a land of over 20 hectares with self produced algae fertilizer. the solution is based on a remote-controlled, automated algae pond in a greenhouse or plastic tunnel, which provides farmers with fresh algae fertilizer suitable for farming activities every second week. This project has received funding from the European Unions's Horizon 2020 research and innovation programme under grant agreement No 673023 (<http://vegaalga.eu/en/page/show/technology>).

The Framework Programme for Research and Innovation (formerly: Framework Programme for Research and Technological Development) is the most important pillar of science support in the EU³ with the last iteration being called Horizon 2020 instead of FP1, FP2, etc.. There are three main research areas called "*Excellent Science*", "*Industrial Leadership*" and "*Societal Challenges*". The Hungarian implementation of Horizon 2020 is being controlled by the National Research, Development and Innovation Office. The allocation of funds is assigned to the European level which means that there are no national funds and the decision of support is made in Brussels. The NRIO is responsible for providing information about the application of proposals, sharing experience about approved proposals, Hungary's absorption of EU funds is comparable to its neighbouring countries according to the CORDIS webpage⁴, accessibility is being limited however with the approval rate being only around 11% for projects with a Hungarian participant or lead partner, while the overall winning rate is being about 12,6%⁵. Most applicants are secondary and higher education establishments and private for profit companies, but the most successful are public bodies (excluding research and education) their share of applicants are relatively low however, with being only 4%. The Framework Programmes are there since 1984 making this support type 34 years old and is one of the most reliable element in research support throughout the EU. The lowering success rates are having an unfortunate effect on research and development in terms of writing application which is very time consuming and thus taking up valuable time from actual research. The disparities in remuneration is also often cited as one of the more controversial aspects of the Horizon 2020

³ <http://www.h2020.gov.hu/horizont2020-program/keretprogram-hattere>

⁴ <https://cordis.europa.eu/search/>

⁵ https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/h2020_threeyearson_a4_horizontal_2018_web.pdf

programme, which discourages participation from countries with lower wages.

SME instrument is relatively novel tool for promoting innovation, fast company growth and development of market-creating technologies. This 1,6 billion € business accelerator support is a part of the Horizon 2020 Work Programme and is being overseen by the European Innovation Council. Contrary to other Horizon 2020 funding, the SME instrument encourages close-to-market activities, it can be therefore be interpreted as an applied research support. SME instrument is subdivided into three phases of which the first is optional and one supplementary activity. The first phase is a feasibility assessment which concludes in a business plan (for those who do not have it cannot apply for phase 2). The second phase is the actual innovation which could be backed by as much as 2,5 million € covering up to 70% of the eligible cost and this 1 to 2 year long period should result in an innovative product, process or service that is ready to enter the market. Phase 3 is a business acceleration period in which the supported organization can exploit different services facilitating the commercial capitalization on the developed product, service or process. These include but not limited to support for further investment readiness, linking with private investors and customers, assistance for further EU risk finance and the requisition of different other services provided mostly by Enterprise Europe Network. Coaching is a supplementary activity which can be attended to during any Phase.⁶ The Hungarian participation is considerably lower than for example Austria, but it is comparable with the neighbouring countries. Agriculture, food industry and medical innovations are among the most common business being support by this scheme in Hungary. The SME instrument is widely accessible in terms of types of organisations which are eligible for application.

Last but not least the COSME Programme is worth mentioning, as an EU Programme which enhances SME finance, market reach, business conditions and entrepreneurship. The Programme has a total budget of 2,3 billion € for the period of 2014-2020.

2.4 BUSINESS INCUBATORS

Business incubation is a very important support method for new, innovative enterprises as they often lack the required experience and management skills since often the inventor is the CEO of the newly founded company. There are several business incubators in Hungary which meet the criteria of offering not just a place and cheap printing services, but guiding the new business through its most important stage

⁶ https://ec.europa.eu/easme/sites/easme-site/files/accelerating_innovation_in_europe_horizon_2020_smei_impact_report.pdf

of life. These incubators use different selection processes but all of them picks only the most promising ones nevertheless according to their thematic scope which is mostly ICT oriented, there are however a few others specialising in biotechnology, medical technology and fintech. MyCO is the only one which focuses solely on greentech and cleantech, also ACME Labs and DBH SeedStar supports greentech among others⁷. The National Research, Development and Innovation Office also provided financial support to establish new incubators through its "Innovation Ecosystem" call with a total fund of 19,5 million €⁸.

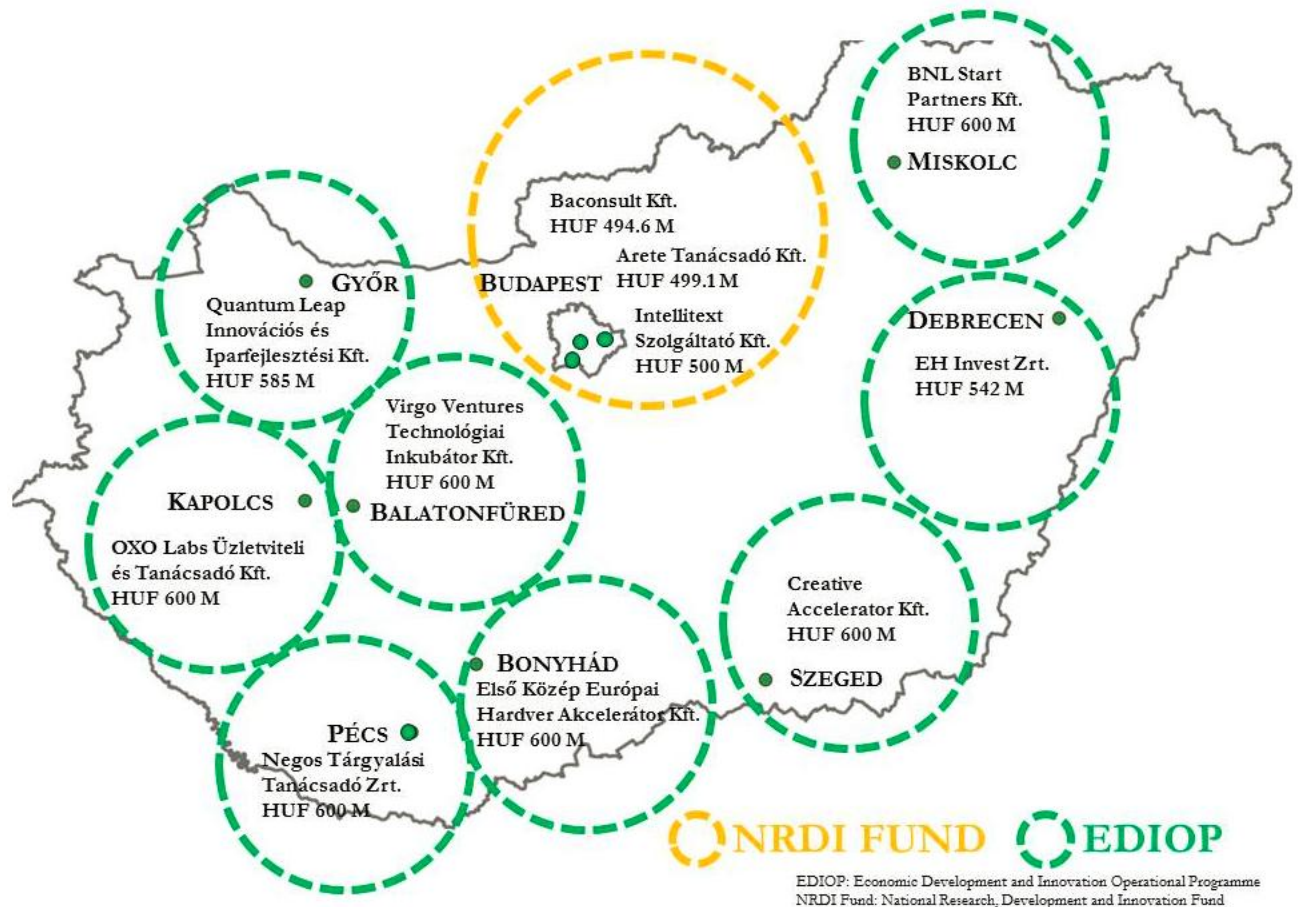


Figure 2. Incubators funded through the "Innovation Ecosystem" call. Source: <http://nkfih.gov.hu/news-and-events/news-of-the-office/three-startup-incubators>

The startup community - which is strongly tied to business incubation - is thriving due to a few advantages which Hungary has to offer, mainly fast and cheap broadband connection, relatively low living expenses, and most importantly an ample amount of venture capital and Jeremie funds. Thus, the accessibility is fundamentally good and stands up to international comparison as well, but participating in one of the mentor programs requires a sound business plan or at least a very good

⁷ <http://nhit.hu/dokumentum/88/InkubatorJelentes2014.pdf>

⁸ <http://nkfih.gov.hu/news-and-events/news-of-the-office/three-startup-incubators>

idea, which criteria depends on the application process of the certain business incubator. Specific knowledge is a must in almost all newly found business however external expertise can be used. The stability of a such fast growing and rapidly evolving sector is of course questionable in terms of business incubators closing and opening in a quick manner, there is however always a wide variety of support opportunities to choose from, which gives a continuity for business incubation.

Regarding the impact of business incubation, most of the incubators were founded by experts coming from the financial sector or funded by the financial sector^{9, 10} and despite the fact, that most of the newly founded businesses fail to make a profit and grow bigger, the overall balance seems to be on the positive side. This indicates that the expected results are achieved. The existing schemes are copying the western ones originating mostly from the USA which is an attribute of the startup economy which is an extremely globalised process, with most of the companies being "born-global"¹¹.

The Association of Business Incubators was established in Pittsburgh, 1991. The reason of the odd location was an application which required this specific organisational form and stability and continuity left something to be desired in a period of reflection. There were no coherent governmental strategy regarding the development of SMEs since most of the institutions were preoccupied with building the foundations of the new, democratic Hungary. The first steps included building industrial parks and rebuilding the industry itself, it was only once these actions had been taken that the SMEs that lacked capital to grow got more attention. Since 1999, more and more applications saw daylight focusing especially on creating incubators and establishing the institutional background of business incubation, of which the Association of Business Incubators became a part with sharing good practices, actively lobbying for developing incubators. This Association receives no other funding that it is able to raise itself, therefore its power is limited in terms of not being able to fund certain projects.

The aim of the mentoring programs is to help innovators and inventors to realize their ideas, therefore the number of these program is numerous which creates a "jungle of support" situation, where there are more supporting schemes than one could follow. The target groups, the timeframe and the expected results may vary as the methods could be very different from simple tutoring to more complex programs including training, coaching, etc. and there is a clear distinction between

⁹ <https://www.baconsult.hu/>

¹⁰ <https://fintechlab.hu/>

¹¹ <https://www.london.edu/faculty-and-research/lbsr/born-global#.WnhRCojOWCg>

government-organised and private projects. The accessibility of these programs varies accordingly, from students to certain age groups and the frequency is also inconsistent.

Coworking had started to gain popularity in the late 2000's and the number of coworking spaces have been increasing greatly in the last decade. The rising number of freelancers, one-man enterprises resulted in growing demand, thus more and more places are offering such services as of today. Most coworking offices offer some kind of business incubation services¹², since a great share of them are the centres of the startup community, while there are simpler ones which only operate as an office with shared tables. Coworking offices are found in large numbers in Budapest (for example Kubik, KAPTÁR, Loffice, Impact Hub), and there are usually one or two coworking spaces in other bigger cities, such as Debrecen, Miskolc, Győr, Szeged and Pécs. Accessibility therefore is limited to the bigger cities, but there were a few attempts to establish such offices in smaller cities, such as Szigetvár in Baranya county, with only limited success¹³. Fortunately the increasing number of coworking spaces still continues and there are no major fluctuation, the market is steadily growing.

There are only two fab-labs in Hungary, Fablab Budapest, which is at the same time the first Biohack space in the country and Makerspace¹⁴.

2.5 SUPPORT BY COMPANIES

Currently about 7000 companies offer apprenticeship training at more than 9000 locations of which 93,5% were SMEs and only 6,5% were larger companies, a total of 40,5% of apprentices were trained at the latter however¹⁵. Most of them are required for certain professions, such as shop assistant, hairdresser, beautician, etc., and certain universities require the same, but the latter is not necessarily related to eco-innovation and the same applies for environmental protection and ecology (because eco-innovation apprenticeship is virtually non-existent). There are innovation-related apprenticeship programmes and applications¹⁶, but these are not continual, also private companies are searching for apprentices from time to time.

Tertiary education underwent a major change in terms of the most common state scholarship. The requirements to be eligible for state scholarship for certain subjects were drastically increased and in a few, albeit very popular fields such as economy most of the students

¹² See <http://mosaik.space/about> or <http://www.colabs.hu/> for more information

¹³ http://www.zrinyiter.hu/vigado-coworking-iroda/?doing_wp_cron=1517992701.9239211082458496093750

¹⁴ <https://www.fablabs.io/labs/fablabbudapest>; <https://www.makerspace.hu/>

¹⁵ http://observatory.org.hu/wp-content/uploads/2015/04/ReferNet_Apprenticeship_EN.pdf

¹⁶ <http://www.kormany.hu/hu/miniszterelnokseg/europai-unios-fejlesztésekert-felelos-allamtitkar/hirek/meghirdettek-a-tijottok-innovacios-versenyt-es-gyakornoki-programot>

nowadays pay for their tuition. Most private scholarships remain untouched however offering a very wide variety of support mostly for foreign students to help them studying in Hungary. For Hungarian students, there is also a broad range of opportunities to choose from, there 18 scholarships just for studying in the USA¹⁷ and there are additional schemes for high school students and for supporting internship as well. The Erasmus+ programme has a long history and well-known for helping students to spend one or two semesters in European universities and provides an almost sufficient amount of financial assistance which makes it very accessible for students and even provides support for international apprenticeship¹⁸. There are several national apprenticeship and scholarship calls which also grant support for short and long term study visits, summer schools for researchers and students as well¹⁹.

Hackathons appeared in the country in the recent years but the increasing share of IT companies in the country, the growing startup community created a huge demand for skilled professionals in that field for which hackathons provide a great entry and can extremely boost the visibility of the profession. It can also draws attention to different challenges in society if it is organised around a specific theme, such as corruption²⁰ or food waste²¹, which is directly linked to eco-innovation. These events are not really widespread yet although they have made an appearance outside the capital. There are bigger companies organising and/or funding various hackathon events which indicates that they could serve as an alternative to interviews as well²². Hackathons are more or less frequent, there are certain organisations working on spreading this method²³ as a tool of mentorship and gathering talented, dedicated young workforce.

¹⁷ <http://washington.kormany.hu/american-scholarship-for-hungarian-students>

¹⁸ <http://tka.hu/palyazatok/131/hallgatok-szakmai-gyakorlati->

¹⁹ <https://palyazatmenedzser.hu/2016/11/23/osztondijak-kulfoldre-2017/>

²⁰ <https://transparency.hu/hirek/24-oras-hackathon-a-korrupcio-ellen/>

²¹ <https://klimainnovacio.hu/hu/esemeny/2017/09/28/food-waste-hackathon-magyarorszagon>

²² <https://www.it-services.hu/a-tudasba-fektetunk/itsh-hackathon/>

²³ <http://hackathon.hu/mentorok/>

CASE STUDY – Food Waste Hackathon in Miskolc, Hungary 28-29.09.2017



Hackathons are a very useful tool for finding new ideas and promising youngsters who can become entrepreneurs or employees at various companies. These events offer insights for the participants and the opportunity to recruit workforce. Hackathons mostly revolve around a specific topic and this very event is about food waste management and reduction. The target group was high school and university students (from 16 years & up), specifically in the fields of IT, design, marketing, environmental and food engineering. The aim was to develop a design for an app and present it to the jury which in turn choose which one to develop in detail and disclose to the public. The event was a part of the STREFOWA Interreg CE project (<http://www.reducefoodwaste.eu/food-waste-hackathon-hungary.html>).

2.6 CROWDFUNDING

Crowdfunding can provide a great financial boost and an immediate feedback for startups and newly found companies, and they can also bypass traditional financial tools, such as loans. It has gained popularity when mainstream online crowdfunding platform, such as IndieGoGo (2008) and Kickstarter (2009) launched. Kickstarter reportedly raised more than 3,5 billion \$ since its launch²⁴ which indicates the popularity of such platforms. Hungarian professional deem crowdfunding very promising because the investment rate of SMEs is steadily declining since 1997, which makes innovative fundraising methods very important. It would be vital to establish a local crowdfunding platform since businesses like to choose local ones in order to comply to the legislative environment, there are none so far however. There had been

²⁴ <https://www.kickstarter.com/help/stats>

attempts to establish local crowdfunding platforms (indulj.be, kezdheted.hu), but due to the lack of critical mass to raise enough support, these eventually failed and closed. Smaller scale crowdfunding platforms operate, namely adjukossze.hu²⁵, which is an charity fundraiser platform, where users pledge to achieve noble goals, such as helping people experiencing poverty; and the other is creativeselector.hu²⁶, which is also help smaller scale events to be realized, such as organising cinema shows, creating subtitles to movies, etc.. These platforms are easily accessed but have very little impact on eco-innovation, using international can be difficult however (for example Kickstarter only allows the participation of business registered in English-speaking countries), while IndieGoGo is easier to use in that sense. There were several successful campaigns run by Hungarian entrepreneurs, such as Ringclock²⁷, or Sybrillo²⁸, an image stabilizer for action cameras. Using the bigger platforms raises several technical questions, because Hungarian law has not been flexible in this field therefore it is much more convenient to establish a business in another country for fund-raising purposes. The accessibility of these platforms depends entirely on the scope and the magnitude of the project in question, but for smaller scale activities it is relatively even, and one can even use local platforms.

2.7 EVENTS AND NETWORKING

International projects and cooperation brought several events to Hungary of which there are several dealing with the topic of eco-innovation, deeply rooted, more or less frequent local events are however very rare, the concerned institutions are the Ministry for Agriculture (which even runs an eco-innovation related website (<http://kornyezettechnologia.kormany.hu/index>) and the Regional Environmental Center established by the European Commission, the U.S and Hungary. The Ministry for Agriculture also founded the Herman Ottó Institution which organises workshops and conferences, not limited only to eco-innovation in their scope, but involving heating, electricity among other topics²⁹. Regional Environmental Center also organises workshops³⁰ as well, although not very frequently. These events are mostly open to the general public but the visibility of these workshops is generally not particularly excellent.

²⁵ <https://adjukossze.hu/>

²⁶ <http://www.creativeselector.hu/>

²⁷ <https://www.ringclock.net/#about>

²⁸ <https://sybrillo.com/pages/faq>

²⁹ <http://www.hermanottointezet.hu/event-created/month>

³⁰ http://documents.rec.org/events/july_09/Agenda_eco_innovation_green_investments_REC.pdf

International seminars are usually easier to find and there are some in neighbouring countries which are within a reasonable geographical reach³¹, also online seminars can be accessed relatively easily. Hungarian public bodies seem to be rather unaware of eco-innovation as a standalone discipline, innovation and environmental protection, green technology seems to be far more widespread in terms of seminar topics. The term sustainable development still is the most important keyword when it comes to eco-innovation, and public education and information, professional workshops and seminars seems to gather around this theme. The territorial prevalence of this buzzword is surprisingly good, as it has a longer history than eco-innovation.

2.8 PROMOTION AND MARKETING

Promoting seemingly abstract notions such as eco-innovation to the public requires a very careful approach in terms of the risk of alienating the audience by being too professional, a more down-to-earth attitude is needed. As seen in the Eco Innovation Scoreboard, the publicity of eco-innovation is the lowest in Europe.

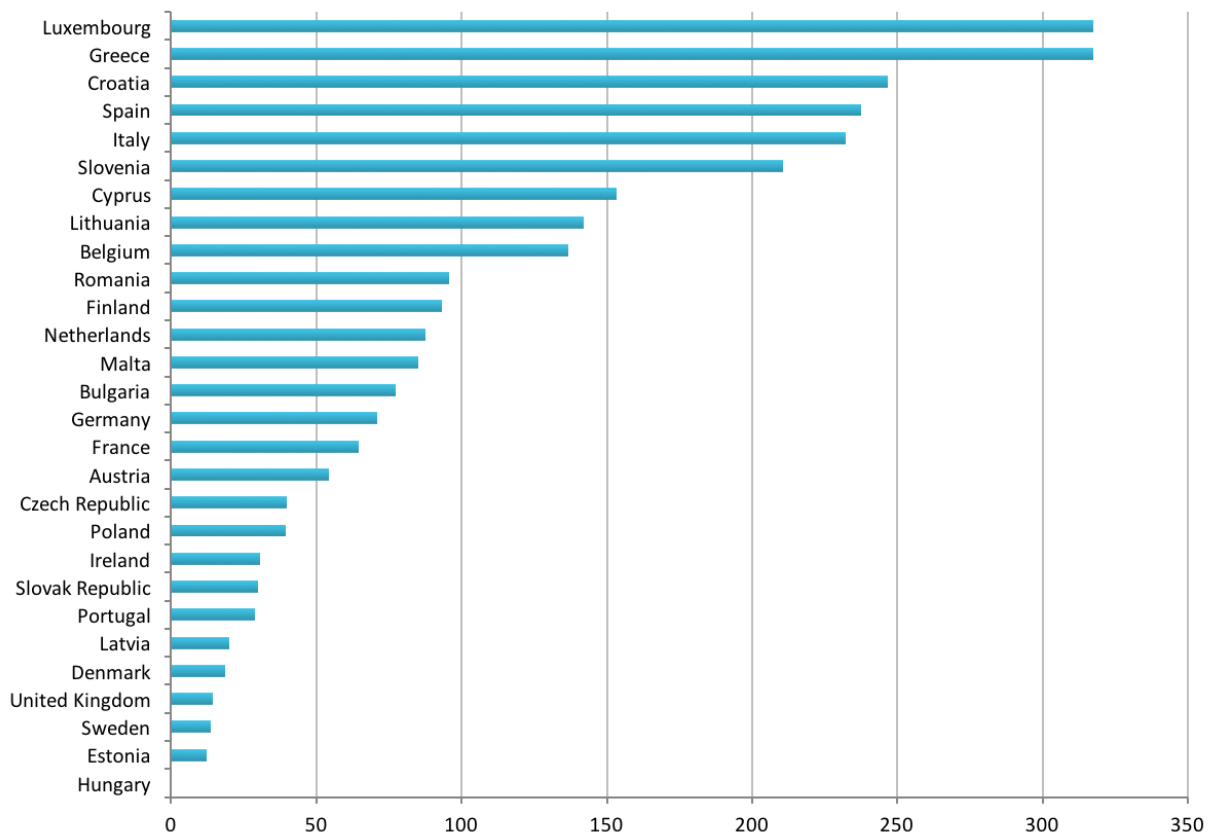


Figure 3. Eco-innovation related media coverage, 2016. Source: https://ec.europa.eu/environment/ecoap/indicators/outputs_en

The appearance of the topic of eco-innovation is irregular and the

³¹ http://www.aseic.org/news/NoticeView.do?ntccttSeq=258&view_bbs_gb_cd=01

number of scientific publications is also very low; start-ups, new products (such as Souldrops) are starting to gain traction and the market seems to open up to these novel ideas, it will however require more time to put down roots. There are numerous events which are focused on eco-innovation (such the Food Waste Hackathon mentioned in a case study in section 2.5) and such occurrences seem to increase in number over time.

3. Support structures and sources for energy efficiency, renewable energy and environment conservation

The governmental support for energy efficiency, renewable energy and environment conservation is mainly funded by the Environmental and Energy Efficiency Operational Programme, the Territorial and Settlement Development Operational Programme, the Economic Development and Innovation Operational Programme, which act as a distribution channel for Cohesion Fund, Regional Development Fund and European Social Fund. These Programmes are responsible for distributing a total of 14,241,507,702 € European financing and additional 2,227,864,516 € of national co-financing. The issues these programmes address are broader in their scope than energy efficiency, renewable energy and environment conservation, however these three includes most of the funds spent on achieving these aims. The EDIOP lists "Some 1,400 to benefit from improved energy and resource efficiency, while the programme will install 240 MW renewable energy production capacities" among other goals, while EEEOP seeks to achieve the following:

- Adaptation to climate change impacts;
- Development of water supply, wastewater disposal and cleaning, wastewater management;
- Waste management and environmental remediation related developments;
- Nature protection and wildlife protection related developments;
- Promoting energy and the use of renewable energy sources.

TSDOP also tackles some of the aforementioned challenges on a local level however:

- The development of green urban areas and the development of small scale environmental protection infrastructure;
- Sustainable urban transport development;
- Improving the energy efficiency of local government buildings,

and also foresees "an annual decrease in CO₂ emissions of nearly 56,000 tons".^{32, 33, 34}

³² http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/hungary/2014hu16m0op001

³³ http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/hungary/2014hu16m1op001

³⁴ http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/hungary/2014hu16m2op001

The support structures leave something to be desired, but the overall aims and achievements of the Operative Programmes are well defined and positive. The renewal of related (and obsolete in many ways) infrastructure is very important in order to achieve greater sustainability, even if it contributes only a little to eco-innovation.

4. Summary

Eco-innovation support structures are somewhat less developed in Hungary than in its western peers and the concept still is in its early stage in terms of prevalence, public information and education. The concept of sustainable development is far more widespread and it is reflected in the most important pillars of Hungarian development support, namely the Operative Programmes, which have by far the strongest effect in supporting public bodies and private businesses alike. As it was established in our previous analysis, eco-innovation still does not have a significant presence in public discourse and does not attract increasing attention so far. More conventional principles, such as energy efficiency, renewable energy sources, environmental protection and conservation are much more well-known. Markets on the other hand seem to be concerned with eco-innovation as it appears in the growing importance of themed hackathons, start-ups with a social cause. The high international embedding of the Hungarian economy will hopefully have a positive impact and will shape governmental policies as well in the future. There are successful organisations seeking to improve the eco-innovation output of the country, such as Kexport Cluster, or the Blue Economy Innovation Cluster among others, which indicate that expertise and dedication are present and can be built upon. In a smaller market as the Hungarian, companies are likely to be more export-oriented, or even "born-global" and domestic activities may not make a great sensation.

The implementation of eco-innovation in subsequent Operative Programmes and further appearances in other government policies can boost the presence of the sector in Hungary and specific subsidies to increase the share of eco-innovation as an industry might have positive long-term effects on employment and quality of life.

5. Literature

http://www.econ.core.hu/file/download/HLM2016/TheHungarianLabourMarket_2016_onefile.pdf