# Leveraging Open Innovation to improve society: Past achievements and future trajectories


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## Abstract

Open Innovation (OI) is an approach which describes a purposive attempt to draw together knowledge from different contributors to develop and exploit innovation. It has become clear that OI directly benefits organisations' economic performance and resilience, but researchers, practitioners, and policy makers became also convinced that OI might be the way forward to tackle the world's most pressing societal challenges, representing unresolved Grand Challenges, which can only be weathered by diverse sets of collaborative partners that join forces. Although anecdotal evidence points at how OI practices can be employed to achieve societal impact not only in private firms but also in public organisations, very little understanding exists -beyond anecdotal- to link OI to societal impact. This special issue has the ambition to start the discussion and establish a framework as the stepping stone to tackle this complex research gap.



Keywords: open innovation; societal challenge; grand challenges; social innovation; motivations; ecosystems;

## 1. Open Innovation methods for societal impact

Many issues affect society today, ranging from the eradication of diseases and the reduction of carbon emissions, to the achievement of more sustainable products and services (Bornmann, 2013). These pressing needs, representing unresolved Grand Challenges (Eisenhardt et al., 2016), call for the development of strong innovative solutions.

Open Innovation (OI) is an approach which describes a purposive attempt to draw together knowledge from different contributors to develop and exploit innovation. It has been traditionally defined considering a commercial organisation capable of using external knowledge for the purpose of developing innovation for their traditional markets, whilst also being capable of the exploitation of internal knowledge in different core and non-core markets (Chesbrough et al., 2006). OI also recognises that innovation is often jointly created by partners working together in co-creation activities (Gassmann and Enkel, 2004).

In recent years, it has become clear that OI directly benefits organisations' economic performance (Ahn et al., 2013) and resilience (Ahn et al., 2018). However, researchers, practitioners, and policy makers became also convinced that OI might be the way forward to tackle the world's most pressing societal challenges which can only be weathered by diverse sets of collaborative partners that join forces (Gassmann and Enkel, 2004, Chesbrough et al., 2006).

The available anecdotal evidence points in several directions at how OI practices can be employed to achieve societal impact. For instance, firms interested in improving their sustainability strategy attempt this via OI approaches (e.g., Jones et al., 2014). Furthermore, authors have shown that academics are ever more under pressure to both increase their OI approach and interaction with industry to develop and commercialise their research outputs (Alexander et al., 2015), at the same time, they need to demonstrate the societal impact of their research (Bornmann 2013). Others have shown how organisations such as Emergency,

with a clear societal agenda, adopt OI approaches leveraging local resources to deliver medical services and to transfer core knowledge back to the local communities (Chesbrough and Di Minin, 2014). Another example relates to EU and many other governments who, in order to involve citizens in administration, have exploited open approaches such as Living Lab networks and Smart City projects (Hilgers and Piller, 2011, Leminen et al., 2012).

However, notwithstanding the proliferation of OI research interested in understanding the impact of adopting OI approaches, very little understanding exists beyond anecdotal, to link OI to societal impact (Chesbrough and Di Minin, 2014). Whilst much work is needed to appreciate how OI methods for societal impact develop and can be measured, this special issue has the ambition to start the discussion and establish a stepping stone to tackle this complex research gap.

## 2. What is "societal impact"?

### 2.1. Definitions

Our first ambition for this Special Issue is to start defining what societal impact actually is. We found references in other field, such as in international development studies. Here, the term impact refers to "significant or lasting changes in people's lives, brought about by a given action or series of actions" (Roche, 1999). More recently, impact has also come to be associated with results that target the "root causes" of a social problem (Ebrahim and Rangan 2014). Others use impact more narrowly to refer to an organization's specific and measurable role in affecting a social result requiring a counterfactual for assessment (Jones 2009). Donovan (2011) indicated that societal impact encompasses a number of benefits : (a) Social benefits (e.g., stimulating new approaches to social issues; improving quality of life; informing public debate and improving policymaking); (b) Cultural benefits (e.g. understanding human beings' identity in a nation and society; contributing to cultural enrichment; bringing new ideas and experiences to a nation and society); (c) Environmental

benefits (e.g. reducing waste and pollution, advocating recycle and sustainability); (d) Economic benefits (e.g. improving productivity; increasing employment; reducing costs; adding to wealth creation). Along these lines, in the innovation management field, we particularly appreciate the work by Bornmann (2013) who reviewed how academic outcomes are evaluated in terms of impact. He refers to impact as the "assessment of (a) social, (b) cultural, (c) environmental, and (d) economic returns [..] effects [..of an innovation..]".

## 2.2. The societal impact of…?

Whilst Bornmann (2013) is specifically concerned with the impact and effects of publicly-funded research, any type of innovation (e.g. Science (Burke et al., 1985); Publicly (Nelson, 2012, Salter and Martin, 2001, Sánchez-Barrioluengo, 2014); or Privately funded research (Petit, 2004); Entrepreneurship (Granados et al., 2011, Haugh, 2005); Strategic management decisions (Ebrahim and Rangan, 2014)) could be the stemming source of societal impact (Dosi et al., 2006, Rogers, 1983). However, it is worth noting that in the innovation literature with the term "innovation" authors mean both the outcome and the process that it is used to derive it. That is specifically the case of the term "Open Innovation (OI)", whereby the impact could be linked to the output of the innovation activities and how it is exploited (in isolation – i.e. closed, or in cooperation - i.e. open) or of the activities to develop the innovations themselves (carried out individually – i.e. closed or in collaboration - i.e. open). These terms are disambiguated only on occasion (e.g. Huizingh (2011)).

## 2.3. Who is involved in defining and creating societal impact?

Given the breadth in the definition of societal impact such as that proposed by Donovan (2011), it is easy to see how these are highly influenced by the society that defines them. Hence what constitutes societal impact (Donovan, 2011) for some stakeholders, will likely not be the same for others. It is also clear that, whilst potentially not very fast, societies change and with that how stakeholders see societal impact. This is particularly important as

societal impact is not a short-term phenomenon, it only becomes apparent in the distant future (Ruegg and Feller, 2003). Hence it is quite hard to estimate, in the short term. This contradicts what organisations, such as universities, are increasingly encouraged to pursue and demonstrate as clearly shown in the paper by Smart et al. (REF), in this special issue, which describes the tension between different (open) models academia is pushed to follow to generate societal impact.

This social constructionist view of impact calls for researchers to look at how the criteria for judging an innovation is defined and who are the groups and stakeholders who participate in defining it (Bozeman and Sarewitz, 2011). Spaapen et al. (2007) identified three groups of stakeholders for societal impact: (1) policy makers; (2) professional users (profit and non-profit); (3) end users, the public or individuals target groups. Each of these stakeholders could take different roles in the (open) innovation process, acting for example as initiators (orchestrators, or key-stones (Iansiti, 2004)), contributors/participants, or/and beneficiaries and judges of societal impact). Hence, they are likely to be moved by different motivations based on what they consider to be of value (Adams et al., 2016). In case a neo-liberal view is taken, the value which shapes business activities and drives stakeholders is only measurable in economic terms. In contrast, when stakeholders consider as value all those listed by Donovan (2011), social, cultural and environmental motivations contribute with economic ones to direct the strategic objectives and shape business activities (Adams et al., 2016). How the stakeholders participate in the OI mechanisms in pursuing the societal impact is the key subject of this special issue. They can follow internal or eco-systemic logics in their OI approaches. As for the former (internal) we refer to the use of other's knowledge to pursue innovation which satisfies internal motivations of the organisation (whether Economic or Societal). As for the latter (eco-systemic), we consider cooperation with others to pursue "systemic innovation" that changes everything inside or outside the firm

boundaries, pursuing the motivations (economic or societal) of numerous stakeholders inside and outside the organisation "transforming established societal relationships and interactions between industry, consumer behaviour, and lifestyles, institutional orientations, and even the very aims of business" (Adams et al., 2016).

## 3. Is (open) innovation for societal value-creation different from other types of innovation?

Much research has been targeted at understanding OI in commercial firms. However, we know that what works in one context might be hard to transfer to others. For example, we learnt recently that the lessons we developed from studying the adoption of OI in large firms cannot be directly applied to small- and medium-sized enterprises (SMEs) (Vanhaverbeke et al., 2018). Hence, we expect that what we learnt about OI approaches for financial goals may not be directly transferrable to OI for societal value creation. The practical employment of OI for societal goals, its adoption and implementation seem to be different from conventional OI in firms at least in three ways.

First, there might be circumstances where the societal impact is the main goal to be achieved through OI. In other cases, whilst ultimately OI practices deliver also a societal benefit, this is not a part of the original ambition of the innovation activities. As a result, OI activities might concern different partners and their motivations may be complicatedly entangled. The difference between the various circumstances is explored in the paper by De Silva and Wright [REF], in this special issue. Whilst in firms diverse innovation activities may be smoothly tuned because of a clear and consistent goal of innovation for profit creation (Kotlar et al., 2018), in innovation activities aiming at social innovation, the boundary for knowledge/resource exchange is expanded from an individual firm to a broad group of stakeholders who are part of the whole innovation system and who are differently motivated to take part. Therefore, a certain level of tension between altruism and commercial viability could be characterising some OI activities and might entail also ethical concerns

(Fini et al., 2018). Thus, compared to conventional OI, more sophisticated strategies, such as a well-balanced combination of intrinsic and extrinsic incentives, different leadership styles, will be necessary for the harmonious co-existence of altruism and commercial viability. This theme is explored by the paper by Schmidthuber et al. (REF) in this special issue who consider different forms of motivations and their effect on citizens participation in crowdsourcing contexts.

Second, changes in the OI process are to be anticipated. When OI is implemented for the creation of societal value, the epicentre of innovation is in most cases no longer confined to a focal firm but it will also likely involve or stem from the initiative of the public institutions and even the general public. Consequently, the OI process will be implemented taking into consideration the different characteristics of these new types of participants. For example, the available resources might be less limited in government agencies or public institutions, but their implementation speed may be much slower because of their bureaucratic structures. Considering these contrasting resource conditions and decision-making processes, social value may be created following different implementation paths. For example, practices such as crowdsourcing might be the most common where government aim to reach the wider public, in contrast to the dominance of R&D collaborations for profit-oriented corporations. This aspect is being explored in the papers by Randhawa et al. (REF) in this special issue. Also, sometimes the paths might be different even when the contextual circumstances are similar (see the paper by Rayna and Strukova in this special issue (REF)). Similarly, whilst in-bound OI has been the dominant process for profit-oriented firms (Chesbrough, 2012, Chesbrough and Brunswicker, 2014), the out-bound OI might be expected to be fairly common where social innovation is the target.

Third, the way in which OI is implemented might change. For many years we considered OI an innovative way to deliver innovation. So much so that some defined it as "innovating innovation" (Chesbrough, 2003). After well over a decade since the model has been published, some companies might have established OI practices as part of their institutional approaches to innovation, settling into it (see Mortara and Minshall (2011), Chesbrough (2012) and Mortara and Minshall (2014)). However, the globalisation of the labour market and the diffusion of digital technologies for knowledge exchange, require firms to quickly adapt to the changes of our modern connected world (Chesbrough 2003) and OI has been seen as a way for them to acquire the necessary dynamic capabilities to continuously adapt (e.g., Di Minin et al. (2010), Chesbrough and Garman (2009) and Ahn et al. (2018)). It is now necessary to understand how other types of organisations, who develop innovation whilst pursuing a more societal aim, adapt to the quickly changing world and use OI methods to achieve their goals and how these practices evolve over time. Hence tracking their evolution will provide more in-depth understanding on how social value is identified, captured, and realised. To this end, the papers in this special issue by Kohler and Chesbrough (REF), and by Sims et al. (REF) track the evolution of open innovation practices for social innovation.

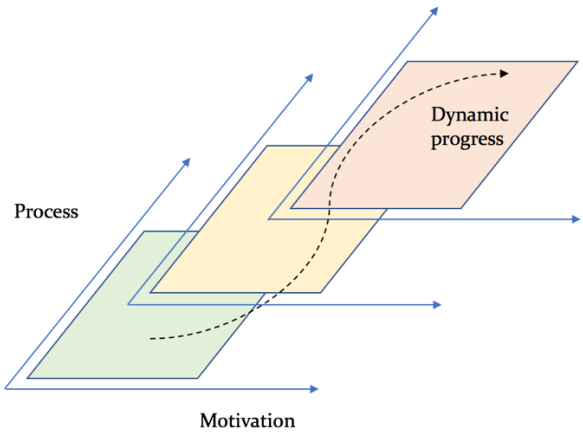


**Figure 1.** Key themes treated in this special issue about open innovation for social value creation: The OI process, stakeholders' motivations and the dynamic changes in OI practices for social innovation

# 4. Benefits and challenges of Open Innovation and their implications for societal impact

## 4.1. What are benefits and challenges of Open Innovation?

From past research, we know that OI can generate several benefits for individuals and organisations engaging in the joint development of new knowledge, technologies, products, services, etc. At the basis of this special issue there is our assumption that benefits that can also, directly or indirectly, accrue to society at large. These benefits are summarized in Table 1. In order to effectively realise these benefits at societal-level, however, the challenges related to OI need to be adequately managed (Gassmann et al., 2010).

**Table 1** Benefits and challenges of Open Innovation

| **Benefits** | **Challenges** |
|---|---|
| *Higher quality of innovations through multi-disciplinary approaches* | *Managing & organising OI in the long run* |
| *Increased learning capacity & (access to) advanced knowledge base* | *Balancing/complementing internal & external innovation and the link to strategy* |
| *Increased speed of innovation/market introduction & increased returns to investments* | *Loss of control & ownership (management of appropriability regimes) & risk of opportunism* |
| *Increased acceptance of innovations* | *Balancing motivational drivers/rules of the game across all stakeholders* |

With respect to the benefits of OI, researchers have found that the outcome of joint innovation projects where partners with different backgrounds (technology, sector of industry, etc.) join forces is likely to be innovations of higher quality that integrate multi-disciplinary approaches. Particularly when it comes to addressing societal challenges, the potential multi-disciplinary nature of OI projects is likely to lead to more fitting solutions than projects undertaken within industrial or technological silos (Enkel et al., 2009). Intermediaries tend to make use of this aspect where they present innovation problems in an

anonymous format to their networks (that is, at an abstract level, disconnected from technological or industrial context) so that solution providers with various knowledge backgrounds can freely respond to the challenges (Roijakkers et al., 2014). Furthermore, the inclusion of multiple types of partners or stakeholders within OI initiatives (e.g. end users, governments) that can participate throughout the process is likely to result in increased acceptance of the ultimate end result, for example, a new concept, technology, product or service (see Baldwin and von Hippel (2011)). An interesting example in this respect is the "Collectief de Kleine Aarde", an innovative, collaborative initiative in the Netherlands. This OI initiative consists of a combination of educational organisations, governmental organisations, and firms aiming to create a sustainable, self-providing community. The group focuses on combining four knowledge areas: The built environment; Bio-based techniques/food; Energy transition; and Social transition. The location itself fulfils educational purposes, provides inspiration, brings forward testing facilities (living labs), and facilitates the reintegration of individuals that are distanced from the labour market. The end users of "De Kleine Aarde" were actively involved in the OI process from the very start. Not only was public money spent requiring the involvement of users/citizens; the involvement of users stimulated their long-term involvement in the initiative leading them to get actively involved in maintenance tasks, promoting the initiative, as well as the continuous generation of new ideas for "De Kleine Aarde". Building on these benefits, individuals and organisations participating in OI endeavours have also reported that tapping into an advanced knowledge base that may be spread across the globe has led to their enhanced learning capacity.

Working within multi-disciplinary teams of partners with diverse knowledge backgrounds requires that individuals learn to understand the languages of different disciplines, thus adding to their ability to absorb new knowledge and link it to their own knowledge in the future (Zahra and George, 2002). Finally, as innovation projects conducted

within organisations are generally associated with high costs, uncertainties, and risks, the sharing of these costs and uncertainties within a group of OI partners, the increased speed to market resulting from collaboration, and the increased returns to investments in OI (in time and money) are reported as important benefits of engaging in OI (see also Chesbrough et al. (2006)).

In order to effectively benefit from the abovementioned advantages of engaging in OI, it is crucial to adequately manage the challenges that inadvertently accompany joint innovation projects (see also Boudreau and Lakhani (2009), Boudreau et al. (2011) and West and Gallagher (2006)). Firstly, several organisations seem to fail in capturing some of the benefits of OI as they lack the capabilities necessary for effectively managing OI (Chesbrough et al., 2014). Learning how to manage OI projects takes time and the investment of dedicated resources in the long run. Both the external management of OI relations and the internal management of OI capabilities require top management support, long-term strategic attention, and allocated budgets. Organisations need to invest, for example, in building the right culture for OI, training their employees in OI skills and attitudes (Mortara et al., 2009) fostering a structural OI learning capacity, creating processes focused on partnering for innovation, setting up performance evaluation systems that stimulate collaboration, etc. This takes substantial effort, investment in both the internal and external coordination of OI relations, and requires a long-term view. This is particularly challenging when the management of OI initiatives is moved from a focal firm to being a collective responsibility of all the stakeholders involved and issues linked to the tragedy of commons might emerge (Gächter et al. 2010).

Second, and related to the first point, is the need to balance internal innovation efforts with external initiatives. Organisational strategies need to determine the focus of internal (or ecosytemic) innovation trajectories and external OI projects, their complementarities, and

their preferred outcomes (Vanhaverbeke, 2017). Finally, organisations and individuals engaging in joint innovation projects fear the loss of control with respect to crucial resources, ownership of intellectual property rights, and the risk of opportunistic behaviour on the part of OI partners. The challenge herein is the set-up of a governance model that not only manages joint value creation but also ensures fair value capturing by all partners involved. Particularly in projects that aim to create societal value the adequate measurement of the value created and the effective distribution of value captured among OI partners can be a strenuous task.

## 4.2. Dynamics and mechanisms for societal impact

The OI benefits mentioned above do not remain at the firm level. OI encourages resource exchanges across different organisations, and this is in line with what innovation ecosystems desire to achieve – nurturing competitive innovation actors and synergy creation though their network formation. Some pioneering studies viewing OI from a macroscopic perspective (e.g., Wang et al. (2012) and Roper et al. (2013)) have found that openness generates positive externality. An increase of openness in an organisation results in knowledge spill-over and stimulates competition, which enhances innovation performance in other organisations (Roper et al., 2013). Accordingly, by triggering this virtuous cycle, the extensive adoption of OI can contribute to an increase of social returns in the form of, for example, new value/job creation from innovation (Wang et al., 2012).

The definition of OI has evolved over time to embrace non-pecuniary mechanisms (e.g., open sourcing, free revealing and donations to non-profits), which have also widely been adopted both in public but also in private organisations (Dahlander and Gann, 2010, Chesbrough and Di Minin, 2014). This evolution reflects how the broader applications of OI

in corporate social innovation or the use of on-line platforms in public administration result in social, rather than purely economic value.

By taking stock of the knowledge developed so far, we suggest the following three as main facilitating drivers. First, the entry barrier for social OI would be lowered by extensive resource pooling and relatively low inter-organisational tension. If OI solely pursues commercial value creation, external knowledge acquisition may be hampered by high transaction costs. Also, it is often necessary to compensate external partners by providing reciprocal benefits (e.g., licensing fee). However, when OI aims for social value creation, organisations can avoid such challenges. Newly emerging OI modes (e.g., non-pecuniary OI, see Chesbrough and Brunswicker (2014)) have enabled organisations to tap into new knowledge resources, which have been relatively neglected, such as retired experts, graduate students, and the general public (Wang et al., 2012). This enables organisations to harness easily accessible, relatively cheaper or even free resources contributed by intrinsically motivated/voluntary participants. Accordingly, implementation costs will be lowered, which in turn makes the open social innovation process lean and light. Further, because of less (or no) commercialised goal setting, competition pressure can be eased, which will alleviate the burden for knowledge sharing. In conventional OI, knowledge leakage would cause a high level of conflict or tension, so sophisticated IP strategy is necessary to resolve the paradox of openness (Bogers, 2011, Laursen and Salter, 2014). However, low inter-organisational tension would establish a more cooperative and non-competitive atmosphere. In this situation, innovation actors are relatively loosely integrated, so the cognitive resistance/threshold of knowledge sharing would be lowered by their intrinsic participation motivation.

Second, OI application can go beyond formal R&D activity for social value creation. One of the distinct features of OI would be its methodological flexibility embracing various

application forms (Spithoven et al., 2013). OI has progressively adopted new types of innovation, such as non-pecuniary open sourcing or donation to public (Dahlander and Gann, 2010, Chesbrough and Di Minin, 2014) and recent developments in ICT technology have accelerated the wider and popular application of new OI forms. Multi-channel on-line platforms enable organisations to reach the wider public and making communications very interactive. Thanks to this technological advance, many organisations including government agencies are adopting crowd sourcing not only for solution seeking (e.g., *Intel'*s Make it Wearable Challenge) but also for 'problem seeking' (e.g., Fixmystreet.com[1]) or 'collective learning' (e.g., Peer-to-Patent[2]). Traditionally, the relationship between organisations and the general public has remained unilateral due to the practical challenges in identifying diverse demands from unspecified citizens. However, this evolving OI application has minimised obstacles for interactive communications thus shortening the cognitive distance with diverse innovation actors.

Third, open social innovation can be a win-win game for both private and public organisations. OI does not demand one-side sacrifice; rather it attempts to balance mutual interests of different participants. Some studies (e.g., Sanzo et al. (2015)) have ascribed firms' main motivation for social innovation to corporate social responsibility (CSR). However, from the OI point of view, there are diverse motivations, such as easier tacit knowledge learning, in-depth user/market understanding, and wining legitimacy/reputation in the market (Mirvis et al., 2016). To create social value, private firms occasionally have to form business-to-non-profits (B2N) alliances, but different collaboration configurations

[1] It is a map based website and app by 'mySociety (UK NGO)' which helps people to inform their local authority of problems needing their attention, such as potholes or broken streetlamps.

[2] It is the first social-software, which seeks to assist US Patent and Trademark Office (USPTO) in improving patent quality by gathering public input in evaluating patent applications.

would be necessary to address gaps in resource asymmetry and cognitive/operating differences (London et al., 2005). Unlike well-planned R&D collaboration with firms or research institutions, it is likely that problems are not finely defined, requiring intensive engagement, swift improvisation, and longer commitment. Therefore, it is highly likely that knowledge is exchanged and acquired via a more emergent and less organised process through mutual learning (Kania et al., 2014). This continuous co-learning process helps firms to easily understand implicit knowledge localised in partners, so B2N alliances not only accelerate tacit knowledge learning but also help firms to identify/develop new markets by tapping into newly acquired local knowledge (Mirvis et al., 2016). Consequently, OI can shape new value propositions, and in this process, firms can even enhance their social reputation, which also helps firms to enter the new marketplace with less resistance and lower marketing costs (Mirvis et al., 2016). A good example for this would be Coca-Cola Store Training and Access to Resources (STAR) program, which helps economically deprived women to open a home-based Coca-Cola store in the Philippines.

## 5. Papers in this special issue

The special issue call was announced in March 2016 and in July 2016, R&D Management conference was held at Cambridge, UK, with the theme of "*From Science to Society: Innovation and Value Creation"* to attract scholars' attention and encourage research in this emerging field. The contributions cover a broad area, which encompass several aspects highlighted above and summarised in Fig. 2.

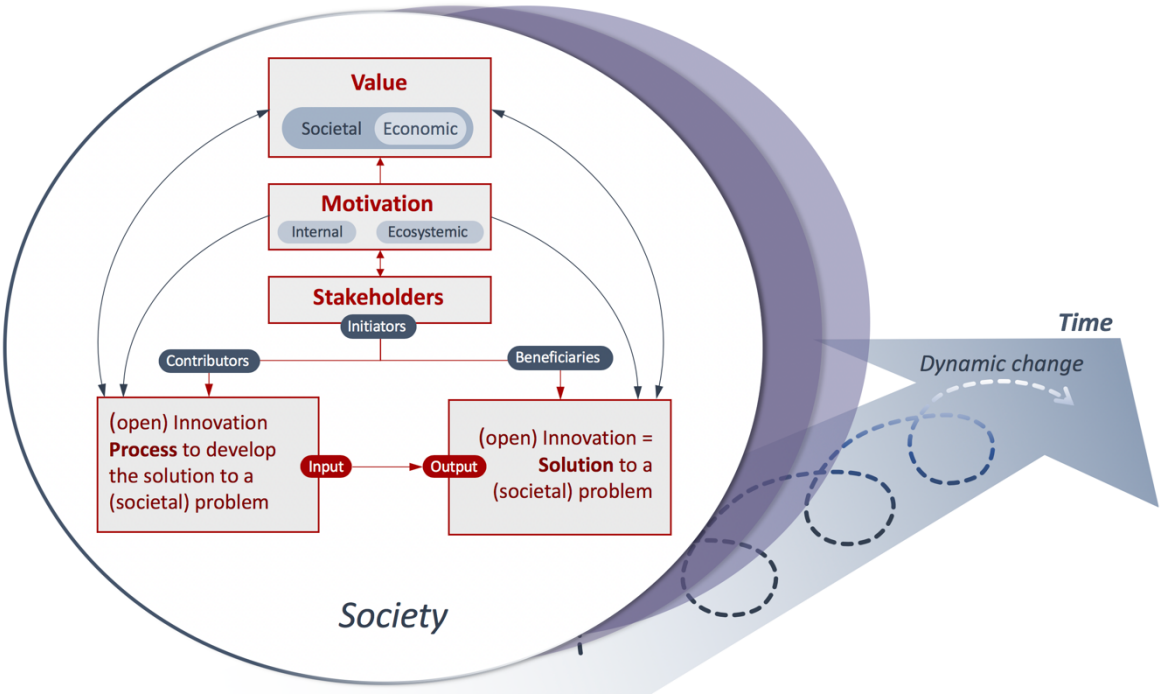


**Figure 2. Open Innovation to deliver societal impact: a framework.** It shows the various elements which lead to the understanding of open innovation in its delivery of societal value. What's of value is determined within society by the personal motivations of the stakeholders involved in the development or/and the exploitation of an innovation. Society changes and with it how the value of (open) innovation is obtained and evaluated.

***Smart et al. ask whether the nature of the relationship between Open Science and Open Innovation is conducive to a knowledge production regime for societal improvement.***

Moving from the consideration that openness has meant that distinct actors across all sides of society (academia, industry, government and citizens) are increasingly able to co-participate in the development and exploitation of scientific knowledge for societal impact, the authors argue that a deep societal transformation which take on a particular view on the role of science in society. In particular, the paper uses a sociological lens to evaluate the role and impact of the different ways in which "open" regimes which involve academia (e.g. Mode 2, Post-Normal Science, Quadruple Helix) have emerged, and reflects on their nature, intrinsic tensions and consequences. Some of the key points raised in the paper are as follows. First, there is a decreasing trust in science-based outcomes which delegitimizes the role of

professional scientists. Second, the paper draws attention on the generative coupling of open science and open innovation. Third, as the socio-political climate supporting the universal suffrage of knowledge production has led to increased tensions in academic institutions between creating proprietary knowledge and ensuring its utility for "universal societal impact", the authors suggests that a partial reconciliation of such tensions may come from further embedding Merton's ethos of science (Communism, Universality, Disinterestedness and Organised Scepticism) and explicating the implications for the 'open organisation' of 21st Century knowledge production in light of the data-driven and digital futures.

***Randhawa et al.' paper examines the organizational and project-level choices of government agencies that crowdsource from citizens to address societal problems***. From the analysis of 18 local government seekers that use the same intermediary, the authors propose a model of seeker crowdsourcing implementation that links the variance in seekers' intent and engagement strategies to differences in project team motivation and capabilities, and ultimately to project outcomes. Specifically, the seeker intents fall into three-levels of desired community involvement (Perfunctory consultation (low); Symbolic engagement (medium); or Transformative change (high)), leading to different engagement strategies (Comprehensive; Transactional, and Compliance-driven). The success of these initiatives is measured against: i) the quality of solver contributions; ii) the seeker implementation of changes; iii) and the tangible impact of changes. Their results imply that strong seeker engagement behaviours are indeed an indicator of future citizen-sourcing projects.

***De Silva and Wright's paper develops propositions regarding the nature of the social value generated by various types of co-creating actors, in a process which involves both the 'co-identification' of an opportunity and their 'co-exploitation'.*** Specifically, their work observed that while all the actors manifested entrepreneurial behaviour and were involved in co-exploitation of the ideas generated, only those who had co-identified

opportunities were involved in initiating the co-creation. However, those not involved in the co-identification participated in the shaping of the specific projects' objectives. The paper links three dimensions of social value, i.e. prominence (direct or indirect social value), innovation (technology development or capability development) and reach (benefiting a focused or a broader group), with the profit orientation and the key resources of co-identifying actors and develops some testable propositions.

***Schmidthuber et al. disentangle the effect of different types of individual motivation and self-identification on the extent to which citizens participate in public administrations' problem solving.*** They analyse a crowdsourcing initiative -the involvement of citizen in an open government platform- and use quantitative data from an online platform launched in 2015 by the local government of Linz in Austria. Results suggest that intrinsic motivation is positively related to an overall level of activity on the platform (i.e., number of ideas shared, comments and likes/dislikes). Conversely, both external and introjected regulations negatively impact individuals' active contribution (i.e. number of ideas), whereas external regulation is positively associated with evaluation behaviours (i.e. number of likes/dislikes). The paper contributes to the conversation on the cognitive determinants of individuals' innovative behaviours and their ability to generate societal impact.

***Kohler and Chesbrough address how crowdsourcing may generate social innovation.*** In doing so, they shed light on how to effectively design a crowdsourcing platform and its constituting elements. They use a case study approach to examine the travel2change crowdsourcing platform, mapping its evolution from a collaborative community to a competitive market. The paper provides insights to organisations interested in implementing crowdsourcing initiatives to generate social impact.

***Sims et al. explore how a community uses open innovation over time to successfully tackle a global social challenge.*** They use a case study approach to examine Open MRS, an

open source software community providing affordable medical record keeping software in developing nations. The analysis illustrates how in-bound, out-bound, and coupled open innovation influence the community through four phases of community development. They show that the community founders' vision, extrinsic motivation and community governance facilitate the growth of open source community. This paper contributes to the conversation on how open innovation processes work in non-profit sectors to pursue social innovation and the non-commercial diffusion of innovation.

***Rayna and Striukova explore the dynamics of open social innovation and the way it delivers social impact within the context of a large governmental seed-funded network of fab labs and maker spaces.*** Their research explores Centres for Maker Innovation and Technology, a network of 170 fab labs and maker spaces, launched in 2013 in Russia. The analysis illustrates how social entrepreneurs adapt to global and local constraints to deliver social impact. In particular, the six stages of social innovation (prompts, proposals, prototypes, sustaining, scaling and diffusion, systemic change) are explored and the challenges related to each stage, in relation to open social innovation, are outlined. The paper adds to the literature on fab labs/maker spaces by providing suggestions of strategies enabling to ensure their long-term sustainability.

## 6. Future research directions

Whilst this Special Issue has started the discussion on this emerging topic and we hope has set foundations for the next steps, much needs to be done to continue in the work to tackle the many aspects identified, but not fully exhausted here.

One issue to consider, on top of those highlighted by the contributors of this special issue, is tackling the challenges in measuring 'societal impact'. This would allow both

academic and practitioner communities to determine the effectiveness of OI practices in obtaining societal value.

In the academic realm, the mostly adopted -yet scant- attempts to measure societal impact are rooted in the Theory of Change (Clark et al., 2004). Indeed, ex-ante conceptually sound objectives have to be defined so that ex-post evaluations are possible and meaningful: as long as social impact is difficult to unravel, consequent implications lose strength and credibility.

Also, practitioners have suggested a plethora of methodologies and metrics to support decision-making and to ensure accountability to their stakeholders (e.g. the OECD, the Organization for Economic Co-operation and Development). Typically, policy makers carry out the evaluation of performance via "results chains" or "logic models" (Bickman, 1987), whose key components include inputs, activities, outputs, outcomes, and impacts (Ebrahim and Rangan, 2014) . However, efforts focused on finding a standardised metric (i.e. the use of quantitative indicators, such as social return on investment – SROI) could be criticized for their intent to attribute financial value to something that cannot be expressed in terms of money. On the other hand, efforts designed to find more detailed information about impacts depending on when stakeholders have been affected (i.e. approaches focusing beneficiaries of SEs' activity) may be criticized for their subjectivity (Kanter and Brinkerhoff, 1981). Martin (2007) cited four problems that commonly cause trouble in societal impact assessments: (a) Causality (i.e., it is not clear what impact can be attributed to what cause); (b) Attribution (i.e., because impact can be diffuse, complex and contingent, it is not clear what portion of impact should be attributed to a certain research or to other inputs); (c) Internationality (i.e., R&D and innovation are intrinsically international, which makes attribution virtually impossible); (d) Evaluation timescale (i.e., premature impact measurement may result in policies that overemphasize research bringing short-term benefits). In the current

environment, social enterprises are able to select the most appropriate social impact metric to demonstrate that they are high-impact, valuable organizations. To overcome this problem and to avoid the possibility that selection criteria could be driven by the intention to camouflage unsustainable practices, investors are offering recommendations for the development of "standardised measures", measures that can guarantee comparability across sectors and organizations.

Finally, social impact and social impact measurements are social constructions of different stakeholders – suggesting, therefore, that it is not possible to establish a "golden standard". What the community should work towards is to develop a framework that stipulates which type of measurement is most appropriate under which circumstance, based on sound theoretical grounding. As scholars started using Corporate Social Performance (CSP) – a quantitative measure of environmental, governance and social performances – as a proxy for societal value generated by firms (Godfrey et al., 2010, Flammer, 2013, Cheng et al., 2014), there's still room for improvement to validate, both conceptually and empirically, holistic measures of societal impact. First, CSP is still defined as an organizational-level measure of non-financial outputs (Clarkson, 1995), only loosely coupled to society-level outcomes (Maas, 2009). Second, the recent advancements on the topic, mostly relate on how social value would benefit the firm that generates it, rather than measuring the effects on societal and environmental grand challenges (Wry and Haugh, 2018).

To conclude, as we are very much conscious that more work should be done to fully understand and appreciate the societal implications of management-related decisions and OI approaches, we hope that this special issue, by taking stock of the state of the art of the literature, may inspire future research in the field.

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