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Cogent Business & Management

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Suggested Citation: Fellnhofer, Katharina (2017) : Facilitating entrepreneurial discovery in smart specialisation via stakeholder participation within online mechanisms for knowledge-based policy advice, Cogent Business & Management, ISSN 2331-1975, Taylor & Francis, Abingdon, Vol. 4, <https://doi.org/10.1080/23311975.2017.1296802>

This Version is available at:

<https://hdl.handle.net/10419/205952>

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MANAGEMENT | RESEARCH ARTICLE

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Cogent Business & Management (2017), 4: 1296802



Received: 06 December 2016
Accepted: 15 February 2017
Published: 03 March 2017

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Reviewing editor:
Tahir Nisar, University of Southampton, UK

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Facilitating entrepreneurial discovery in smart specialisation via stakeholder participation within online mechanisms for knowledge-based policy advice

Katharina Fellnhofer^{1,2*}

Abstract: The European Commission expends much effort toward the facilitation of smart specialisation strategies for smart, sustainable, and inclusive economic growth in Europe. In this framework, stakeholder engagement has received growing attention but is often neglected by the academic community, possibly due to the complexity of a multi-stakeholder approach in knowledge-based policy advice. In this regard, platforms with online mechanisms particularly show promising potential to engage a diverse set of stakeholders, so-called quadruple helix stakeholders, throughout the development of smart specialisation strategies. This report discusses a conceptional approach for promoting stakeholder engagement using online mechanisms for knowledge-based policy advice. This paper recommends seven propositions for future empirical testing of hypotheses to provide a robust fundament for future research. Because of this scope of policy advice via stakeholders, this contribution is particularly relevant for policy-makers, researchers, entrepreneurs, and the society at large interested in cultivating a knowledge-based economy via online mechanisms for exchanging policy advice.

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PUBLIC INTEREST STATEMENT

The European Commission expends much effort toward the facilitation of smart specialisation strategies for smart, sustainable, and inclusive economic growth in Europe. In this framework, stakeholder engagement has received growing attention but is often neglected, possibly due to the complexity of a multi-stakeholder approach in knowledge-based policy advice. In this regard, platforms with online mechanisms particularly show promising potential to engage a diverse set of stakeholders throughout the development of smart specialisation strategies. This report discusses a conceptional approach for promoting stakeholder engagement using online mechanisms for knowledge-based policy advice. This paper recommends seven propositions for future empirical investigations to provide a robust fundament for future research. Because of this scope of policy advice via stakeholders, this contribution is particularly relevant for policy-makers, researchers, entrepreneurs, and the society at large interested in cultivating to a knowledge-based economy via online mechanisms for exchanging policy advice.

Subjects: Politics & International Relations; Economics, Finance, Business & Industry; Information Science

Keywords: smart specialisation strategies; stakeholder participation; online mechanisms; knowledge-based policy advice; knowledge-based economy; research and innovation strategies

1. Introduction

In the last decade, the European Commission (EC) has accelerated much effort toward their policies related to implementation of smart specialisation strategies in Europe (Gheorghiu, Andreescu, & Curaj, 2016). The European Union's (EU) development strategy connects three "mutually reinforcing priorities" of smart, sustainable, and inclusive economic growth (EC, 2010). Additionally, smart specialisation strategies represent an ex-ante precondition for receiving support from the structural funds. Thus, most nations and regions in Europe started implementing smart specialisation methods in their research, development, and innovation policies. Because of the high demand, scholars of this research field are calling for clear guidelines to facilitate the (re)design and implementation of these research and innovation strategies (Gheorghiu et al., 2016; Kroll, 2015a; Paliokaitė, Martinaitis, & Reimeris, 2015).

Despite the call for more in-depth supporting material, vital guidance from Foray, David, and Hallb (2011), Foray et al. (2012) and Foray (2014, 2015) on creating research and innovation strategies for smart specialisation has acted as groundwork for the EC. In particular, the "Guide to Research and Innovation Strategies for Smart specialisation (RIS3), Smart specialisation Platform" (Foray et al., 2012) provides a comprehensive description of a policy concept that proposes 6 steps and 18 sections for developing research and innovation strategies for smart specialisation. Additionally, this guide respects the individual, strategic environments of different nations and regions. However, there is a need for clearer step-by-step instructions that describe expected results of the applied development procedure, methodological normativity, applied methods, stakeholders engaged, principles, and criteria (Gheorghiu et al., 2016). Overall, published literature in this context highlights gaps between theory and practice (Gheorghiu et al., 2016; Kroll, 2015b).

The majority (99.8%) of all European enterprises are small- and medium-sized enterprises (SMEs) (OECD, 2016; Stawińska, 2011), efforts to boost entrepreneurial discovery as the "core concept" of smart specialisation is necessary. The role of entrepreneurial discovery in the national and regional governments needs to be strengthened. Stakeholders with important knowledge related to entrepreneurial discovery must explain the procedure for self-discovery using broad participation to ensure dialog and legitimization to boost the mechanisms (Paliokaitė et al., 2015; Paliokaite, Martinaitis, & Sarpong, 2016). A diverse set of stakeholders can potentially boost entrepreneurial discovery across the steps in smart specialisation strategies.

The central aim of this review is to shed light on the positive outcomes of stakeholder participation in smart specialisation in facilitating the entrepreneurial discovery process across activities within smart specialisation. Advantages can be acquired using online mechanisms to enable consultative and deliberative processes, which offer valuable support to engage a diverse set of stakeholders to facilitate knowledge transfer and co-creation. In this framework, Amabile and Kramer (2011) report was used to attain a better understanding of the associations among the design features of innovation projects, including online mechanisms. Previous research of innovation management centers on direct influences on results, ignoring exchanges among different stakeholders (e.g. Burroughs, Dahl, Moreau, Chattopadhyay, & Gorn, 2011; Janssen, 2005). Such stakeholder collaboration is the key to facilitating entrepreneurial discovery. Thus, the purpose of this conceptual paper is to illumine gaps in the literature and propose seven recommendations for further research to strengthen the multi-stakeholder approach in smart specialisation initiatives toward knowledge-based policy advice via innovative and supportive online mechanisms.

2. Framework for knowledge-based policy advice

This work builds on the guidelines of Foray et al. (2012), and their recommended assessment wheel for research and innovation strategies serves as a basis to upgrade the strategies by reviewing comparisons, benchmarking, considering essential features adequately, adapting priorities and needs to regional processes, enriching the preparation and negotiation of funding programs, reflecting required activities, and identifying co-operation activities and opportunities for mutual learning.

Among many other factors, mutual learning plays a crucial role in strategic development within smart specialisation. In this regard, a diverse set of stakeholders is essential to facilitate the learning process. Public policy (e.g. Abelson & Gauvin, 2006; Rowe & Frewer, 2004, 2005) and innovation processes research (e.g. Abelson & Gauvin, 2006; Rowe & Frewer, 2004, 2005) have emphasized that successful stakeholder participation includes quality dimensions, which enables better development of public, participatory processes. Based on the literature regarding stakeholder participation quality (Cadwallader, Jarvis, Bitner, & Ostrom, 2010; Ommen, Blut, Backhaus, & Woisetschlager, 2016), motivation to participate is critical to the quality of stakeholder cooperation. Since stakeholders are motivated by multiple factors including logic, quality of the participatory innovation process, and design of the participatory innovation process, the motivation to participate varies among stakeholder groups. Using the Componential Theory of Creativity, Amabile (1983) explains that the creativity level of a group is impacted by the work environment. Giving decision-making autonomy to individuals and presenting feedback on performance outcomes can boost individuals' motivation to participate (Amabile & Kramer, 2011). In other words, the degree of innovation performance refers to stakeholders' perception toward newness of the innovation (Wang & Ahmed, 2004) to measure the degree of innovation performance. Acceptance of the innovative elements is an individual's assessment toward the confidence that the elements will support the expected outcomes (Choi & Price, 2005; Wang & Ahmed, 2004). In designing and managing innovation projects, the needs of all involved stakeholders must be considered. According to Amabile and Kramer (2011), promoting motivation by providing expressive objectives, enough resources, and supportive colleagues encourages stakeholders to transfer knowledge. In addition, the environment for exchange is important for cultivating motivation among stakeholders. The involvement of stakeholders in innovation processes should integrate co-determination, collaboration, interaction, and participation (Alam, 2002; Alam & Perry, 2002; Ordanini & Parasuraman, 2010).

While the methods for encouraging the participation of stakeholders using online mechanisms enable consultative and deliberative processes, the participatory process itself is theorized as a complex interplay of various characteristics of online mechanisms' design. Assessment of the characteristics of design points influences participation quality. Matching similar methods that describe the quality of the participation process is "a global judgment, or attitude, relating to the superiority of a service" (Parasuraman, Zeithaml, & Berry, 1985, p. 16). The involvement of stakeholders supports projects by generating new thoughts from different points of view and offering informational resources to gain detailed know-how of specific needs. The factors regarding stakeholder participation are understood well; however, the aspects of productive participatory innovation procedures are under-researched. In particular, research considering how entrepreneurial discovery is supported by innovative, online mechanisms is limited. In addition to collaboration among stakeholders with varying viewpoints, the "quadruple helix stakeholders" provide vital input in a multi-level, cooperating development process. According to the quadruple helix model, stakeholders can be classified in four main groups: university/academia, government/policy-makers, industry/entrepreneurs, and society/individuals (Carayannis & Rakhmatullin, 2014; Etzkowitz, 2003; Etzkowitz & Leydesdorff, 1995, 2000; Fogelberg & Sandén, 2008; Garrett-Jones, Turpin, Burns, & Diment, 2005; Howells, Ramlogan, & Cheng, 2012; Shinn, 2002).

Though integral for all types of stakeholders, in both entrepreneurship as well as digital learning literature, Bandura's (1982, 1982b) theory of self-efficacy is linked to perceived usefulness and ease of use of online mechanisms. These two dimensions are cornerstones for digital platforms. Self-efficacy is also defined as "judgments of how well one can execute courses of action required to deal

with prospective situations” (Bandura, 1982b, p. 122). Overall, self-efficacy can be used as a central predictor of behavior. Bandura’s (1982a, 1982b) also claims that “[i]n any given instance, behavior would be best predicted by considering both self-efficacy and outcome beliefs” (p. 140). Thus, this report focuses on the perceptions of stakeholders toward a web-based participation process to boost entrepreneurial discovery in the exchange of knowledge-based policy advice.

3. Propositions for stakeholder participation via online mechanisms

Studies in the literature on creativity and open innovation research related to participation quality dimensions are very similar to each other (Ommen et al., 2016). Specifically Amabile, Conti, Coon, Lazenby, and Herron (1996) claim that research dedicated toward creativity recognizes the importance of task-related resources for creating inspirational environments, which is relevant for promoting entrepreneurial dynamics. Adamczyk, Bullinger, and Möslin (2012) highlight the importance of rewards in co-creation and open innovation. Janssen (2005) recognizes an encouraging influence of stakeholders’ perceptions toward innovations in implementing those initiatives. In this framework, perceived ease of use on behalf of the stakeholders plays a key role. Overall, a focus on accessibility of supportive tools in open source data projects is viewed as a vital element to promote knowledge transfer (Lakhani & Panetta, 2007). Rogers and Shoemaker (1971) explain complexity as “the degree to which an innovation is perceived as relatively difficult to understand and use” (p. 154), which is similar to perceived ease of use. In a meta-analysis regarding the relationship between innovation characteristics and implementation, Tornatzky and Klein (1982) indicate that the compatibility and participation among stakeholders affect implementation across a wide range of innovation types. These factors can be vital in developing research and innovation strategies via in-depth analysis of regional and national contexts as well as assets for providing an essential fundament for effective strategies (Gulc, 2015; Pauna, 2015; Piirainen, Tanner, & Alkærsig, 2016). For instance, the online mechanisms show potential to increase entrepreneurial alertness of different stakeholders which could be measured by recommended scales of colleagues (entrepreneurial alertness elaborated by Tang, Kacmar, & Busenitz, 2012; e-GovQual scale modified to the smart specialisation topic elaborated by Papadomichelaki & Mentzas, 2012). In particular, the stakeholders might assess the provided services as supportive to acquire relevant information for new business ideas as well as a supportive source to scan potential new business opportunities. In line with this argumentation, via step one of the assessment wheel for research and innovation strategies related to analysis of regional and national contexts, including analysis of regional and national assets, outward dimensions, and entrepreneurial dynamics (Foray et al., 2012), the following is proposed.

Proposition 1 Different stakeholder groups perceive online mechanisms as equally supportive to facilitate innovation.

Open innovation includes broad participation, i.e. the involvement of a diverse set of stakeholders, but also focuses on potential investors to boost the capability of innovation. There are many characteristics regarding the design of open innovations that are able to motivate stakeholder involvement, including contests and crowdsourcing (Adamczyk et al., 2012; Brabham, 2008; Ebner, Leimeister, & Krcmar, 2009). Lakhani and Panetta (2007) describe the logistic design of software communities. They argue that if tasks are designed in a modular manner, involvement of stakeholders increases. Moreover, Lakhani and Panetta (2007) state that the key features of participative design principles are independent selection of tasks, transparency, and accessibility of supportive tools toward innovative behavior. Zheng, Li, and Hou (2011) examined, by analyzing 283 crowdsourcing contests, the roles of different design features and their ability to drive motivation. The authors suggest essentials that can facilitate involvement intention and actual participation. Adamczyk et al. (2012) offer a framework that consists of design components that can be used for illustrating innovation projects. Generally, the components of independent selection of tasks, motivational incentives, design components for different stakeholders, and supportive functionalities for assisting in interactions among stakeholders represent fundamentals for innovation processes.

With the potential of online mechanisms for research and innovation strategies in mind, theoretically, management and governance are different. However, there are overlapping procedures between them. The decision-making process as well as the arrangements for coordination, communication, and resources in a regulatory setting are emphasised in management foundations (Hatfield-Dodds, Nelson, & Cook, 2007). Communication within norms, rules, structures, and processes to regulate how stakeholders achieve consensus on decisions relevant for controlling influence, responsibilities and accountability reflect key components of governance (Cundill & Fabricius, 2010; Lebel et al., 2006; Raik & Decker, 2007). An integrated procedure of the processes in governance represents the management process (Hurlbert & Gupta, 2015; Moutinho, Au-Yong-Oliveira, Coelho, & Manso, 2015). For instance, the online mechanisms show potential to increase entrepreneurial alertness of different stakeholders which could be measured by recommended scales of colleagues (entrepreneurial alertness elaborated by Tang et al. (2012); e-GovQual scale modified to the smart specialisation topic elaborated by Papadomichelaki & Mentzas, 2012). In particular, the stakeholders might assess the provided services supportive to recognize new relationships relevant for potential new (business) opportunities. This discussion reflects step two of the assessment wheel for research and innovation strategies related to governance including governance structures, broad participation, management and communication (Foray et al., 2012). In line with this argumentation, the following proposition is suggested.

Proposition 2 Different stakeholder groups perceive online mechanisms as equally supportive for facilitating research and innovation strategies for smart specialization.

The “Swedish Paradox” and the “European Paradox” indicate that expanding research and development investment and supporting entrepreneurship require further stakeholder engagement to boost employment and economic growth (Aldridge & Audretsch, 2011; Ejermo, Kander, & Svensson Henning, 2011; Thurik, Audretsch, & Grilo, 2012; Van Stel & Storey, 2004). Both paradoxes highlight “... the disappointment of economic growth that did not seem to respond to high levels of investment in knowledge ... such as human capital, R&D and patents, as well as broader aspects such as creativity” (Audretsch, 2009, p. 250). The University-Industry-Government collaborations have a regional outlook within a broad view of innovation (Sternberg & Litzenberger, 2004) based on empirical evidence, which can be found in the literature concerning the knowledge spillover theory of entrepreneurship to overcome challenges. This type of entrepreneurship is dependent on human capital and creativity demonstrated in creative individuals and various urban environments which appeal to creative classes for scenario analysis (Audretsch & Belitski, 2013). In parallel, a stakeholder war has started to appeal creative talents, which are rewarded at the regional level (Acs, Bosma, & Sternberg, 2008). A larger knowledge spillover is mostly experienced by regions that have higher research and innovation investments, such as corporate, university, or governmental investments (e.g. Audretsch & Feldman, 1996; Audretsch & Keilbach, 2004, 2005, 2008). Potential markets, demand (Buesa, Heijs, & Baumert, 2010; Lindič, Bavdaž, & Kovačič, 2012; Pires, 2005), and entrepreneurial opportunity to use knowledge and technology affect sustainability (Audretsch, Lehmann, & Warning, 2005). As a result, a source of regional competitive advantage can be knowledge transfer among stakeholders (e.g. Caragliu & Del Bo, 2011; Fagerberg, Landström, & Martin, 2012; Fritsch, 2008; Hurlbert & Gupta, 2015; Moutinho et al., 2015; Pe’er & Vertinsky, 2008; Tappeiner, Hauser, & Walde, 2008). Thus, the involvement of stakeholders in innovation processes shows great potential for cultivating a shared vision, which generates positive outcomes (Alam, 2002; Alam & Perry, 2002; Ordanini & Parasuraman, 2010). For instance, the online mechanisms show potential to increase a shared vision within entrepreneurial alertness of different stakeholders which could be measured by recommended scales of colleagues (entrepreneurial alertness elaborated by Tang et al., 2012; e-GovQual scale modified to the smart specialisation topic elaborated by Papadomichelaki & Mentzas, 2012). In particular, the stakeholders might assess the provided services supportive to make novel connections and perceive new or emergent relationships between various pieces of information. Additionally, online mechanisms show support to come up with new ideas and approaches to current problems within the community. This is in line with step three of the assessment wheel for (re)designing research and innovation strategies related to shared vision, including a broad view of innovation, grand challenges, and scenario analysis (Foray et al., 2012). Therefore, the following is proposed.

Proposition 3 Different stakeholder groups perceive online mechanisms as equally supportive in facilitating the development of an overall vision of the future of the region.

Knowledge is viewed as a source of competitive advantages for countries. It is the key ingredient for developing successful and ambitious international businesses. In this framework, competitive elements are linked to human resources, scientific information, and infrastructure (Porter, 1990). Though knowledge is integral, also perceptions of stakeholders play a crucial role in this context. Perceptions mirror reality (Carroll, 1988), particularly with those who have the strength to identify the policy agenda (Hisschemöller & Gupta, 1999), taking the revision of past priorities into account. The connections between the perception of challenges, consistency, and critical mass as well as the political environment are vital to democratic governance. According to Vasileiadou et al. (2012), stakeholders and human observations are structured by perspectives, and individuals are supported by the belief systems of their environment (Hurlbert & Gupta, 2015; Moutinho et al., 2015). In this framework, the identification of priority setting and investments in information and skills are cornerstones for increasing entrepreneurial opportunities. Because of the increase of knowledge, the success of entrepreneurial activities by assisting acknowledgment of stakeholders and taking advantage of new business opportunities tend to increase continuously on a global basis (Acs, Braunerhjelm, Audretsch, & Carlsson, 2009; Auerswald, 2010; Fritsch, 2008; Wersching, 2010).

The majority of the literature views participation as vital for promoting democracy and solving difficult problems (Hurlbert & Gupta, 2015; Moutinho et al., 2015), which represent an essential element in priority setting in knowledge-based policy advice. Nearly all suggestions regarding improvement of governance urge stakeholder participation (Norton, 2005; Pahl-Wostl, 2009; Pahl-Wostl et al., 2007). The belief is that the higher the participation, the higher the probabilities to improve governance (Arnstein, 1969; Hurlbert & Gupta, 2015; Moutinho et al., 2015). Overall, stakeholders should meet and create economic priorities at the regional level. Human resources and intangible assets (Hitt, Ireland, & Hoskisson, 2012) create collaborative partnerships, and alliances at different stages facilitate innovation (Moutinho, Au-Yong-Oliveira, Coelho, & Manso, 2016). This discussion reflects step four of the assessment wheel within the development of research and innovation strategies related toward identification of priorities, including revision of past priorities, consistency, and critical mass (Foray et al., 2012). For instance, the online mechanisms show potential to increase entrepreneurial alertness of different stakeholders which could be measured by recommended scales of colleagues (entrepreneurial alertness elaborated by Tang et al., 2012; e-GovQual scale modified to the smart specialisation topic elaborated by Papadomichelaki & Mentzas, 2012). In particular, the stakeholders might assess the provided services supportive to see connections between previously unconnected domains of information. Thus, it is suggested to illuminate the proposition as follows:

Proposition 4 Different stakeholder groups perceive online mechanisms as equally supportive in facilitating priority setting.

Scholars (e.g. Collins & Ison, 2009; Lebel, Grothmann, & Siebenhüner, 2010) have illuminated the typology of challenges related to structuring and framing policies to overcome these societal challenges. The resulting policy's framework and scope, policy-makers' interactions, and societal involvement are crucial to overcome these societal challenges. Theories of policy design that examine a policy's form and content are vital to clarity and adaption of policy procedures across disciplines (e.g. Dupuis & Knoepfel, 2011; Hulme, 2005). Colleagues (e.g. Ingram, Schneider, & DeLeon, 2007; Schneider, 2006; Schneider & Ingram, 1993) examine variables to determine the success of specific policies. Connecting this framework with innovation processes, literature concerning stakeholders' participation in policy development and the subsequent success of policy is rare. However, Hoyer, Chandy, Dorotic, Krafft, and Singh (2010) provide variables for the firm-level to explain individual's co-creation in development processes, which appear relevant for policy roadmaps and interrelated action plans for implementation. In addition, the authors debate perceived benefits as an appropriate way to stimulate stakeholders. Im and Nakata (2008) empirically explored the role of project characteristics in regarding cross-functional incorporation. The authors explain that aspects such as

a rewards system, process formalization, managerial encouragement, and involvement influence cross-functional integration in a positive way. Moreover, the literature generally idealizes participation without assessing the specific mechanisms involved in participation and determining which of those are challenging. Nevertheless, some reports have described the circumstantial challenges of participation (e.g. Allan & Wilson, 2009; Collins & Ison, 2009) and its wider impact (Akamani & Hall, 2015). More information is needed on the optimal settings for stakeholder participation and the factors that determine participation levels, which can be used for effecting important policy (e.g. Hurlbert & Gupta, 2015; Moutinho et al., 2015; Warren, 2009). This discussion reflects step five of the assessment wheel for research and innovation strategies related to policy mix, including roadmapping, balance, and framework conditions (Foray et al., 2012). For instance, the online mechanisms show potential to increase entrepreneurial alertness of different stakeholders which could be measured by recommended scales of colleagues (entrepreneurial alertness elaborated by Tang et al., 2012; e-GovQual scale modified to the smart specialisation topic elaborated by Papadomichelaki & Mentzas, 2012). In particular, the stakeholders might assess the provided services supportive to increase a special alertness or sensitivity toward potential opportunities in facilitating the development of policy mixes, roadmaps, and action plans for implementation. Since there is a direct relationship between the creative characteristics of stakeholders' engagement and the paucity of work relevant for implementation, the following proposition needs further illumination.

Proposition 5 Different stakeholder groups perceive online mechanisms as equally supportive in facilitating the development of policy mixes, roadmaps, and action plans for implementation.

Hedelin and Lindh (2008) state that the characteristics of an ideal environment for stakeholder participation have been unsatisfactorily addressed so far. Nevertheless, various engagement levels appear to be adequate depending on the goals, context and the stakeholders (Fung, 2006; Michener, 1998; Richards, Blackstock, & Carter, 2004; Tippet, Handley, & Ravetz, 2007). Aspects such as mutual learning and trust as well as acceptance level of other stakeholders' judgments in the policy procedure are essential points (Tsang, Burnett, Hills, & Welford, 2009) required for conflict moderation (Mackenzie & Krogman, 2005). In this framework, differences between management and governance of political challenges must be considered to increase effectiveness and efficiency (Hurlbert & Gupta, 2015; Moutinho et al., 2015).

Along with the need for monitoring and evaluation tasks among stakeholder groups, there is a need for mutual learning in problem solving and developing solutions occurring through joint interactions (Argyris & Schön, 1978, 1996; Siebenhüner, 2008). This learning must be supported through facilitation of collaboration and collaborative learning in interdependent stakeholder networks (Mostert et al., 2007). This procedure of reflection (or monitoring and evaluation), takes place through exchanging perceptions, opinions and experiences (Keen, Brown, & Dyball, 2005), thus revising previous experiential findings to determine a theory and practice that leads to new visions, future innovations, and action implementation (Blackmore, Ison, & Jiggins, 2007). Mutual learning involves both trans- and interdisciplinary learning among different stakeholders with different backgrounds (e.g. Hurlbert & Gupta, 2015; Moutinho et al., 2015).

Following a multi-stakeholder approach, there are different learning possibilities (e.g. Argyris, 1999; Cundill & Fabricius, 2010; Hurlbert & Gupta, 2015; Keen et al., 2005; Moutinho et al., 2015) to improve procedures and policy approaches to address structured issues. Im and Nakata (2008) claim that cross-functional incorporation profits from procedure formalization, which supports the findings of transparency leading to high stakeholder participation. For instance, the online mechanisms show potential to increase entrepreneurial alertness of different stakeholders which could be measured by recommended scales of colleagues (entrepreneurial alertness elaborated by Tang et al., 2012; e-GovQual scale modified to the smart specialisation topic elaborated by Papadomichelaki & Mentzas, 2012). In particular, the stakeholders might assess the provided services supportive to distinguish between potential high-value opportunities and low-value opportunities which is valuable for monitoring and evaluation tasks for future implementation. This discussion reflects step six

of the assessment wheel for research and innovation strategies related to monitoring and evaluation, including output and result indicators, monitoring, and strategic updates (Foray et al., 2012).

Proposition 6 Different stakeholder groups perceive online mechanisms as equally supportive in facilitating monitoring and evaluation tasks for future implementation.

The affordance of technology in the online learning environment is highly associated with the social constructs of online learning. Computer-mediated communication mechanisms effect the way in which stakeholders communicate with each other while interacting and participating in networks. An examination of individuals' perceptions of how they use and how they feel regarding the material provided and features transmitted by online mechanisms was conducted by Davis (1989) to understand how use of such online mechanisms affects stakeholders' interactions. A framework called the 'Technology Acceptance Model' is often used to explore technology behaviors of users (Davis, 1989). Moreover, the users' purpose for using technologies affects their attitudes and opinions on using online mechanisms for future activities; therefore, two key constructs, perceived usefulness and perceived ease of use, were recognized as central determinants of individuals' technology acceptance (Davis, 1989; Mathieson, 1991). Lin (2005) implemented the Technology Acceptance Model in an investigation of the online learning experience of individuals to determine using technologies affects the behavior in a positive manner. Another study presents the connections between perceived ease of use, perceived usefulness, social ability, and intelligence of community in online courses, where findings show that these determinants influence each other positively (Tsai, Tung, & Laffey, 2008; Tsai et al., 2008). For instance, the online mechanisms show potential to increase entrepreneurial alertness of different stakeholders which could be measured by recommended scales of colleagues (entrepreneurial alertness elaborated by Tang et al., 2012; e-GovQual scale modified to the smart specialisation topic elaborated by Papadomichelaki & Mentzas, 2012). In particular, the stakeholders might assess the provided services supportive in filtering or blocking out insignificant information to make decisions for facilitating effective future implementation of smart specialisation strategies. Thus, the following is proposed for future investigation.

Proposition 7 Different stakeholder groups perceive online mechanisms as equally supportive in facilitating effective future implementation of smart specialisation strategies.

4. Discussion and conclusions

This conceptual work offers required propositions to close the research gaps in facilitation of entrepreneurial discovery in smart specialisation processes via stakeholder participation in online platforms for knowledge-based policy advice. The ladder of participation proposed by Arnstein (1969), and the notion of 'levels of public involvement' by Dorsey, Doney, and Rueggeberg (1994) span from low levels of stakeholder engagement, which involve moments of informing or educating, to higher engagement levels, which are continuous and aim to build consensus. In this framework, stakeholder engagement can be increased due to high levels of trust. Pretty and Ward (2001) claim that learning requires mutual trust and confidence among stakeholders, as well as acceptance of others stakeholders' views during the policy development process. Tsang et al. (2009) argue that whether people differ in opinions, high trust still can predominate if these stakeholders are eager to work together and are working toward the same goal, i.e., smart specialisation. The self-reflection procedure shows that individual mental models relevant to decision-making with good facilitation, stakeholder engagement, and high information quality (Hurlbert & Gupta, 2015; Moutinho et al., 2015; Pahl-Wostl, 2006) are integral to knowledge-based policy advice. Nevertheless, some engagement methods can be applied to groups any trust level via online mechanisms. However, Pahl-Wostl (2009) and Huntjens et al. (2011) claim that to build trust, enhancing flows of information and processes of engagement are essential elements in the stakeholder engagement processes. Moreover, Huntjens et al. (2011) believe that early communication is necessary for building trust; joint and participative knowledge creation can lead to collective, open-access knowledge; and clear decision-making procedures result in responsible distributions. These are all vital conditions for exchanging knowledge-based policy advice in online platforms. Abrams, Cross, Lesser, and Levin (2003) argue

that transparency and building trust are linked and, therefore, groups need a: “facilitator” to build trust by facilitating motivation, collecting and creating information, resolving conflicts, connecting stakeholders, and mobilizing support for transformation (Folke, Hahn, Olsson, & Norberg, 2005). Whether such a facilitator can be provided in online mechanisms and be perceived as supportive for knowledge-based policy advice for a diverse set of stakeholders is still an open research question.

Though online mechanisms can virtually facilitate knowledge-based policy exchanges, many studies have asserted a need for validated instruments (e.g. Abdinnour-Helm, Chaparro, & Farmer, 2005; Lund, 2001; McKinney, Yoon, & Zahedi, 2002; Straub, Hoffman, Weber, & Steinfield, 2002). In particular, empirical investigations of supportive online mechanisms used in stakeholder engagement in policy-making in a knowledge-based economy have been neglected so far across communities. This report addressed those gaps and provided recommendations for entrepreneurial-driven online mechanisms to adequately consider the unique multi-stakeholder nature within smart specialisation and its functions in the knowledge-based economy in a policy agenda environment. Based on well-built constructs dedicated toward stakeholder participation quality in policy advice (e.g. Ommen et al., 2016), this report takes a multi-stakeholder approach in the smart specialisation framework and represents the first of its design. As such, it delivers vital insights for online mechanisms dedicated to knowledge-based policy advice with a focus on regional research and innovation strategies for smart specialisation. However, as such, it faces limitations—namely, a lack of empirical support. Nevertheless, the central purpose of the current review is to build the fundament for future in-depth analysis in this regard.

This study delivers both theoretical and practical implications. Both researchers and practitioners can benefit from the findings of this contribution. The presented fundaments in this study can be used by researchers to create models for satisfaction in policy-making, usage patterns of online mechanism for policy advice, and successful stakeholder participation in a knowledge-based economy. Additionally, this report can be used by policy-makers to identify the various levels of satisfaction among different stakeholders during their engagement in policy-making processes. For technical designers of online mechanisms for policy-making, this report provides techniques for testing online platforms linked to relevant scales in the discipline of policy. Practitioners will especially benefit from the established fundaments in this report, as there is currently no standardized scale to assess stakeholder participation in online mechanisms for knowledge-based policy advice. This work provides the first method in this direction.

In future research, empirical testing and the application of further statistical techniques, for example, multidimensional scaling for measuring the various dimensions and comparing the similarities or differences among different stakeholder groups, should be implemented. Ultimately, this study is the first of its design and provides a valuable conceptional basis for these further steps.

Acknowledgment

This article reflects only the author’s view. Neither the Research Executive Agency nor the European Commission is responsible for any use that may be made of the information it contains.

Funding

This project has received funding from the European Union’s Horizon 2020 Research and Innovation Programme [grant number 710659], ONLINE-S3.

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Citation information

Cite this article as: Facilitating entrepreneurial discovery in smart specialisation via stakeholder participation within online mechanisms for knowledge-based policy advice, Katharina Fellnhöfer, *Cogent Business & Management* (2017), 4: 1296802.

Cover image

EU Emblem.

Source: http://ec.europa.eu/research/participants/docs/h2020-funding-guide/grants/grant-management/acknowledge-funding_en.htm.

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