Hacking Hekla

Exploring the Dynamics of Digital Innovation in Rural Areas

Falter, Magdalena; Jóhannesson, Gunnar Thór; Ren, Carina

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Hacking Hekla: Exploring dynamics of rural entrepreneurship and digital innovation

Corresponding author:
Magdalena Falter
Eggertsgata 24, 403
102 Reykjavík, Iceland
Faculty of Life and Environmental Sciences, University of Iceland
maf29@hi.is

Other authors:
Gunnar Thór Jóhannesson[a], Carina Ren[b]

[a] *Faculty of Life and Environmental Sciences, University of Iceland, Sæmundargata 2, 102 Reykjavík, Iceland, gtj@hi.is*

[b] *Department of Culture and Learning, Aalborg University, 9100 Aalborg, Denmark, ren@hum.aau.dk*

SAMPE CRediT AUTHOR STATEMENTS

Gunnar Thór Jóhannesson: supervision, writing review & editing, **Carina Ren:** methodology, writing review & editing **Magdalena Falter:** investigation, writing original-draft, project administration, data curation.

DECLARATION OF CONFLICTING INTERESTS

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ETHICS APPROVALS

Data concerning Hacking Hekla's keynote speakers, mentors, and judges were treated according to the University of Iceland's ethical guidelines. The interviewees were informed about the scientific processing of the data and offered anonymity. Participants provided declarations of consent either verbally or in writing.

ABSTRACT

This article explores innovation initiatives in rural communities in Iceland conveyed through the implementation and perceived outcomes of the hackathon Hacking Hekla. Digitalisation is often proposed as a new, all-purpose tool for regional development that responds to rural challenges innovatively. However, the digital role is often less clear when examining finer development practices. Hackathons are frequently applied to achieve instant economic and societal change. Through the example of Hacking Hekla, we research the challenges and outcomes of creative interventions and critically explore the value of innovation and digitalisation in the context of rural development in Iceland. Based on action research, we use the hackathon as a tool for knowledge generation and intervention in regional policy discourse with the intention to foster applied digital innovation. Data was collected using qualitative semi-structured interviews. The study demonstrates a gap between regional policies emphasizing digital innovation and innovation practices on the ground and argues that fostering digital innovation in rural communities is a complex process that could demonstrate effects only in the long term.

Keywords: Rural innovation, hackathon, digital divide, digital innovation, Iceland

Total words: 9235

INTRODUCTION

This article explores entrepreneurship and innovation processes in rural communities in Iceland based on a case study of a rural hackathon, Hacking Hekla, intended to encourage digital innovation in rural Iceland and conceived by the lead author in 2020. The main objective of this paper is to critically explore the meaning and value of innovation, digitalisation, and entrepreneurship as they unfold in the context of rural development in Iceland. We describe the planning, execution, and outcomes of the Hacking Hekla hackathon from the perspective of its supporters and organisers with an emphasis on how digitalisation and innovation become meaningful and valuable for entrepreneurs. Using action research as a methodology, the hackathon thereby functions as an intervention that enables us to explore the dynamics and networks of digital innovation and regional development.

Digitalisation is often proposed as a tool that responds to the challenges of rurality in an innovative way and has become a buzzword in academia and policy-making (Wolf & Strohschen, 2018; Sept 2020). However, several researchers argue that the concept of digitalisation is abstract, mutable, and vague (Schumacher et al., 2016; Wolf & Strohschen, 2018; Bloomberg, 2018). Moreover, when addressing digital development and innovation practices, the role and interplay of the digital with innovation and entrepreneurship often become less clear (Ren & Jóhannesson, 2017). The paper aims to improve understanding of the challenges and opportunities for digital innovation in enhancing rural development.

First, we provide an overview of the current discussion on innovation and digitalisation regarding regional development. We follow this synopsis with a brief review of the relevant literature, highlighting ongoing debates on the requirements for innovative tools in regional development. Next, we present key sustainable rural tourism development and digital innovation topics recently emphasised in Icelandic regional policy. The methodology section introduces the rural hackathon case study and describes the action research approach employed in the study. In the subsequent analysis of Hacking Hekla, we address the meaning and values attached to the participation in the hackathon by exploring the motivations of involved actors and demonstrate a gap in digital innovation and regional development. Literature on regional development and innovation describes

digital innovation such as hackathons as tools that instigate ground-breaking change. The intervention of Hacking Hekla, however, reveals that implementing a rural hackathon does not lead to a burst of innovation but rather subtle repercussions and humble outcomes. This gap further manifests in a missing link between the policy discourse and innovation practices. We conclude by considering how such modest outcomes underscore the slow, ongoing, and improvised process of valuable innovation and its implication for regional policy.

Exploring the Dynamics of Digital Innovation in Rural Areas

Regional Development: Toward Creativity

Rural areas often lag behind when it comes to the infrastructure required for digital solutions. Current research on rural digital innovation tend to focus on the "fourth agricultural revolution" (Barrett & Rose, 2022), agri-food systems (Rotz et al., 2019), tools for responsible and efficient digital farming (Søraa & Vik, 2021; Charatsari et al., 2022; Espig et al., 2022) and the underlying political and policy debates. Thereby, only a few studies put emphasis on co-creation and network effects (see Lioutas & Charatsari, 2022). Especially research on fostering digital innovation and creativity beyond agricultural issues (Roberts & Townsend 2016), is scarce. Hence, it has been criticised that rural areas are seldom considered attractive for entrepreneurs or creative hotspots (Mayer et al., 2016; Shapiro & Richard, 1999). According to Gibson (2010), creative processes require face-to-face interaction, highlighting the significance of innovative meeting places for like-minded people (Leadbeater & Oakley, 1999) to facilitate knowledge exchange and accumulation that support entrepreneurship and innovation. Scholars have argued that cluster building and innovative networks strengthen a region's capacity to attract creative actors (Feld, 2012; Huijbens et al., 2014). The argument is that digital innovation requires a creative space that fosters the interaction of various actors within clusters and facilitates the exchange of experiences, knowledge and competence for developing a successful entrepreneurial scene (Fuglsang & Eide, 2012). Networking and cluster building play an essential role in current European rural development programs (European Commission 2014-2020). The European Cohesion Policy has two significant funding instruments for strengthening rural and regional development: the European Region Development Fund (ERDF) and European Agricultural Fund for Rural Development (EAFRD). Both emphasise digitalisation to a considerable extent. Digitalisation has played a leading role in the global discussion on rural and urban development as a tool for improving living and working conditions (Wolf & Strohschen, 2018). The significance of digitalisation in international policy is also evident in the Organisation for Economic Cooperation and Development's (OECD) rural development strategy. In its report *Rural Well-Being: Geography of Opportunities*, the OECD discusses the European digitalisation policy and outlines the importance of digitalisation for sustainable development. The report emphasises the potential of digitalisation for overcoming the disadvantages of remoteness in rural regions by reducing distances and increasing location-independency. A practical example of how this is being translated into practice in rural and regional policy initiatives in the Nordic

countries is the alliance of the Norwegian Ministry of Local Government and Modernisation and the Nordic Council of Ministers, where Iceland is a part of. In order to overcome rural drawbacks in terms of digitalisation they set themselves as a common goal the strengthening of the 'competitiveness of our enterprises through digitalisation (Randall et al., 2020, p. 6).

Digital divide and smartification

The challenge remains to successfully translate policy discourse, theoretical insights, and concepts into practice (Dubois & Sielker, 2022). Digitalisation is undergoing a value shift in terms of European policy as a regional development tool to address demographic and climate change, low income in remote areas, limited services, broadband restrictions or the effects of the COVID-19 pandemic (Panciszko, 2021; Cambra-Fierro & Pérez, 2022). The importance of making use of ICT and *smart* digital approaches to respond to the specific needs and expectations of rural communities has also increased in prominence recently (Hanninger et al. 2021; Mohanty et al. 2020; Anastasiou et al., 2021). Smartification implies the improvement of quality of life through the usage of information and communication technologies (Chourabi et al., 2012). Unlike the development of digital innovation in urban areas, in terms of the smart city concept, approaches of applied smartification in rural areas are scarce.

Cambra-Fierro & Pérez (2022) point out how the requirements for a higher life quality by residents in rural areas differ significantly from their urban counterparts. This gap in digital development between urban and rural areas is referred to as 'digital divide' in the current body of literature (Lyhreatis et al., 2021). It implies a gap of digital knowhow and application evoked by unequal conditions between urban and rural areas (Rooksby et al., 2002; Philip & Williams 2019; Morris, et al., 2022) and ranges from an infrastructural gap such as poor broadband connections to social gaps (Rooksby et al., 2002; Cowie et al., 2020; Palmer-Abbs et al., 2021). Social components play an essential role in fostering digital applications (Roth et al., 2013) as smartification goes beyond the bare application of ICT and digitalisation. It requires the interconnection between technology and people (Burnes & Choi, 2015, meaning that the digital divide often stems from a lack of access and digital competences that can only be overcome when digitalisation adds identifiable value to peoples' lives (Rocksby et al., 2002). Therefore, digital innovation must be meaningful to residents in rural areas if it is to as underlined in a case study by Kenny and Regan (2021) of the willingness by Irish farmers to engage with apps to simplify and monitor farming and administration processes. They illustrated how essential a positive validation of technology is in order to apply it. In order to overcome these barriers and find ways to foster digital rural innovation the first step was acknowledging and addressing the farmers' lack of trust in digital applications and their perceived insufficient gain of digital engagement (Kenny and Regan, 2021).

The policy trend of aiming to foster rural smartification is also manifested in Iceland, where

digitalisation in sustainable development is outlined as a key role in Iceland's regional development policy (Stjórnarráð Íslands, 2018). The following section explores this focus on digital technologies and creative network formation.

Regional Development in Iceland: Digital Technologies and Creative Network Formation

The Icelandic Strategic Regional Development Plan (Byggðaáætlun fyrir Ísland) provides basic conditions for planning methods and consists of precise objectives, geospatial planning, and general guidelines for regional development. Its primary objective is to create opportunities and improve living and working conditions in all sectors of society, focusing on sustainable development nationwide. The policy discourse in Iceland has an increasing focus on smartification. The policy issued for the period 2018–2024 stresses the need for research and development into digital solutions for rural areas (Stjórnarráð Íslands, 2018). It aims to increase business capacity, enhance digital technologies, and foster industrial innovation in sparsely populated and remote regions, specifically within small companies.

In the context of this paper, the Icelandic Strategic Regional Development Plan aims to establish "collaboration with marketing agencies, regional consultancy services, and lifelong learning centres throughout the country to reach as many parties as possible" (Stjórnarráð Íslands, 2018, p. 16). This objective is similar to innovative networking concerns such as the establishment of so-called Digital Innovation Hubs described in the European Cohesion Policy (European Commission, 2014–2020). These hubs are considered a digital entry point for rural creativity, providing access to technological knowledge, support, and experiments with digital innovation. Nevertheless, regarding the abovementioned regional development goals, it remains unclear what concrete projects will support the implementation of the regional development plans. Furthermore, concrete project directly addressing smartification of rural areas in Iceland are scarce. To intervene in innovative regional development and obtain first-hand and practical insights into the dynamics of rural entrepreneurship, we focus on the rural hackathon, Hacking Hekla, conceived by the lead author. Initially intended to foster digital development in rural Iceland, the case of Hacking Hekla shows that smartification is a complicated and non-straight forward process.

Hacking Hekla Methodology and Case Study Description

Hacking Hekla is an exploratory intervention in the implementation of regional policy. It attempts to link different actors in rural Iceland by building a platform to respond to the challenges of rurality and create tools to overcome rural and digital gaps identified in literature and policy, addressing the previously discussed policy goals in practice. Following the hackathon's interventionist ambitions, we adopted an action research methodology, in which we invested ourselves in the research with the explicit aim of instigating change (Dickens & Watkins, 1999; Kumar, 2014; McTaggart, 1991; Thiollent, 2011; Hjemdahl & Aas, 2017; Lune, 2017; Cunningham, 1995). In this case, the lead author founded, organised, and hosted Hacking Hekla.

According to Cunningham (1995), an essential precondition of action research is identifying a problem. In the Hacking Hekla case, the first aim is to explore ideas and insights into possible regional development applications. The second aim is to gain academic and practical insights into the dynamics, values, and meanings of innovation, digitalisation, and entrepreneurship through collaborative research (Ren et al., 2017). The project's third and final aim is to foster networks through hackathon participation.

This method of conducting research as part of a development process draws inspiration from and responds to the current rethinking of research methods. For example, Ivanova et al. (2020) criticise the restrained objectivity of traditional research approaches in tourism studies and highlight their limitations. They argue that retention and cautious rapprochement in research leads to "partial and limited" knowledge (p. 5) and see creativity and active involvement in research as a "new [way] of bridging the gap between research and practice collaborations" (p.5). The collaborative Hacking Hekla study adopts this idea while building on the well-established tradition of action research. By codesigning the hackathon and actively participating in it, we approached the research questions from two aspects: an academic, descriptive perspective and a practical, disruptive, and interventionist standpoint. Hence, we actively and explicitly participated in cocreating tourism knowledge (Ren & al., 2017).

Hackathons as Network-Forming Events

The term *hackathon* is derived from a combination of the words *hack* and *marathon*, in which hacking is understood as a way of exploring, investigating, and experimenting (Briscoe, 2014), and marathon alludes to a longer period of work. In the usual sense of the word, a hackathon essentially refers to an event focusing on software development (Briscoe, 2014). A typical hackathon is an invention marathon in which inventors, entrepreneurs, and creative individuals collectively program intensely over a short period, usually 24 hours. Hackathons offer founders, students, and entrepreneurs a platform to work on a business idea, start-up, or product from conception. The result can be an application, a website, or any other digital creation (Briscoe, 2014; Soltani, et al., 2014; Pogačar & Žižek, 2016).

Although discussions about digitalisation have increased exponentially in recent years, research into digital innovation practices remains scant. According to the current literature, network building is essential to trigger innovative thinking and entrepreneurship (Feld, 2016; Fuglsang & Eide, 2012; Bathelt et al., 2004). Hacking Hekla can be considered a suitable vehicle for such a purpose and investigating how hackathons, as network-forming events, enhance digitalisation and innovation.

Hacking Hekla

The concept of Hacking Hekla was the creation of a rural hackathon in South Iceland. Hacking Hekla is named after Mount Hekla, one of the three most active volcanoes in Iceland, located in the South of Iceland. This name was chosen for its symbolic reference to unpredictable

and powerful energy and eruptions. The goal of Hacking Hekla Suðurland was to foster innovative and digital solution-based thinking and address problems regarding living and working conditions in South Iceland. More concrete, the participants were asked to develop digital solutions for strengthening local food production and marketing, increasing the awareness for nature, tackling the challenge of rural mobility and transportation and fostering rural tourism. This was partly devised in collaboration with Nordic Food in Tourism, a project implemented on behalf of the Nordic Council of Ministers (https://nordicfoodintourism.is). At first, we focused on the digital aspect encouraging the participants to make use of new technologies and digital innovation and yet being inclusive and open towards non-digital approaches. Our goal was to foster the development of apps, webpages, software or various forms of VR and AI suitable to grapple with identified challenges in South Iceland. In the further course of the event, we realised that there was little response from the participants towards the development of digital solutions and decided to shift the focus of Hacking Hekla for the follow up events (further discussed below). From there on we promoted Hacking Hekla as a non-traditional hackathon that does not exclusively address technology-interested stakeholders and software development. The COVID-19 pandemic reached Iceland during the planning phase in spring 2020. Therefore, we hosted Hacking Hekla Suðurland as a three-day online event. The intention was to run Hacking Hekla on-site in Hvolsvöllur, a small town about 1½ hours away from the capital Reykjavík. The most eastern town of South Iceland (Höfn) is 4½ hours' drive from Hvolsvöllur. Converting the hackathon to an online event saved participants substantial traveling time, often lacking among small entrepreneurs. However, the digital format also created challenges, discussed later in this paper. Regarding the demographic arrangement of the 21 hackathon participants, 67% were originally from Iceland. Most (56%) of the participants resided in Reykjavík, while 33% lived in South Iceland.

In addition to the hackathon activities, in which the lead author took part as a participant-observer, the research is based on material collected as part of planning, organizing, and hosting the hackathon. This material includes observations, documents and policies, a survey, and interviews with the mentors, keynote speakers and judges involved in Hacking Hekla. We conducted qualitative, semi-structured interviews with 17 of these Hacking Hekla mentors, keynote speakers, and judges several weeks after completing the project. We also invited the 21 Hacking Hekla participants to take part in a post-project survey, to which around half responded (48%). In Section 2, we analyse this material to explore the outcomes of the hackathon as an example of a digital rural development event in practice.

ANALYSIS

Developing Entrepreneurship and Innovation in Practice: Barriers and Ways Forward

We established Hacking Hekla with the long-term goal was to provide entrepreneurs in rural Iceland with a platform to meet, exchange ideas and information, and thus enhance digital innovation and

rural entrepreneurship. The most significant obstacle to implementing Hacking Hekla was communicating it to the local community and stimulating interest.

To our knowledge, Hacking Hekla is the first rural hackathon in South Iceland. Regional actors were unfamiliar with the concept of the hackathon and its potential benefits.
Consequently, gaining interest and subsequent involvement was not straightforward. To establish a rural hackathon in the local community, we approached local companies for support and to help communicate about the event. We invited local food and tourism businesses to discuss their opinions regarding the challenges of running a business in South Iceland and the changes they would like to see. We explained the concept and procedure of the planned hackathon and that this event would be used to specifically tackle these challenges and develop individual solutions for them. We saw an important benefit in including the local businesses in the fact that we would offer them a platform to share their own and 'real problems' they are facing. We expected a high identification with the Hacking Hekla project through getting the feeling of being actively involved from the very beginning. We furthermore approached various rural and urban high schools and institutions, requesting support in spreading the news about the event and promoting it to their students and encourage them to participate. However, interest remained limited. Businesses did not appear to perceive Hacking Hekla as a relevant opportunity. The interest of schools was restrained and would have required more follow-up effort and would have required more than we were capable of at the time. A lack of financial support also delayed the implementation of Hacking Hekla. Several applications for funds to support rural development in the project area were rejected.
The breakthrough in the project development process happened when the first author got in touch with the Icelandic innovation scene. Especially players from the Icelandic Tourism Cluster, the Icelandic Tourist Board and individual entrepreneurs that are involved in various way in innovative regional development projects, saw great value in the Hacking Hekla concept. Through their various networks, Hacking Hekla got magnified by multiplier effect and Hacking Hekla Suðurland was finally carried out in collaboration with SASS (Samtök Sunnlenskra Sveitafélaga), the Regional Municipality Association of South Iceland. Later in the course of the project, Hacking Hekla received funding from the Ministry of Industries and Innovation and the Entrepreneurial Fund of Íslandsbanki (an Icelandic bank; Frumkvöðlasjóður Íslandsbanka) to provide follow-up events in other rural locations in Iceland. Through this enhanced network consisting of rural entrepreneurs, the Icelandic innovation support system, universities and initiatives such as student councils, the Icelandic Tourism Cluster, and Icelandic Start-ups, we gained support and involvement including mentors and keynote speakers as well as channels to share information about the event. Reaching out to different actors in the national innovation scene, and gaining access to entrepreneurial networks to support the event, enabled us to approach South Icelandic businesses again, this time with more success. The key learning we drew from that project development process was the importance of networking. As soon as we could refer to well-established names and institutions, the event was taken more seriously by prospective participants.

Even though the event was open for everybody, we aimed at participants between 18-40 years living in or having strong interest in South Iceland. Apart from the word-of-mouth effects, we ran a targeted facebook campaign, which lead to a few registrations. We furthermore hosted a Hacking Hekla pub quiz event in a hostel a couple of weeks prior to the first COVID-19 lockdown, which resulted in a few further signups to the event. As surveys after the event have shown, a big part of our participants took notice of the Hacking Hekla event due to the advertisement of the University's of Iceland email distribution to all students. Hacking Hekla Suðurland was attended by 20 keynote speakers, mentors, and judges, who supported the participants and their project development through counselling sessions. In the following we will describe the main value, challenges and outcomes as perceived by this group.

Perceived Value of the Hacking Hekla Hackathon

The group of keynote speakers, mentors and judges consisted of highly qualified entrepreneurs from the Icelandic innovation and start-up scene. Their professional background ranged from private entrepreneurs and business owners to staff members of regional development institutions and public officials. The panel of judges, which evaluated the participants' pitched projects after 48 hours project development, consisted of project manager of Nordic Food in Tourism, a member of SASS, the Regional Municipality Association of South Iceland and a representative of a local branch of Íslandsbanki. Considering the difficulties in initiating the project, it is interesting to explore how this group perceived the value and outcomes of Hacking Hekla.

In the following we are going to explore the perceived values and outcomes for attending the hackathon for the mentors, keynote speakers and judges through four key motivation of participation.

Motivation I: Obligation to the Entrepreneurial Scene

When we asked the keynote speakers, mentors, and judges why they dedicated their time to participate in Hacking Hekla, most of them responded that it was something they simply did:

> Because it's a person to person [*sic*] to try to mentor and help people ask questions and be in the creative.... I don't know anything that is more fun than that, solving problems and... And engage people, and bring people to bring the best out of – and I do it internationally. I do it so many times a year. (Reykjavík-based entrepreneur who grew up in South Iceland)

The inclination to support other entrepreneurs, as a matter of course, seems to be expected in the entrepreneurial scene. The entrepreneurial scene consists of institutions and private entrepreneurs and is vaguely structured, hard to define, and resembles an organic cluster of like-minded people (some have also referred to it as an ecosystem) rather than an organised, bounded group. Most of the actors seemed to know about each other. The desire to raise awareness about their organisation was mentioned by only one institution, suggesting a minor role in expressed motivation. One

entrepreneur described this evident willingness to support others as a "pay-it-forward kind of a deal":

> I mean, entrepreneurs are a special breed of people. And I am one of them, so I love it. So yeah, pretty much everyone in the ecosystem here knows that if my help is needed, then they will get it. (Reykjavík-based entrepreneur who grew up in South Iceland)

The lead author also experienced this sense of support when approaching the scene with their project. Despite being an unknown newcomer, the Hacking Hekla project received significant interest from the early stages. This interest could be attributed to increased activity in innovation by individual entrepreneurs and central authorities in Iceland in recent years. In addition, as previously demonstrated, many actors consider assistance a natural part of belonging to the "special breed." Increased networking and involvement in events such as Hacking Hekla, accelerator programs, or innovation courses could have led to a sense of camaraderie and loyalty in this circle.

Motivation II: Heart of the Countryside

A further decisive aspect of participating in Hacking Hekla was the event's focus on the Icelandic countryside:

> Because it doesn't happen often that events like this are moved from the center, which is Reykjavík, to the people in the rural areas. So, even though it was a webinar, it was still focused on a different area that has a special focus on an area that is not the Reykjavík area.... Usually, it's the rural people or the people from the countryside that are going. (Entrepreneur living and working in North Iceland)

As previously discussed, hackathons are becoming popular, particularly in urban areas. Conversely, rural areas have not been included in this hacking movement to the same extent, in Iceland or internationally. Approximately eleven hackathons were carried out in Iceland in 2019–2020, focusing on different fields. Of these eleven hackathons, only one (besides Hacking Hekla Suðurland) included rural Iceland. Therefore, as expressed in the above quote, hackathons or entrepreneurial events with a rural focus remain rare in Iceland. Mentors with personal connections in the Icelandic countryside emphasised the necessity of developing initiatives such as hackathons in rural areas. This connects to a perceived stigma regarding rural areas, as expressed in the following statement:

> And I know it from my own experience; being a person from a rural area... I hate it when people are saying, "Oh, why are people living there? Why don't they just come to [Reykjavík]?" (Representative and board member of the Entrepreneurial Fund of Íslandsbanki)

Rural areas are not seen as places to be or the locations of creative processes. During a conversation with one mentor, it became evident that participation in Hacking Hekla was connected to a personal desire to reach the development goals addressed in the Icelandic Strategic Regional Development Plan. One of the leading development goals in the Icelandic Strategic Regional Development Plan 2018–2024 is the "sustainable development of rural communities throughout the country" (Stjórnarráð Íslands, 2018, p.3).

> I love to live in [the countryside]. And I would love for my family to be here... to have the opportunity to come back home, and to have a nice job here that pays well, then we need to have more specialised jobs here. (Entrepreneur living and working in North Iceland)

This compassion for rurality was evident among interviewees with roots in the Icelandic countryside. The desire to increase rural innovation rests predominantly upon the personal wish to improve living and working conditions for the participants. Conversely, non-rural interviewees approached rural innovation with less emotion.

Motivation III: Joining Forces and Building Trust

Aside from the emotional connotations of rurality, interhuman aspects played an essential role in the decision to support Hacking Hekla. The following comment by an individual working in the entrepreneurial support system in Iceland demonstrates that a good idea alone is insufficient; it requires social fit, passion, and the capacity to communicate project visions clearly:

> I knew that you were a strong team. And that is so important. You have to have people that are dedicated to the subject and have this ambition and drive, to make something good and great.... And I thought joining forces with you guys. That could absolutely be the best that we could do. (Reykjavík-based entrepreneur working in the entrepreneurial support system)

One question is whether the significance of trust in the project team alluded to in this statement could lead Hacking Hekla to concrete successful outcomes in the future. Hacking Hekla's rural focus was a good fit for its primary funders. The hackathon was partly financed by SASS, the association of municipalities in South Iceland. It also received a large grant from the Entrepreneurial Fund of Íslandsbanki bank. When we asked the bank why they decided to sponsor Hacking Hekla, a representative stated that Hacking Hekla's focus on rural areas significantly influenced the decision process. While having their largest market share in the capital area, only a few applications to the Entrepreneurial Fund were received from entrepreneurs from rural areas. Hacking Hekla thus fitted an agenda and responded to a demand by the fund, the bank's motto, *hreyfiafl til góðra verka* (a moving force for good), and its aim to support sustainable development in both rural and urban areas:

> We do have a higher market share in the Reykjavík area, but we as a bank have a great social responsibility, and we talk about social responsibility, and we talk about *hreyfiafl til góðra verka* and that we want to move Iceland in the world in the right directions. So that is why we really need to look into entrepreneurship. We do have the Entrepreneurial Fund of Íslandsbanki [translated by the authors], and we are using that. (Representative and board member of the Entrepreneurial Fund of Íslandsbanki)

The hackathon also fitted the South Icelandic Regional Development Plan, (Sóknaráætlun Suðurlands) carried out under the auspices of SASS. In recent years, enhancing innovation and digitalisation have been a highly discussed issue in regional development policy, nationwide and in South Iceland specifically. Therefore, Hacking Hekla fitted a perceived demand for a concrete project on digital innovation.

Motivation IV: Self-Gain

Mentors working or conducting business in South Iceland voiced hope that Hacking Hekla would help them expand their networks. A mentor running a tourism business in South Iceland referred to her expectations and hopes for reaching out to locals and strengthening their network in the area:

> It would have given me a lot of value if I would strengthen my network in this area. Cause [*sic*] that is one of the issues that we struggle a lot with in running tourism companies in the south. It is difficult to kind of make these connections with the farmers and the kind of the backland. (Entrepreneur and tourism business owner in South Iceland)

This entrepreneur was motivated to participate in Hacking Hekla by a need to expand their business network. However, the hackathon proved unable to fulfil this need or deepen this entrepreneur's business relationships in South Iceland due to the absence of suitable connections. According to this entrepreneur, the "locals, even though they were not farmers … the people living in Hvolsvöllur" that they would have liked to connect to, were not present at Hacking Hekla Suðurland.

Together Apart: Networking at Online Events

According to several mentors, the low local networking effect could have been because Hacking Hekla Suðurland was carried out online. On the one hand, several mentors argued that the online event provided access to a wider range of individuals. An on-site event in South Iceland would have incurred travel and accommodation costs for mentors and participants. Hence, an online platform facilitated participation without committing an entire weekend. On the other hand, several participants voiced concerns about an online event. Approximately half of the Hacking Hekla mentors, keynote speakers, and judges highlighted the difficulties of networking in online events. Some argued that virtual meet-ups could not replace physical networking:

> Nobody has cracked that code. All online events struggle with the same fucking thing. But we can't actually sit together on [*sic*] a table and smile and be human. (Entrepreneur based in rural Iceland, working on innovative and social projects)

The perceived value of Hacking Hekla for enhancing and boosting innovation

The low number of participants from South Iceland in the hackathon prompted the question of why there was such restrained local interest. In conversation, many Hacking Hekla mentors, keynote speakers, and judges highlighted a divide between the entrepreneurial rural support system and those working at the ground level:

> We struggled a bit with that mindset of the core group that would be farmers or growers. So, it was a bit weird that we didn't, I don't know if I am saying this if it is not true, but I felt, we were having a lot of outsiders... and very few kind of people within the circle. (Entrepreneur and tourism business owner in South Iceland)

The event did not appear to attract those within the circle, resulting in a creative network with perceived outsiders and the challenging mindset of local farmers. This inability to engage local participants is reflected in the following statement:

> And when I heard [first] about Hacking Hekla, I was like "okay you are not going to get the locals at least." (Reykjavík-based entrepreneur who grew up in South Iceland)

According to one mentor, the debate among hackathon participants sometimes lacked regional focus despite ongoing keen and lively discussion. They argued that most participants had no connection to South Iceland and that significant insider insights and knowledge about the area were lacking in the concept and project development processes. This insight expressed by mentors, keynote speakers, and judges suggests that opinions about innovation and digitalisation in South Iceland are divided between them and us.

> I think we, in general, not you guys, but we as this digital entrepreneur industry, we are still working with, or against the stigma that is connected, that has to do with everything that has to do with innovation, entrepreneurship, even though these are the words that draw us in, but I think these are also the words that keep them out. (Entrepreneur working in the Icelandic tourism support system)

This entrepreneur highlights the role of innovation and entrepreneurship as attractants and repellents and touches upon the stigma attached to them. This notion links to and reinforces the vision presented in the interviews of a bifurcated situation. On one side, is a creative network of mentors, judges, and keynote speakers (and potentially interesting but absent locals). On the other, are farmers and growers who do not see (or are not considered open to) the value of digital

innovation or innovative interventions, such as hackathons.

In terms of this 'digital entrepreneurial industry' we also observed restrained response from our participants. Despite the original goal of Hacking Hekla Suðurland to foster rural innovation through digital approaches, only one out of eleven pitched projects - an interactive webpage for restaurants and consumers to decrease food waste – could be classified as digital. The majority of ideas and projects developed in Hacking Hekla focused on innovation in terms of raising awareness of local food, distributing local value through even creation and alternative and more sustainable ways for local food production. The winning idea 'Ómangó' was a project that artificially produced mango puree by extracting mango cells with the goal to decrease the proven high carbon footprint of mangos being imported to Iceland.

The absence of local residents significantly concerned mentors, keynote speakers, judges, and those wishing to expand their networks. According to several respondents, the lack of interest and participation in events such as Hacking Hekla derives from the traditional Icelandic culture and mindset:

> I was born and raised in that area. And I think it's a cultural thing. It's about people, they are afraid, I don't have the English, it's like *spéhræðsla* [fear of mockery] in Icelandic like they are afraid of showing off or showing what they are doing. (Reykjavík-based entrepreneur who grew up in South Iceland)

According to one mentor from South Iceland, rural Icelandic people are typically described as *small kings* who prefer the do-it-all-yourself approach to collaboration and networking. Another mentor continues this thought, highlighting the lack of networking and innovation in the tourism and agricultural sector in South Iceland:

> There is a lot going on there, but it hasn't really been put in context as "we are a group of people that are doing innovation in food or tourism." I think that tourism and farming and all that, they need to kind of step up at the game. And I think they just don't know how to, and Icelanders are quite shy. (Business owner in South Iceland)

This view outlines the situation as one populated by an innovative group of entrepreneurs (the scene) perceiving themselves as struggling with a reserved rural community characterised by a non-collaborative approach, which is perhaps not translated or immediately identified as "doing innovation in food and tourism." Interestingly, despite expressing an interest in and feeling motivated by compassion for the countryside and the desire to break down barriers in rural communities, the entrepreneurs also reinforced the stereotypical image of rural areas as places where nothing happens.

Misconception of Hackathons

The perception of (rural) development occurring slowly was recognised by most of the mentors, keynote speakers, and judges. One keynote speaker highlighted this view, stating that projects such as Hacking Hekla resemble "a marathon, not a sprint." In contrast, short-term effects are scarce and difficult to measure. Mentors suggested that although participation in Hacking Hekla Suðurland was limited, the event probably influenced individual perceptions and reduced barriers to participating in such creative events:

> So I think we would probably really [be] kidding ourselves if we thought that we had really transformed the south of Iceland with this one event. It is more about what could this grow into? (Entrepreneur and expert in boosting innovation in rural Iceland)

This statement suggests that Hacking Hekla Suðurland triggered a discussion instead of creating an immediate and tangible impact. According to a SASS consultant, the main challenge to long-term success is to "keep the discussion alive, and remind [the community]." One keynote speaker confirmed this sentiment and stated that the journey of innovation is "disappointingly slow" and requires patience and stamina:

> I am pretty sure you will have to go through 2–3 events through 2–3 years before it actually starts showing effect. But that's the thing with change; it doesn't happen overnight. It happens within a long time frame and even generations. It's terribly disappointing, but unfortunately, that's our game. (Entrepreneur based in rural Iceland, working on innovative and social projects)

The Íslandsbanki representative expanded on this idea, criticizing the tendency for infrastructural projects, and those proposing immediate impacts, to be more likely to receive government support. They commented that the Icelandic grant and funding system still tends to fund "the hard stuff," referring to infrastructural projects such as tunnel or road construction, rather than "[an] area [that] is doing special things." Two hackathon mentors within and outside Iceland supported this statement, arguing that the effects of hackathons are often misunderstood at political and institutional levels. One mentor criticised the way politicians tended to focus on the end products rather than the creative process of hackathons:

> First misconception [about hackathons] is that there is something valuable that is being created. Very seldom there is something valuable created in hackathons. It is about empowering people and giving them a chance to create. (Reykjavík-based entrepreneur who grew up in South Iceland)

One keynote speaker confirmed the ongoing "capitalisation of hackathons," considering a short-sighted political mindset the reason for this situation:

> Because they don't see in the short term how it will be paid back. And we have no models that fit into a long-time-frame event. Only power plants fit into that frame.... So when we come in and say, "Yeah, this will actually take effect in 10 or 15 years," they don't wanna hear it cause [*sic*] it's so long. (Entrepreneur based in rural Iceland, working on innovative and social projects)

DISCUSSION

This study aimed to explore and describe the dynamics of rural innovation through the Hacking Hekla hackathon from the perspective of its supporters and organisers. We focused on the value, challenges, and outcomes of Hacking Hekla for digital innovation in Icelandic rural development. The study revealed that the involvement and participation of the mentors, keynote speakers, and judges involved were driven by different values. Interestingly, this group raised highly emotional reasons for their support of Hacking Hekla, rooted in personal backgrounds and relations to the Icelandic countryside. Several mentors, keynote speakers and judges mentioned a personal caring obligation to the entrepreneurial scene, a desire to contribute to the local community, and an ambition to build networks for future business. Other, more formal values were primarily mentioned by those representing institutions or companies, such as Hacking Hekla, fitting the profile and agendas of private or public funding agencies.

A bit more challenging to track is the perceived value of Hacking Hekla to the local entrepreneurs, the intended target group of the hackathon. Most of the mentors, keynote speakers and judges noted that Hacking Hekla did not attract sufficient interest from local entrepreneurs. They cited several possible reasons, such as the mentality in the region concerning entrepreneurship and what some termed the "Icelandic mindset," referring to a lack of willingness to collaborate. They argued that the lack of presence and participation derives from a lack of understanding about hackathons and innovation and inadequate communication about the potential benefits and outcomes. The fact that Hacking Hekla did not solely focus on digital innovation, and thus had a wider thematic scope than other hackathons, did not affect local interest or participation in the event. We explicitly stated in the marketing campaign that no specific knowledge was required to participate in the hackathon. However, mentors, keynote speakers, and judges perceived an association between hackathons and hipsters and nerdy city computer specialists, fostering a division between "them," locals living in a farming community, and "us," the urban, tech-savvy entrepreneur community, reflecting, to an extent, a rural-urban divide in digital development (Gibson, 2010). Conversely, despite the above mentioned compassion and concern for South Iceland expressed by the mentors, keynote speakers and judges, we identified a further distinction between a lively urban entrepreneurial scene and a reluctant rural community, reinforcing stereotypical perceptions. Much literature has been published regarding hackathon procedures (De Götzen et al., 2020; Briscoe, 2014; Nandi & Mandernach, 2016). The participant groups presented in this study primarily refer to hackathons as innovative tools used in universities or student associations (Nandi & Mandernach, 2016). Therefore,

it could be assumed that the lack of local participation is connected to an inability to identify with the target group or, as one entrepreneur commented, the stigma associated with the concepts of entrepreneurship and innovation. However, this hypothesis requires further investigation.

According to mentors, keynote speakers, and judges, low participation rates among South Icelandic locals impeded Hacking Hekla's potential for the regional anchoring of innovation and development and underlined the challenges of intervening in regional development. It raises concerns about implementing regional policy objectives in rural areas and demonstrates that despite the potential usefulness of digital solutions, creating outcomes and having an impact does not transpire from technology. It also entails the participation and anchoring of actors in digital practices (Ren, Petersen & Nielsen 2018). Given the weak links identified between the hackathon event and local entrepreneurs, this could prove challenging. It also raises questions about inclusion and exclusion in regional development and bridging the apparent gap between policy and practice. In this study, we endeavoured to engage residents using targeted social media campaigns, direct contact with local companies, and collaboration with SASS. Despite this wide reaching out, the intervention of Hacking Hekla did not enrol many local residents. It remains unclear if a different hackathon design, target group, hackathon theme or wording and language in the marketing campaign would have had a positive impact in that regard. The distinction made by the mentors, keynote speakers and judges between "us" and "them" and their invoking of traditional stereotypes of rural culture and mindsets further leaves the question open, if hackathons are the right tool for fostering rural innovation at all. The mentors, keynote speakers and judges lamented that the lack of participation among local actors hindered inter-geographic discussions and networking, reducing the event's value. We did, however, not get any insight into how and if these discussions would have benefited the locals of South Iceland.

The value of Hacking Hekla on a political level differs from the personal, ideological and emotional values mentioned by the keynote speakers, mentors and judges and is more focused on concrete outcomes in terms of (digital) innovative projects and products. This is somewhat counteracting the objective presented in the Icelandic Regional Development Plan, which emphasises the role of "lifelong learning centres" in increasing the "digital lead in rural areas" (Stjórnarráð Íslands, 2018, p. 16). The original idea of Hacking Hekla Suðurland was indeed to create digital solutions for local rural challenges such as food, tourism and nature. As discussed above, the response of our participants towards the development of digital responses was however very low. According to our mentors, keynote speakers, and judges, the public innovation support system considers immediate proof of the societal and economic benefits of events such as Hacking Hekla more critical than the creative process. In terms of outcome, the original effort to enhance digitalisation in rural South Iceland through Hacking Hekla can thus be said to have failed from a political point of view as it did only to a very limited extent contribute to fostering digital innovation. The mentors, keynote speakers, and judges stressed however that fostering innovation in rural areas is a long-term process. The cocreation of value most often happens gradually. From this perspective, the primary outcome and

contribution of Hacking Hekla is that it promotes the idea that hackathons provide a valuable learning experience and as such introduces an alternative mode of innovation to participants.

One of the reasons for the restrained interest in developing digital applications could be a digital divide. It is possible that there is a lack of access and competence in South Iceland that hampered the participants to think about digital applications in a meaningful way. As mentioned above, a division emerged between those identifying as members of a more general, nationwide entrepreneurial scene (judges, speakers, and mentors) and residents as the intended participants. While the former seemed to ascribe value and meaning to the hackathon more readily, they also perceived the concept of digital innovation and hackathons as more distant to local (potential) entrepreneurs. This is however something that needs to be explored through further research. Despite the restrained interest in applying digital approaches, Hacking Hekla Suðurland was still functional as an incubator for rural innovation and a momentum to instigate change. At the time writing this article, three further Hacking Hekla events in other rural areas in Iceland have been successfully carried out in collaboration with the particular regional development associations and private entrepreneurial initiatives. This ongoing nation-wide interest after our pilot project supports the view that while Hacking Hekla might not instigate change in digital innovation, it provides a valuable space for creativity in rural areas. Hence, we conclude that Hacking Hekla adds value to rural innovation processes by providing a platform for creative collaboration.

CONCLUSION

The goal of this article was to explore the dynamics of rural entrepreneurship and digital innovation in rural Iceland. The study identified a gap between policy discourse and practice and highlighted challenges of digital innovation in rural Iceland as well as bringing forth the perceived value of hackathons for boosting innovation. Digitalisation has become a buzzword in regional development circles and digital approaches are often expected to lead to bursts of innovation. When Hacking Hekla was advertised as the first hackathon in rural south Iceland, the slogan *Hacking Hekla: Creative Eruptions* was used to reflect expectations about its creative capabilities. However, this article's analysis indicates that Hacking Hekla's impact was subtle. The innovative process of Hacking Hekla may still be likened to volcanic activity despite it did not result in a full blown eruption in the form of ground-breaking change and with a long-term effect and the active involvement and participation of local residents. Similar to an earthquake, innovative interventions are ongoing processes that build gradually, are discernible through increased activity, and can be experienced as tremors or subtle shifts in the way things are done. Most of the activity is modest and occurs in the background, of which some of them never reach the surface as in our case the application of digital innovation in Hacking Hekla Suðurland. The conversations with the involved mentors, keynote speakers and judges revealed that the event outcomes and developed projects played a minor role in their views of the value created. This observation shifts the understanding of Hacking Hekla from a solution-finding competition and innovation accelerator to a more modest event serving as a platform for sharing interests and concerns and exploring solutions.

A limiting factor in this study is the focus on only one case in South Iceland. The overall feeling from the other three hackathon is that they are seen as valuable input in an ongoing effort to enhance innovation in rural areas. So far, these events and potential effects on rural innovation have not been analysed in-depth.

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