Were Social Labs immune to COVID-19? Impacts and benefits

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Abstract. *The COVID-19 pandemic disrupted higher education worldwide. Higher education institutions needed to adapt very rapidly to the crisis and a new environment, and also needed to revise their role in society. Higher education institutions can contribute to social innovation through research, education and helping to address citizens' issues and communities' needs, which is why the creation of social labs by higher education institutions has increased in the last decades. Social labs are spaces where higher education institutions experiment and test new ideas. However, social labs at higher education institutions are still a relatively new phenomenon and have not yet been examined sufficiently. Moreover, it is not fully known how COVID-19 affected social labs' activities and impacted their establishment. To reflect on the current reality, this article focuses on two research questions: (1) How were social lab activities and partnerships affected during the pandemic? and (2) What impact has COVID-19 had on social labs? To answer these questions, a quantitative survey was conducted, and the data was analysed by quantitative and qualitative methods. The results showed that the biggest challenge lies in organisational processes and human resources management. Yet, it should be noted that COVID-19 also provided opportunities. They are mainly linked with an impulse to develop innovations and increase digitisation in social labs. The study showed that social labs with flexible organisational processes and human resource management were more successful in their adaptation to crisis conditions caused by COVID-19. In summary, this article provides insight into social labs in higher education institutions by bridging an existing knowledge gap in scientific literature, and expands on it by investigating pandemics as having a crisis impact on social lab development.*

Keywords: social innovation, social labs, social challenges, higher education institutions, COVID-19.

Introduction

Higher education institutions (hereafter – HEIs) are increasingly expected to facilitate economic development and social welfare (Etzkowitz and Leydesdorff, 2000; Etzkowitz, 2018), especially today in times characterised by different "wicked" challenges (Lake et al., 2016, 1). There is growing interest in understanding HEIs' contributions to social innovations (Benneworth and Cunha, 2015; Cinar and Benneworth, 2020, 753). However, there are no specific framework and guidelines on how HEIs should contribute to the social innovation process (Kumari et al., 2020, 6).

Scholars (Anderson et al., 2018, 51; Cinar and Benneworth, 2020, 765) agree that HEIs can contribute to social innovation through research, education and assisting citizens with problems. Active engagement of HEIs in social innovation encourages them to create collaborative platforms or spaces in order to engage stakeholders for knowledge exploration and mutual learning (Kumari et al., 2020, 7). It facilitates cooperation between HEIs and society and applies the university knowledge in response to community knowledge needs.

A current trend is the creation of social labs (hereafter – SLs) – spaces where universities can experiment and test new ideas and approaches. This is a well-known concept from the fields where laboratories – or 'labs' – have their origin: technology, biological and natural sciences (Munk et al., 2017, 1). Therefore, in recent years, numerous SLs have appeared worldwide to support an emerging social innovation movement (Pawlicka-Deger, 2020). SLs take an essential role in creating social innovations and addressing social problems. However, SLs – as institutional organisations – are still relatively new in social sciences and humanities. According to Zabaniotou (2020), despite living labs' (Nguyen and Marques, 2021, 1139) and SLs' activity all over Europe, there is a lack of research about them. A theoretical gap continues to exist in terms of SL literature; empirical research of their practical implementations is also limited.

The COVID-19 pandemic disrupted and repositioned higher education and its role in the area of social innovation worldwide (Paunescu and McDonnell-Naughton, 2020). HEIs needed to adapt very rapidly to the crisis and a new environment. Many HEIs started e-learning and became more adaptive. But SLs at HEIs are a new research area. Thus, there is a lack of information on how SLs at HEIs responded to the COVID-19 crisis and how the pandemic affected their social impact creation. This paper therefore aims to determine how COVID-19 affected SLs' activities and their impact. This aspect focuses on two sub-questions: (1.) How were SLs' activities and partnerships affected during the pandemic? (2) What impact has COVID-19 had on SLs? The paper further aims to discover how these labs contributed to solving the COVID-19 crisis.

Literature Review

Social innovations at HEIs

Contemporary society is facing new problems and grand challenges (climate changes, environment destruction, social exclusion, population growth, ageing, energy security, etc.)

that are complex, interconnected, and multidisciplinary in nature and almost impossible to solve without the active and direct participation of actors of society and citizens. This complexity has driven society toward social innovation. Such initiatives require critical thinking and cooperation. Additionally, they promote the co-creation of new ideas or solutions to provide sustainability in society (Kumari, et al., 2020, 6), to meet social, economic, political and environmental challenges (Domanski, et al., 2020). The definition of social innovation is by no means settled (Slee, et al., 2021). Recently, social innovation[1] has been increasingly evident in policy areas and projects of development organisations as a way to solve emerging societal problems (Domanski, et al., 2020). Terstriep et al. (2020) require a particular ecosystem for providing social innovations, which include (1) a mode of governance that integrates actors from civil society and the social, economic and academic field; (2) social innovation hubs, labs and transfer centres as intermediaries that accelerate social innovation activities; and (3) the integration of different modes of innovation in transformational innovation strategies.

HEIs influence society mainly through teaching and research. As centres of these activities, they face significant demand from the community to participate in finding solutions to current problems, and to address urgent social and environmental challenges (Belcher, et al., 2021). Based on this, HEIs have recently become agents of social transformation through social innovation. In a knowledge society, academia – based on its competencies – may have the most crucial role in developing, testing and disseminating social innovations (Amorim, et al., 2019, 9293). HEIs and research institutes represent important platforms for promoting intensive exchange between disciplines, business sectors and cultures (Anderson et al., 2018, 50).

The role that HEIs are playing in social innovation has evolved in recent years, and therefore a systematic review of knowledge on the role of the university in enabling social innovation is required. Bayuo et al. (2020, 7) noted the growing interest in the topic and considered three important domains, namely teaching, research, and universities' third mission (contribution to society). But Schuch (2019) indicates shortcomings in the way that social innovations initiated by HEIs are documented: from the implementation and monitoring of these activities to the way that they are promoted or communicated to the society.

Besides researching transformation processes, more attention is also being focused on science itself as an active participant in social innovation processes. Concepts such as Design Thinking or Transformative Research with a focus on the active participation of stakeholders are becoming more critical for the work of HEIs with their environments (Camelo, et al., 2019; Ruiz and Chalacan, 2021). Through transformative research, science seeks to solve societal problems by activating processes of societal change. Against this background, the creation of appropriate structures (Living Labs and other spaces for exploration and learning) that help to develop knowledge based on experience in order to establish new social practices has received growing attention and needs to be further promoted (Nguyen and Marques, 2021, 1127; Konstantinidis, et al., 2021). Only by sensitising

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[1] The idea and the notion of social innovation are still weakly conceptualised due to various definitions and lack of a comprehensive theoretical foundation (Kumari, et al., 2020, 6; Tjörnbo and McGowan, 2022). This paper will use the definition introduced by BEPA (2010), which states that social innovations are new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations.

people about societal problems and possible solutions, can HEIs advance the development of social innovation with community members (Anderson et al., 2018, 52).

Social innovation focuses on the active involvement of citizens in the generation of public value, although even here, further research is desirable to identify forms of citizen involvement in building community networks in social innovations (Butkevičienė et al., 2021).

The engagement of HEIs in social innovation encourages academics and students to deliver a variety of social services by participating in community-development activities or service-learning (Munoz et al., 2019; Groulx et al., 2021). HEIs can play an important role in the social innovation ecosystem by providing different knowledge and resources (Baturina, 2022, 46).

The concept of transformative learning, experimental learning, systemic thinking, social and living labs and hubs uses educational practices to bring innovative and sustainable social changes (Purcell et al., 2019; Salinas-Navarro et al., 2019). This concept can enable HEIs and other engaged actors to work on new ideas for social change and to create social impact. HEIs can be used to provide a collaborative platform to engage stakeholders for knowledge exploration and mutual learning and help them to perform their activities outside the academic setting. Many HEIs started to create innovation hubs, living labs and SLs (Bodolica, Spraggon, 2021; Nguyen and Marques, 2021, 1125; Kumari et al., 2020, 13). Knowledge sharing and experimentation in a social context is an important way through which HEIs can participate in the development and implementation of social innovation activities (Kumari et al. 2020, 10). SLs at HEIs are often specific spaces that enable social innovation to develop and grow. As they are emerging social phenomena without conceptual maturity, a brief conceptualisation is provided in the part that follows.

Social labs' conceptualisation

Many academic institutions worldwide are beginning to recognise their role in creating political, economic, and social value. Their vast resources, research capabilities, and connections mean that universities can foster, promote, and lead social innovation globally (Munk et al., 2017, 1). Before describing the characteristics of SLs, it must be acknowledged that various similar terms have been used to describe similar "landscapes". Labs have existed in the academic and for-profit sectors since the 1800s, but in the early 2000's started to appear in all sectors, including governments and universities (Marcelloni, 2019)[2]. The term 'social innovation lab' is also used to characterise a variety of different organisational forms and methods (Wascher et al., 2019)[3].

SLs are characterised (see Figure 1) by: 1) a social perspective, gathering together people with different backgrounds and approaches to working together; 2) an experimental perspective, dealing with cyclical creation processes; and 3) a systemic perspective, working

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[2] Westley, Goebey & Robinson (2012, 8) state that social Innovation labs (SILs) represent a new policymaking process that has spread rapidly since the 2008 financial crisis. On the other hand, innovation labs are also developed within the public sector (McGann et al., 2018; Tõnurist et al., 2017).

[3] It includes organisations such as centres for social innovation, design labs, change labs, public innovation labs, impact labs, impact incubators, impact learning labs, collective impact learning labs and more (Papageorgiou, 2017). The same author also provides the genealogy of diverse social innovation labs movements.

on the generation of prototypes that can solve significant challenges (Romero-Frías and Robinson-García, 2017)[4].
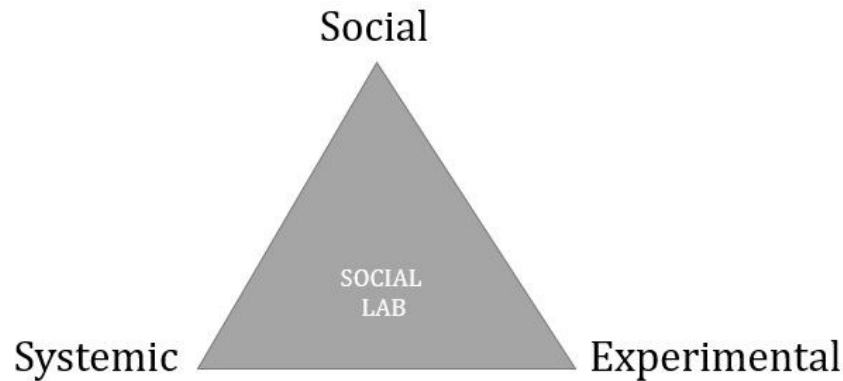

Figure 1. Social lab perspectives

Source: Nguyen et al. (2018, 7).

SLs[5] are **social** for the following reasons: 1) they address complex social challenges that cannot be solved by a technological approach; 2) they require a transformative approach to socio-operational patterns, social design and imaginaries, institutions, business models and value chain heuristics, regulatory and policy practices, as well as, potentially, stakeholder identities, attitudes and behaviour; 3) the issue at hand is approached by all stakeholders in concert, negotiating their stakes as well as positions, engagement and impact.

As mentioned, SLs are platforms created to address social challenges (Romero-Frías and Robinson-García, 2017). SLs are social in nature, reflected by those participating in the lab, to those targeted by the social innovation. It is furthermore considered social because the lab addresses social problems or challenges – which are often complex (Timmermans et al., 2020).

SLs are **systemic**. The ideas and initiatives developing in SLs, released as prototypes, aspire to be systemic. This refers to solutions that go beyond dealing with only one part of the whole or merely alleviate symptoms, and address the root cause of why things are not working in the first place. They address difficult and complex problems that have thus far been resistant to solutions. SLs offer a complex approach based on complementarity and an in-depth view of problems (Dinca-Panaitescu, 2020).

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[4] Timmermans et al. (2020) acknowledges key features of social labs by summarising numerous authors. They are a space for experimentation; experiments conducted in and by the lab are typified as social experiments; they require active participation of a wide range of societal stakeholders that are of relevance to or have an interest in social challenges; are multi- and interdisciplinary involving a wide range of expertise and backgrounds as well as approaches; they support solutions and prototypes on a systemic level and they have an iterative, agile approach.

[5] Similarly social innovation labs share the following five key characteristics: they provide institutionalised processes and spaces for experimentation (organisations or organisational units, structures and resources); they facilitate innovation processes (use innovation methods, e.g. co-creation, collective intelligence, design-thinking); they work on societal challenges and demands framed as specific questions; they engage with cross-sectoral, multi-stakeholder teams; they create 'practice inventions' (socially innovative initiatives) as prototypes with high innovation potential (Wascher et al., 2019).

SLs are **experimental** because the initiatives are not one-off experiences. They are ongoing and sustained efforts. The team doing the work takes an iterative approach to the challenges it wants to address, prototyping interventions and managing a portfolio of prospective solutions. This reflects the *experimental nature* of SLs, as opposed to the project-based nature of many social interventions. The experimental approach allows researchers to collect data in a more realistic context (Vincens et al., 2018). A core component of this process is the requirement that all participants "let go of their preconceived ideas about the problems that exist and the best solution(s) to them" (Westley et al., 2015, 13). SLs offer spaces for doing social experiments in a practical context where experts and stakeholders join to tackle different social issues without knowing exactly how to proceed, so they often have a high level of uncertainty and unpredictability (Hassan, 2014, 2; Timmermans et al., 2020).

According to Timmermans et al. (2020), SLs require the active participation of a wide range of societal stakeholders that are relevant to or have an interest in the social challenge, such as policymakers, businesses, government, and civil society. They are multi- and interdisciplinary, involving a wide range of expertise and backgrounds as well as approaches.

In fact, SLs move away from a technology- and natural sciences-centred focus by making social change their main *raison d'être.* SLs, for example, have been applied to address sustainability (Klincewicz et al., 2022, 179), poverty alleviation and social cohesion in municipalities (Groulx et al., 2021; Malan, 2020; Domanski, et al., 2020).

SLs provide a variety of outcomes. Tangibly, SLs offer new – or changes in – products, services, organisational structure and policy (Domanski, et al., 2020). However, due to the systemic nature of SLs' work, much of the actual impact created is intangible. According to Hassan (2014, 6-7), SLs generate human capital (new capacities and skills), social capital (increased trust and collaboration), and, finally, intellectual capital (new knowledge and learning). Hassan (2014, 7) therefore suggests that the success of SLs should be measured by multiple indicators. But due to this, SLs struggle to formulate coherent strategies for measuring or even defining what they create and consequently have difficulties determining the results they have obtained (Kieboom, 2014, 10, 38). As a result, many of the outcomes of SLs, especially intangible ones, have been given little attention (Kieboom, 2014, 38). Yet, without a means of proving that SLs are making a positive impact, it is difficult to legitimise them as a viable approach for solving complex social challenges (Nguyen et al., 2018, 8).

This paper will therefore analyse the role that HEIs are playing in social innovation through SLs during the time of the COVID-19 crisis. The next sections of the paper will present the methodological framework and research results, after which the discussion will attempt to contribute to the current body of research regarding the impact of the COVID-19 pandemic on the activities of SLs.

Methodology

An empirical study was carried out to assess the impact of the COVID-19 pandemic on social labs at Higher education institutions. The following objectives were raised: 1) to reveal how the pandemic impacted SLs' activities and partnerships; 2) to identify challenges that emerged during the COVID-19 crisis; 3) to analyse that impact that COVID-19 had on SLs' social impact creation. For the implementation of the study, a quantitative research methodology was selected, with a questionnaire as the main research tool.

Data collection strategy. Researchers used convenience sampling. COST Action SHIINE network participants are focused on the topics of social changes, SLs, social innovation labs

and etc. Researchers asked participants of the network to take part in the research. They had to have a minimum of 1 year of work experience at a SL and their professional activities needed to be directly related to development or research and innovations. A total of 21 respondents from various SLs (N=21) (see Table 1) at HEIs in Europe participated in the research.

Table 1. Social labs at higher education institutions

Country	Number of Labs	Field	Affiliation	Years active
Albania	5	Education (3), Professional, Scientific and Technical Activities (1), and Transportation and Storage (1)	All 5 belong to universities	Education (Two SLs: 1 year, and one SL: 3 years), Professional, Scientific and Technical Activities (1 year), and Transportation and Storage (3 years)
Bulgaria	2	Education	One belongs to a university, one belongs to a private company	One SL: 1 year, and one SL: 3 years
Finland	2	Human Health and Social Work Activities	Both belong to universities of applied science	Both SLs: 1 year
Lithuania	1	Information and Communication	University	1
Hungary	1	Human Health and Social Work Activities	University	1
Kosovo	1	Education	University	1
France	1	Information and Communication	College	4
Czech Republic	1	Education	University	4
Germany	1	Other service activities	Private company	1
Serbia	1	Professional, Scientific and Technical Activities	College	1
Slovenia	1	Education	University	4
Moldova	1	Professional, Scientific and Technical Activities	Research institution	4
Netherlands	1	Human Health and Social Work Activities	University of applied sciences	1
Romania	1	Agriculture, Forestry and Fishing	University of applied sciences	4
Poland	1	Manufacturing	University of applied sciences	1

Source: Authors' own research.

Responses were anonymised and respondents are referred to by a number.

The data collection plan was prepared and it was decided to apply the principles of exploratory pilot investigation due to the small number of respondents. The questionnaire was created by the authors and made available via the online research tool

https://pollmill.com/. Respondents could complete the questionnaire between 1 December 2020 and 31 March 2021. Data was recorded via the online tool and downloaded for purpose of statistical analysis.

Structure of questionnaire. The questionnaire included some biographical information and questions were then divided into three parts, based on their relevance to the research questions. The questionnaire consisted of closed and open-ended questions. A summary of the questions, their purpose, relevance to the research question, and format is presented in Table 2.

Table 2. Structure of questionnaire

Question Category (Cronbach's alpha, α)	Question purpose	Relevance to research questions	Question type	Coded	Question No
General characteristics (α_general=0,9643)	Sector	Identification of possible differences dependent on general characteristics of responding organisations	Multiply list (only one answer)	No	1
	Country			No	2
	Duration of activities			No	3
	Type of responding organisation			No	4
Impact (α_impact=0,973)	How did pandemic impact activities?	How SLs' activities and partnerships had been affected during the pandemic	Open-ended question	No	5
	Impact on human resources		Multiply list (only one answer)	Yes	6
	Impact on organisational processes			Yes	7
	Impact on innovation projects			Yes	10
	Impact on labs' granting programme			Yes	11
	Impact on active working projects			Yes	13
	Impact on creating labs' social impact			Yes	14, 15
	Impact on digitisation			Yes	16
	Impact on collaboration			Yes	17
Supporting (α_support=0,9672)	Impact on organisational communication	What impact COVID-19 has generated on SLs social impact?	Multiply list (only one answer)	No	8
	Contributing to solve the pandemic problems		Check box (a lot of answers)	No	9
	Difficulties of adaptation to the situation		Multiply list (only one answer)	Yes	12
	Supporting of labs			Yes	18
	Supporting organisation type			No	19

Source: Authors' own research.

Data transformation strategy. The collected data were downloaded in MS Excel. Written responses were coded in order to convert the qualitative data into quantitative data for analysis. The written responses were converted into numbers on a Likert scale (see Table 3).

Table 3. Numbers on a Likert scale

Label	Numbering
Strength of negative impact	not at all: 1, a little: 2, to some extent: 3, very much: 4
Strength of positive impact	not at all: 4, a little: 3, to some extent: 2, very much: 1
Impact on grants	grant funding has decreased: 3, grant funding has remained the same: 2, grant funding has increased: 1, we do not get grant funding: 0
Difficulties to adapt	very easy: 1, easy: 2, difficult: 3, very difficult: 4, no attempt to adapt: 0
Impact on the project's activities	project has stopped: 3, considerable: 2, some limited: 1, no impact: 0.

Source: Authors' own research.

Reliability. The reliability of the research was determined using Cronbach's alpha (α) (Table 2, column 1). This is a generally accepted way to measure reliability, or internal consistency of an instrument. The reliability of the questionnaire's three sections was as follows: $\alpha_{general}$= 0,9643>0.9, α_{impact}=0.9767>0.9 and $\alpha_{support}$=0,9673>0.9 (presented in the Table 2, column 1). This means that the questionnaire has a high degree of reliability.

Descriptive statistics. All quantitative indicators (questions: 6-8, 10-18 in Table 2) were analysed by the descriptive statistics indicators. The parameters included in the analyses were the sample size, average, median, mode, skewness of distribution, kurtosis of distribution, and standard deviation.

Variance. Another feature of an instrument's reliability is the test score variance. Variance indicates the variability from the average or mean. For this questionnaire, the variation ($\lambda=\underline{x}/\sigma$) of some questions (questions: 3, 6, 11, 13, 14, 16, 17 in Table 2) was too big ($\lambda>0,3$), which means that these results show a wide range of values. The data from these questions should therefore rather be used for exploratory analysis.

Correlation analysis. For the establishing existing linear relationships the correlation analysis ($r_{criteria1 \times criteria2}$) was performed.

Qualitative analysis methodology. Content analysis was performed of the responses to open-ended questions (question 5 in the questionnaire, Table 2) by dividing keywords into logically related subcategories and grouping them by their linguistic meanings.

Results

The analysis of COVID-19's influence on the SLs' human resources at the time of the COVID-19 pandemic found that eight responding labs felt the impact of COVID-19 to some extent, but seven SLs (33%) did not feel any impact on human resources. On average, the impact on the SLs' human resources was not very significant. Based on the descriptive statistics results, it could be said that the pandemic affected SLs to some extent (38%; $\bar{x}$=Me=2 (a little); Mo=3 (to some extent); σ=0,96; A_F=0,06>0; E_X=-1,3<0).

The analysis of the pandemic's influence on the SLs' organisational processes indicated a marked influence. Five responding SLs (10%) felt a very strong impact on their organisational processes, seven SLs (33%) felt a weak effect, and seven SLs indicated an impact to some extent ($\bar{x}$=Me=Mo=3 (to some extent); σ=0,96; A_F=-0,12<0; E_X=-0,86<0). So, it could be said that the COVID-19 situation had a stronger impact on the organisational processes because 76% of SLs felt the effect. This would make sense as there were various

national regulations in place in countries during the pandemic, such as limiting contact and implementing remote working.

Based on the results of the correlation analysis, it was found that the SLs that had been operating longer were more severely affected by the COVID-19 pandemic in the area of human resources ($r_{duration\&human\ resources}$=0,359, p=0,110>0,05). These results could be explained by the limiting of social contacts in organisational processes, because there is also a relationship between the pandemic's impact on the organisational processes and human resources ($r_{organisational\ pro'cesses\&human\ resources}$=0,372, p=0,087>0,05). Still, both established relationships are not statistically significant and should only be used as possible tendencies. This fact could mean that SLs are employing teamwork for different projects, so the organisational processes also depend on the employees' possibility to work in teams. So, it could be assumed that in half of the cases, the influence of COVID-19 was felt in organisational processes and human resources.

Four responding SLs did not feel any impact on their active working projects. Ten SLs identified some limited impact on their projects and seven SLs called the impact quite intense. Only one SL from the set of responding SLs needed to stop all projects during the pandemic crisis. As respondent 8 mentioned in the open question (Table 2): "*we don't work at all*". The data therefore seems to indicate that during the pandemic, active working projects were negatively affected. Respondents' answers included "*no activities have taken place since March 2020*" (respondent 10), "*all lab research activities have been suspended*" (respondent 21), "*some lab activities were restricted*" (respondent 15), showing that the pandemic imposed severe limitations on SLs' activities.

The assessment of the COVID-19 impact on the implementation of new innovation projects found that the pandemic was a significant impulse for 18 responding SLs (90%) to start innovation projects. The tendency to start innovations projects could be identified ($\bar{x}$=Me=Mo=3 (to some extent); σ=0,76; A_F=-0,33<0; E_X=-0,41<0): six felt a weak impulse to start new projects, two experienced it as very strong, and ten felt a significant force to implement innovation projects.

An analysis regarding additional funding found that about half of the responding SLs did not perceive changes in terms of grant allocations. However, ten SLs perceived the increase of grants allocated during the pandemic ($\bar{x}$=Me=Mo=2 (a little); σ=0,63; A_F=-0,94<0; E_X=1,86>0). So, it could be assumed that the COVID-19 crisis also is considered as an impulse for the new implementation of innovations, but these changes are not always linked to increased funding. It is important to note that in half of the responding SLs, the increased funding went hand-in-hand with negative impacts of the pandemic on the active projects.

A correlation analysis of the positive and negative impact of COVID-19 on the creating responding SLs' social impact found that, of course, these SLs that experience the negative impact of the crisis cannot feel positive impacts ($r_{negative\&positive}$=−0,315; p=0,067>0,05), but the relationship is not statistically significant. It emerged that there was an equal split between SLs that felt the positive ($\bar{x}$=Me=Mo=2 (to some extent); σ=0,80; A_F=-0,05<0; E_X=-0,33<0) and the negative consequences ($\bar{x}$=Mo=3 (to some extent); Me=2 (a little); σ=0,73; A_F=0,6>0; E_X=-0,8<0) on their social impact.

It would seem that the one neutral influence on the responding SLs' social impact could be the more intensive integration of digital technologies in daily activities of the SL. Almost half of the the responding SLs (11), felt a very strong positive impact of the increasing

of digitisation in processes ($r_{positive\&digitization}$=-0,35, p=0,067>0,05). However, the relationship also is not statistically significant.

The analysis of the COVID-19 impact on the responding SLs' cooperation processes found that only three responding organisations did not feel this impact. The other SLs experienced the impact from not significant to a very strong impact, meaning that there is a tendency towards a stronger impact ($\bar{x}$=2 (a little); Me=Mo=3 (to some extent); σ=0,87; A_F=-0,17<0; E_X=-0,48<0). A weak, insignificant relationship could be noted between the COVID-19 impact on the cooperation activities within the increasing digitisation ($r_{collaboration\&digitization}$=0,293; p=0,098>0,05). This relationship could be summarised by the opinion of respondent 7: "*all the activeness is online*". As mentioned before, the research results also established a weak relationship between the digital tool integration and the increasing social impact. The use of these digital tools mitigated the pandemic's negative impact on cooperation processes. Still, this relationship is not statistically significant and is very weak, so it could be seen as only a tendency of interdependence, and it would require more detailed analysis.

It is important to consider the respondents' opinions about the negative impact of the pandemic on a wider area of SLs' activities:

● limited accessibility of resources: "*limited access to research subjects, both people and organisations*" (respondent 2), "*precluded access to more powerful computing equipment*" (respondent 21), "*restricted access to required inventory, software*" (respondent 6);

● limited social interactions: "*we are mostly online in contacts with students, but cooperation with colleagues and industry for research is more difficult*" (respondent 18), "*we do not have direct contact anymore*" (respondent 19), "*bad, very bad, closed, not moving, not working, online everything*" (respondent 2), "*online meetings are not always effective when innovation and decisions are needed*" (respondent 4);

● decreased involvement and creativity: *"decreased the participation"* (respondent 20), "*difficulties in attention and motivation attraction*" (respondent 16), "*inhibits collaborative creativity*" (respondent 18).

But some of the respondents mentioned that COVID-19 had a positive impact on sustainability:

"*the switch of the main informative/awareness raise activities into online mode*" (respondent 3); "*fortunately, this is not only a hurdle but rather a possibility to us, because the online platforms make meeting and events more accessible in many ways and there is no need for accessible transportation through different locations*" (respondent 2); "*digitisation, which enabled fast-growing, attracted additional funding and improved the quality of processes*" (respondent 17); "*we had to digitalise our activities but apart from that received a lot of support from our funding partners*" (respondent 1).

So, it could be assumed that under the negative influence of COVID-19, the activities of responding SLs have felt difficulties. But there have also been positive influences such as the additional impulse to develop innovations and to increase digitisation of responding SLs' processes, and these results allowed new modes and new techniques of responding SLs' working styles through possible digital cooperation.

In response to the COVID-19 crisis, the processes of communication were switched to online events for most SLs, namely 18 (86%). This was also echoed in the open question (Table 2): "*the activities have been moved to online space due to restrictions*" (respondent 5), "*all activities are going on only online*" (respondent 11), *we switched online teaching*

(respondent 12), "*we switched to online teaching*" (respondent 19)*, "teaching has been held online*" (respondent 10). Some changes in the work conditions were noted, and they were related to new possibilities to enable the new mode of work such as remote workplaces: "*we started to work from home*" (respondent 13), "*we are implementing RDI [research, development and innovation projects] remotely*" (respondent 17).

One SL stopped all activities during the crisis: "*we don't work, everything has stopped*", said respondent 8. Also, the challenges that appeared during the COVID-19 crisis influenced the reaction of responding SLs in the context of contributing to the management of these challenges. The majority (52%) of responding organisations (11) started to increase research activities which could be implemented under pandemic conditions, and seven responding organisations began new community projects (33%).

So, it could be assumed that the majority of responding SLs switched to the new mode of working and implemented new activities to strengthen their organisational community by involving the team in the activities and strengthening the readiness of the community to continue working after the crisis. However, it cannot be ignored that one SL had to completely stop all activities.

The research results show that more than half of the SLs had difficulties adapting their processes to the pandemic situation, but six SLs were able to amend their processes quickly according to the changed situation under the pandemic conditions. Also, it would seem that adaptation is more difficult for these responding organisations, which:

- felt a stronger COVID-19 impact on their organisational processes ($r_{\text{adaptation \& organisational impact}}$=0,741; p=0,0001<0,01);
- felt a stronger negative impact on the creating of social impact, and these two relationships are especially significant ($r_{\text{adaptation \& social impact}}$=0,631; p=0,0021<0,01);
- felt a stronger negative impact on the projects the lab is working on, and this relationship is statistically significant ($r_{\text{adaptation \& working}}$=0,471; p=0,031<0,05);
- felt a stronger impact on innovation projects, but it is only a possible tendency because this relationship is not statistically significant ($r_{\text{adaptation \& innovation}}$=0,385; p=0,656>0,05).

From the above, it could be argued that the strong negative COVID-19 impact on the organisational processes, including the negative influence on the innovation projects and on the active working projects, are main reasons that the responding SLs found it difficult to adapt their activities. In addition, the more significant challenges of adaptation depend on the affected organisational processes of the SLs.

The research showed that only one responding SLs did not get funding during the pandemic, and the same responding SLs also did not get any support. But more than half (13) of all investigated SLs received support, and the prominent supporting organisations were universities.

Some of the respondents mentioned the positive impact of COVID-19 for the support of responding organisations through the granting or other material and not material grants: "*we had to digitalise our activities but apart from that received a lot of support from our funding partners – Postcode Lotterie, Heideh of Stiftung – and grow faster than ever!*" (respondent 1).

Based on the results of the correlation analysis, it could be argued that the most statistically significant relationships are in the category of the COVID-19 impact on the responding SLs' social impact creation, as it is presented in Figure 2. It can be seen that the negative COVID-19 impact strongly and significantly influenced these own social impact

factors as organisational processes ($r_{neg.\ impact\ \&\ organisational\ processes}$=0,657; p=0,001<0,01), working projects ($r_{neg.\ impact\ \&\ working\ projects}$=0,641; p=0,002<0,01), and adaptation ($r_{neg.\ impact\ \&\ adaptation}$=0,632; p=0,002<0,01) (Figure 2). The weaker impact was on human resources ($r_{neg.\ impact\ \&\ human\ resources}$=0,465; p=0,037<0,05) and innovation projects (($r_{neg.\ impact\ \&\ innovation\ projects}$=0,384; p=0,087>0,05), but the last one relationship is not statistically significant. It is important to mention that COVID-19 did not have any negative influence on grants and funding.
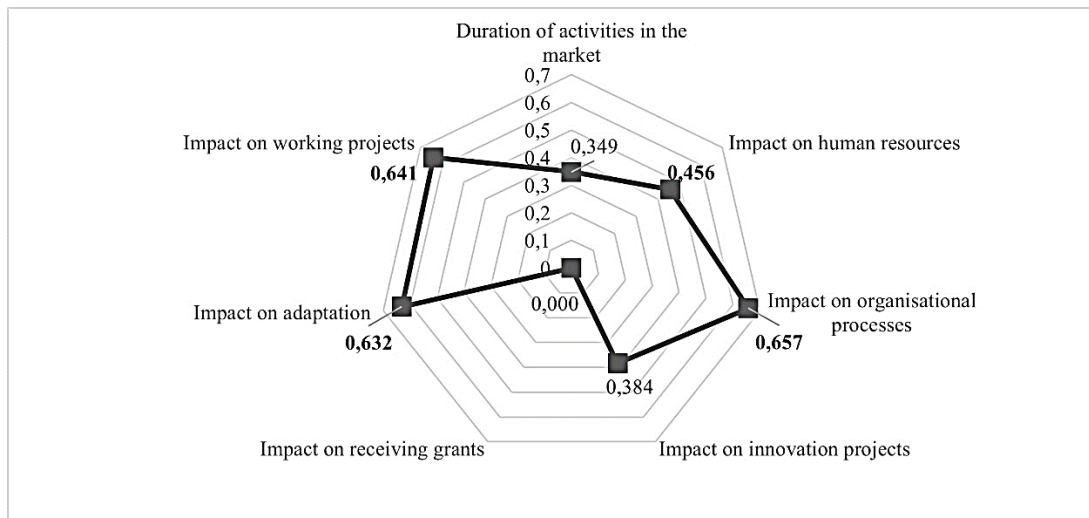

Figure 2. COVID-19 impact on the labs' social impact creation

Source: Authors' own research.

The correlation analysis showed that the negatively affected possibilities to create social impact under the pandemic conditions were strongly related to the increased negative impact on the SLs' organisational processes and human resources. There was also an increased negative impact on active working projects, and it was also more difficult to adapt to the resulting challenges.

Discussion

This is preliminary research to provide insights on SLs across Europe functioning, social impact creation and impacts of COVID-19 pandemic. It goes beyond the current body of research that consists primarily of descriptive overviews and case studies of different forms of labs (for example, Romero-Frías, 2017; Ruijsink and Smith, 2016; Smith et al., 2015), or are practically orientated towards discussing designs of different labs (for example Kieboom, 2014, Puttick, 2014; Westley et al., 2015, 16). First, the contribution of this research is to assess the impact of COVID-19 on SLs. As it was indicated above, they faced various impacts, ranging from negative to positive. Negative consequences included losing some grants (or the possibilities to participate in grants that were stopped due to COVID-19.). Positive consequences included getting extra funding or creating new partnerships. Furthermore, COVID-19 also acted as a trigger for some SLs to be established or become involved in new research fields to investigate. According to Minoi et al. (2020), the nudge theory could be easily noticed in Malaysia, where COVID-19 acted as a trigger for various innovations, including social ones. In their article, the illustrative examples describing nudging indicators

and social innovations are provided (Minoi et al., 2020). In addition, Nichols et al. (2013) investigated how knowledge mobilisation and collaboration manifest in social innovation in higher education. Their observations are still very relevant in today's discussion about the post-pandemic higher education system. The rise of social innovation could stem from the active interplay between community and campus, which pushes knowledge mobilisation that nudges knowledge collaboration (Nichols et al., 2013).

This situation required adapting and rearranging existing infrastructure as well as working culture and adapting to new realities. Additionally, SLs often are a facilitator in social processes in society, so they have the mandate to act and help others find their way in this changed context (Nichols et al., 2013). Even more so, SLs as research centres have to observe these changes and should provide long-term insights. However, not every SL inherits all presented above tasks, yet it is expected that at least one of the situations/tasks will be relevant to any SL.

Furthermore, in a significant amount of scientific literature, SLs are presented as joining links between society, business and academia. So, COVID-19 required SLs to build new and strengthen existing partnerships. As observed in this research, a considerable number of SLs fulfilled this role. The SI-Drive project tackled the challenge of mapping SLs and their partners. According to project results, almost 15 % of initiatives to establish SLs stem from HEIs out of all more than 1000 case studies analysed in the project (Anderson et al., 2018, 50). Additionally, quite boldly SI-Drive researchers state that "[…] universities generally do not recognise the important role social innovation can play as part of their knowledge exchange policy, and regional ecosystems also tend to favour more commercial and technological forms of innovation" (Anderson et al., 2019, 147). This research points out that SLs faced challenges that negatively affected their work and partnerships with other partners. So, the pandemic situation slowed down collaboration.

Moreover, collaborations were disturbed due to the inability to meet and discuss together, share knowledge, and inspire one another (Cockshut et al., 2020). These changes and effects were reported by various researchers on business and organisation management (Amankwah-Amoah et al., 2021; Azizi et al., 2021, 7; Ebersberger and Kuckertz, 2021; Gómez et al., 2020). All of them state that changes in the work environment due to COVID-19 have adverse effects, but not entirely all of them are negative. However, despite their impact, all changes required adaptation and the necessity to navigate in unsettled and unknown waters (Gómez et al., 2020).

Yet, some observed that HEIs are key institutional players within their localities since they have been shown to have significant economic and social impacts on their communities (Glasson, 2003). Furthermore, since the 7th EU Research Framework, it was expected that research has to focus more on societal changes (Avelino et al., 2017, 2015; Bayuo et al., 2020, 6; Schneidewind et al., 2016) instead of technical solutions for any and every kind issues (Bayuo et al., 2020, 6). Due to COVID-19, SLs faced some difficulties in the management of organisations' human resources, yet it is reported that organisational processes were affected more. It is predicted that organisational processes were affected mainly due to lockdown followed by remote working and personnel sick leave or family leave (in several countries, parents of young children had the opportunity to have paid leave to take care of their children).

The public and the private sectors, as well as the civil society, are relevant for social innovations on a more or less equal footing, with science and research only taking a minor

role in social innovation initiatives (Domanski and Kaletka, 2018, 207). HEI SLs are one of the ways which could close or at least minimise the "gap" between sectors. However, this could be limited due to the research funding focusing only on COVID-19-related research and leaving other scientific areas to experience stagnation or decreasing funding.

Additionally, Bayuo et al. (2020, 9) pointed out that the obligations of universities extend beyond research and teaching. It is expected that universities should be active, persuasive, and initiative actors in the quadruple helix system[6]. However, Anderson et al. (2019, 149) discussed various concerns regarding the existing image of SLs, and also provided probable solutions required to make SLs and their activities needed to make social innovation used and applied more widely. As exclusive actors, the SLs could face many complications, yet a shifting paradigm could make social innovation a necessary tool for the co-production of knowledge. It also often acts from implementation machinery (Anderson et al., 2019, 148).

One of the important hindrances to the SLs' establishment in HEI is their traditions of slow-pace changes. Constraints posed by institutional factors can limit the level of success for innovation in higher education (Campbell and O'Meara, 2014). Becoming more flexible and deviating from silo thinking within bureaucratic structures is a relevant precondition for developing social innovations (Schröder and Krüger, 2019) that SLs aspire to. So, SLs could be a nucleus for changes around HEI as well as within HEI. Azizi et al. (2021, 1) pointed out how COVID-19 brought changes: "adverse consequences, such as economic shock, global health crisis, change in social behaviours, and challenges at the organisation level to continue business operations". However, HEI could easily fulfil the role of the predictor of the near future and provide solutions to deal with near-future situations. However, due to the slow pace of HEI reaction, often this role is taken over by various consulting businesses or non-governmental organisations. Such consultations are however not always transparent and could be obscured and ambiguous. So, Terstriep et al. (2015, 152) correctly observed that conflict between the culture of context and the new culture of social innovation could cause obstacles and resistance to establishing and developing SLs. HEI could be an early adopter of SLs in their environment and provide knowledge and experience to other sectors.

Conclusions

There is a growing interest in understanding how HEIs contribute to social innovations. However, there is no specific framework and guidelines for that contribution. HEIs develop social innovations through research and education, often facilitated by multidisciplinary social innovation hubs, labs, and transfer centres. Universities can experiment and test new ideas and approaches in those intradisciplinary spaces where HEIs specialists and partners from the public and private sectors meet. Despite their popularity, SLs are still relatively new institutional organisations. As a result, a significant gap exists in empirical research on practical implementations of the idea of SLs in HEIs.

The COVID-19 pandemic disrupted higher education worldwide. As a result, HEIs needed to adapt rapidly to the crisis and a new environment. The labs were also affected by those forces. The presented research focused on the socio-demographic characteristics of HEIs SLs, and on identifying COVID-19 impact on lab's operations.

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[6] For more information on the triple, quadruple and quintuple helix system, see Etzkowitz (2018).

Most of the investigated labs were organisations less than two years old (13 labs), and 8 labs were more than 2 years on the market. The study shows that organisations with a longer history were affected by COVID-19 pandemics, mainly in the area of human resources. Moreover, COVID-19 significantly impacted organisational processes due to government restrictions, limitations of contacts, and remote work. Labs reported not only difficulties but also a positive impact of COVID-19-related changes. The pandemia gave an impulse to develop innovations, be involved in new research areas, find new partners, and increase digitalisation processes. As a result, most investigated labs switched to the new working model. They implemented new activities to strengthen their communities and maintain readiness to continue their mission after the crisis. One organisation, however, stopped their activities completely.

The paper concludes that SLs with flexible administrative processes and human resource systems were more successful in their adaptation to the COVID-19 pandemic. Therefore, SLs could consider hiring flexible and adaptive specialists and increasing their operations' flexibility in general. That would increase their capacity for other unexpected changes. SLs should accept that unexpected and impactful events other than COVID-19 will influence their operations in the future. Understanding how crises impact labs and how labs can create value under demanding conditions is crucial as VUCA (volatility, uncertainty, complexity and ambiguity) remains the prevailing characteristic of the current decade. The article was written in the middle of the next crisis, the war in Ukraine and the refugee crisis in Europe that followed the war. Society needs resilient and impactful organisations that effectively implement social innovations in such a challenging environment.

The main limitation of this research project is the relatively small sample and unequal (albeit comprehensive) geographic coverage of SLs. The concept of a SL is ephemeral, not codified, and constantly evolving; as a result, it is hard to make even rough estimations of the number of such labs. The lack of reliable data on the total number of SLs made it difficult to evaluate the representativeness of the research sample. Furthermore, our broad geographic coverage limits the interpretation of findings as labs operated in different circumstances. For example, this study has been focused on the impact of the same factor, COVID-19, on SLs. However, the research design does not allow more profound interpretations: it was not possible to consider the local circumstances such as the time, duration and strictness of lockdowns, severity, and the number of COVID-19 cases.

It is necessary to estimate the total number of SLs at HEIs for further research. Defining and measuring the size of the labs' population would enable quantitative studies in social innovations. Furthermore, qualitative studies can focus on multiple case studies that would contextualise SLs' responses to COVID-19 and other crises.

Acknowledgement

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