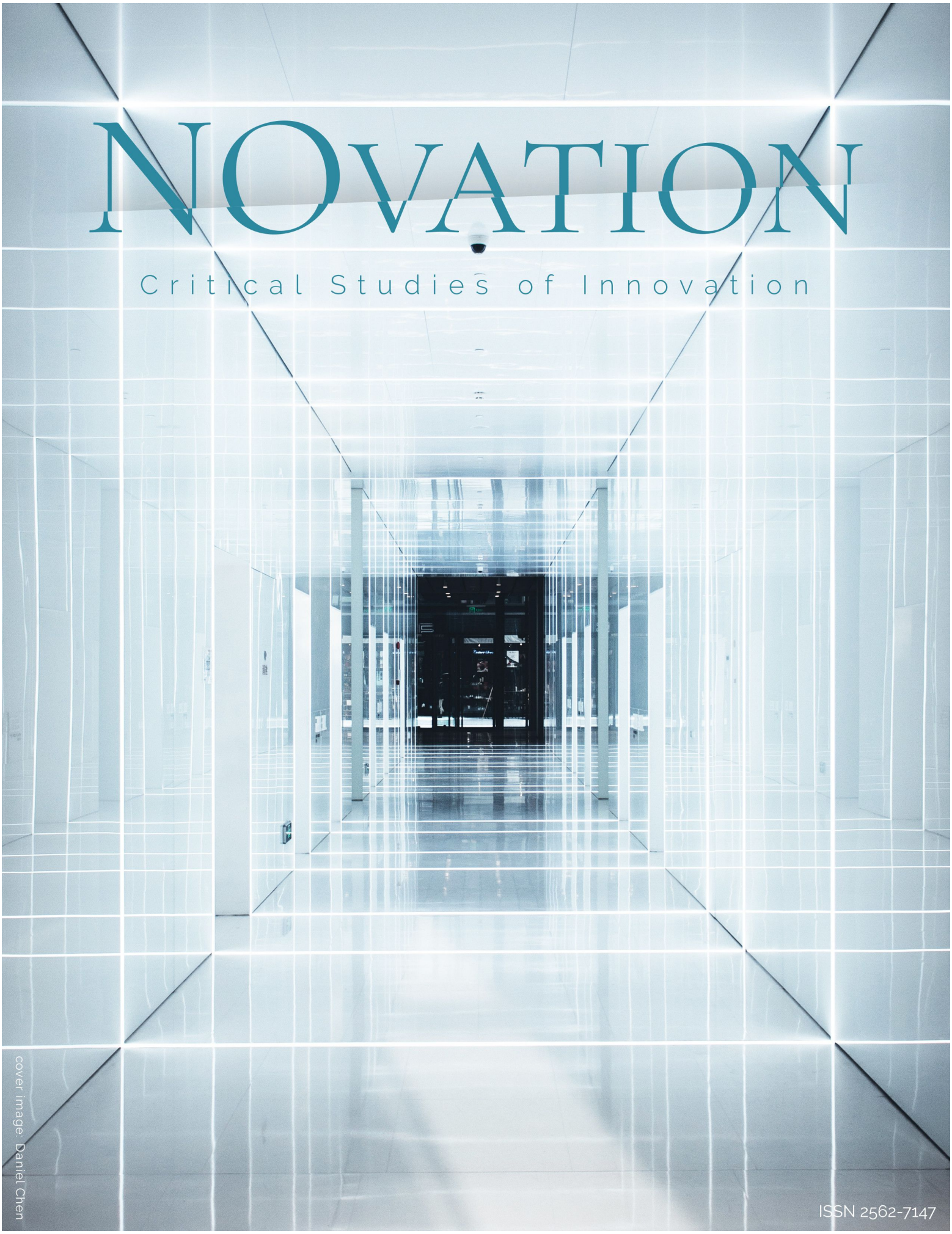
NOVATION

Critical Studies of Innovation



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X-Innovation

Re-Inventing Innovation Again and Again

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About Us

The international journal *NOvation: Critical Studies of Innovation* was launched to contribute to the rethinking and debunking of innovation narratives in STS (Science, Technology and Society) and STI (Science, Technology, and Innovation). There is a need to critically examine studies of innovation and obtain a clearer portrait of innovation than the depiction this field has been accustomed to. The journal questions the current narratives of innovation and offers a forum for discussion of some different interpretations of innovation, not only its virtues, but also its implications. In this sense, NO refers to non-innovative behaviors, which are as important to our societies as innovation is. Failures, imitation and negative effects of innovation, to take just some examples of non-innovation or *NOvation*, are scarcely considered and rarely form part of theories of innovation.

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X-Innovation: Re-Inventing Innovation Again and Again

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ABSTRACT

Innovation is an old word, of Greek origin, that came into the Latin vocabulary at around the fourth century and into our everyday vocabulary with the Reformation. However, it is only during the second half of the twentieth century that innovation became a fashionable concept and turned into a buzzword. It gave rise to a plethora of terms like technological innovation, organizational innovation, industrial innovation and, more recently, social innovation, open innovation, sustainable innovation, responsible innovation and the like. We may call these terms X-innovation.

How can we make sense of this semantic extension? Why do these terms come into being? What drives people to coin new terms? What effects do the terms have on thought, on culture and scholarship and on policy and politics? In this article we offer a conceptual historical analysis of the semantic field of innovation.

Keywords: Innovation Studies; Science, Technology and Innovation – STI; Conceptual History; Intellectual History; X-Innovation.

INTRODUCTION

Much has been written on innovation. For centuries, innovation was discussed and debated in religion, politics and social affairs (Godin, 2015). Then, in the last sixty years innovation has come to be identified with technological innovation. A whole industry of books and articles offers theories, frameworks and models to make sense of technological innovation and contribute to public policies and firm strategies. Because of (or thanks to) technological innovation, innovation has become part of our everyday vocabulary, even a buzzword. As Jack Morton, an engineer at Bell Telephone Laboratories who brought the transistor from invention to market, and author of numerous articles and a book on innovation, put it already in 1973: "Innovation is certainly a "buzz-word" today. Everyone likes the idea; everyone is trying to "innovate"; and everyone wants to do better at it tomorrow" (Morton, 1971, p. 73).

Yet, technological innovation is only one of many kinds of innovation. It is also one of the many phrases or terms that make use of the concept of *innovation*. In recent years, innovation gave rise to a plethora of terms like social innovation, open innovation, sustainable innovation, responsible innovation and the like.

How can we make sense of this semantic extension? Why do these terms come into being? What drives people to coin new terms and what do they want to achieve? What effects do the terms have on thought, culture and scholarship?

This article offers answers to these questions through a conceptual historical analysis of some of the terms that define the semantic field of innovation. The story is one of appropriation and contestation. On the one hand, people appropriate a word (innovation) for its value-ladenness and, consequently, because of what they can do with it. A word with such a polysemy as innovation is a multi-purpose word. It works in the public mind (imaginaries) and among policy-makers. It also contributes to scholars' citation record. On the other hand, people contest a term (technological innovation)

because of its hegemonic connotation. They coin alternative ones that often becomes a brand. We call these terms X-innovation.

This article uses conceptual history as evidence to the study of one of the most popular terms coined with the word innovation: technological innovation, a term that appeared in the first half of the twentieth century. It also looks at one of the first alternative terms invented to broaden the scope of innovation, so it is claimed, understood as technological until then: social innovation. It is documented that social innovation is a term that appeared over a century before technological innovation, with a negative connotation, then got resurrected in the 1980s with a positive connotation. We have here the two poles of an ideological spectrum. Technological innovation refers to capitalism, both as factor and consequence of capitalism, while social innovation has clear residues of its original meaning in it today: socialism.

The article introduces the notion of X-innovation, as the latest step in a century-old process of enlargement of the concept of innovation. Over the last five centuries, innovation enlarged its meaning from the religious to the political to the social to the economical. X-innovation is the more recent such enlargement. X-innovation is the continuation, under new terms, of the contestation of technological innovation as the dominant discourse of the twentieth century.

APPROPRIATION

Innovation is an old word, of Greek origin, that came into the Latin vocabulary at around the fourth century and into our everyday vocabulary with the Reformation (Godin, 2015). Innovation is a word that has many meanings. It can take the form of a noun (a novelty), a verb (adopting something new) or a process (a series of activities, from generation to diffusion). Over the centuries, the meaning shifted from noun to process, thanks to or because of scholars. 1

From the sixteenth to the eighteenth century, the word innovation was rarely used in isolation. It was always used in conjunction with adjectives (e.g.: 'dangerous', 'violent', 'pernicious', 'zealous', 'unscriptural', 'schismatic'). Pejorative associations also abounded: 'ignorance and innovation', 'superstition and innovation', 'usurpation and innovation', 'revolution and innovation'. Clearly, innovation was a value-laden word. It served to disqualify and stigmatize an enemy and demonise his behavior. Innovation is a 'private' affair, private in the sense of working against the social order and the orthodoxy of the time.

Beginning in the nineteenth century, the 'dangerous innovation' gradually turned into innovation with superlatives: the 'Happy Innovation', the 'Great Innovation'. Innovation also gets 'technicized'. In the early twentieth century, people started talking of 'political innovation', 'innovation in law', 'linguistic innovation', instead of just innovation. This is a sign that people appropriate a word in general use for more specific purposes. Over the twentieth century, linguistic appropriations proliferated in the literature. Invention (e.g. induced invention) became (induced) innovation. Change shifted to innovation, and technological change to technological innovation. Certainly, none of these new terms replaced the other completely. For example, change is a process, and innovation is a mean to and outcome of change (and itself a process). Yet, change and innovation as concepts started to be used interchangeably.

Technological Innovation

Today, innovation is most readily equated with technological innovation. Yet, "technological innovation" is a term that emerged after World War II. Certainly there were some uses before that date, but they were few and far between (Veblen, 1899, p. 118, 128-29; Usher, 1929, p. vii, p. 10; Hansen, 1932; Stern, 1937; Schumpeter, 1939, p. 289). "Innovation" *tout court* is far more frequent, although with different meanings, and very often with a spontaneous and implicit meaning as technological. The term technological

innovation appeared with increasing frequency in the 1950s, and its use exploded in the 1960s. Certainly, the word "technology" – which remains far more popular than innovation today – existed before that date, as did 'technological change'. However, in a matter of decades, technological innovation eclipsed other terms and became a dominant concept. Why the term of "technological innovation", when invention, machine and technology exist in the vocabulary already?

The 'technological' in technological innovation stands for goods. Theorists and others talk of technological innovation, but most of the time they are concerned with goods. Goods are named technology because they are either new invention (mechanization, automation, computerization) or means (processes, as it is called) to industrial production, or include a body of knowledge or research and development (R&D) and engineering. Yet, whether such a good having these above characteristics is a technology depends on how one defines technology. Technology as a body of knowledge has simply shifted, over the last century, to technology as a product (Schatzberg, 2006).

The 'innovation' of technological innovation stresses this aspect: innovation is the commercialization of a 'technology'. It stresses application. The emergence of the term 'technological innovation', despite what one might expect, has little to do with the useful arts or with inventors, at least not in the sense that we moderns understand technological innovation (Godin, 2016). To inventors of the eighteenth and nineteenth century, the word innovation had no connotation of the market and the commercialization of invention. What is missing among the inventors is any discussion of innovation in industry – unlike the discourses on the "mechanical arts", technology and applied science – as well as explicit references to manufacturing. At the time, innovation had little to do with market issues (artifacts or goods for the market). Artifact was only one of the many connotations of innovation. A different but then newly-coined word was used to talk of technological innovation: technology. Jacob Bigelow, Jacob Beckman and Charles Babbage, to name just the most studied writers of the nineteenth century on technology, as well as

dictionaries of techniques, arts and manufacture, make no use of innovation in the positive sense.

Technological innovation comes from a diversity of groups concerned with the application of science. After World War II, governments, engineers and managers adopted the concept of innovation and made it a strictly technological matter (Godin, Forthcoming-B). Engineers particularly may be considered the pioneering theorists in this sense. Innovation is more than research, so it is said. It is application (not invention), it starts with (social or market) needs (not research) and it is systemic (a "total" process that involves a diversity of people, not just scientists) (Godin, Forthcoming-A).

Technological innovation is a counter-concept to science – and more particularly to basic research – as a dominant cultural value of the twentieth century. Science was so dominant a value in the first half of the twentieth century that research was postulated to be the originator of innovation, so claimed the 'linear model of innovation' (Godin, 2017). This model comes from the very first theorist of technological innovation: the economic historian Rupert Maclaurin from MIT (Godin, 2008). Lately, technological innovation got in discourse, action and policy, because it was useful to include a large(r) number of people (than just scientists) and activities (besides science or basic research) that contribute to economic progress. Innovation is a *process* that includes several people and activities, so it is claimed. Science or research is only one step or factor in the process of innovation, and often not even a necessary step. As Jack Morton suggests: innovation "is not a single action but a *total* [my italics] process of interrelated parts. It is not just the discovery of new knowledge, not just the development of a new product, manufacturing technique, or service, nor the creation of a new market. Rather, it is *all* [our italics] these things: a process in which all of these creative acts, from research to service, are present, acting together in an integrated way toward a common goal" (Morton, 1971, p. 3-4). The concept of technological innovation represents a desire to enlarge the discourse on science – yet at the same time there is a restriction of innovation to the technological.

Innovation is action contributing to the practical, namely economic progress, while science is strictly mental and contributes only indirectly to innovation, when it contributes at all.

In sum, technological innovation sprang from a tension between science (for its own sake) and society, or aspiration to action. The century-old basic research/applied research dichotomy is concerned with or internal to science. It contrasts two types of scientific research. The twentieth century brought in a new pairing or dichotomy: (basic) research/innovation. The contrast is no longer internal to science, one between types of research, but between research and society. Innovation is contrasted to research, particularly basic research, for society's benefit. "The 1960's saw the emergence of a new awareness that research by itself does not provide direct answers to the problems faced in the practical world" (Havelock & Havelock, 1973). "Having a new idea and demonstrating its feasibility is the easiest part of introducing a new product. Designing a satisfactory product, getting it into production, and building a market for it are much more difficult problems … the technical innovators are men who not only have some scientific knowledge but who are also inspired to put it to work on every new idea that comes their way" (Morse and Warner, 1966: 15, 17). Research must be useful to society – through the marketplace.

The term technological innovation has a threefold discursive function. First, it serves social identity. Engineers and/as managers have used the term to get a place in a dominant cultural value of the twentieth century – science – and the policy (funding) of science. Technological innovation includes many other activities that just science or basic research. Technological innovation is a total process. Second, the term puts innovation on the political agenda and contributes to the shaping of national policy. Governments have made of technological innovation an instrument to industrial competitiveness, world leadership and national wealth. Third, the term is embedded in

an ideological or commonplace linguistic context. It serves the practical – as opposed to the purely mental or intellectual.

Social Innovation

From the very first theoretical thoughts on 'social innovation' in the twentieth century (e.g.: Drucker, 1957) to the most recent ones, social innovation, defined as "new ideas that work in meeting social needs" (Mulgan, 2007), has been presented as a new idea, or at least the interest in the idea is presented as new or relatively new. Some writers date the origins of the term to 1970 (Cloutier, 2003). Some suggest that Benjamin Franklin, Karl Mrrx, Emile Durkheim, Max Weber and Joseph Schumpeter had the "notion" already (Mumford, 2002; Hillier *et al.*, 2004; Nussbaumer & Moulaert, 2002; Ionescu, 2015). However, most often the 'newness' is taken for granted and is not documented. In fact, social innovation is regularly contrasted to technological innovation, and presented as a remedy for or adjustment to the undesired – or limited – effects of technological innovation (e.g.: Mesthene, 1969; Dedijer, 1984; Mulgan, 2007; Klein & Harrisson, 2007; Callon, 2007; Murray *et al.*, 2009). In this sense, the term social innovation would have appeared after that of technological innovation. In fact, one of, if not the oldest X-innovation form is social innovation. It amounts to an enlargement of the concept of innovation, from the religious to the political to the social and to the economy (Godin, 2015). The term dates back to the beginning of the nineteenth century – a time when 'technological innovation' did not exist in discourse.

In 1858, William Lucas Sargant (1809-1889), English businessman, political economist and educational reformer, published *Social Innovators and Their Schemes* (Sargant, 1858), a diatribe against those "infected with socialist doctrines" or "social innovators" as he called them – the French Henri de St-Simon, Charles Fourier, Louis Blanc, Pierre-Joseph Proudhon, Émile de Girardin, and the political economists including

Adam Smith – to whom welfare rather than work is the solution to social problems. To Sargant, social innovation amounts to innovation of a specific kind: socialism.

What is feared in a socialist scheme is particularly the threat to capitalism and property. In the late nineteenth century, many, including Sargant, defined social innovation specifically as the overthrow of private property and the abolition of an institution on which society has always rested. For example, in 1888 a popular edition of the *Encyclopedia Britannica* included a long article on communism which begins as follows: "Communism is the name given to the schemes of social innovation which have for their starting point the attempted overthrow of the institution of private property" (Encyclopedia Britannica, 1888, p. 211).

Rarely if ever did the socialists of the 1830-40s themselves made use of the word innovation to name their innovation (Saint-Simon, Fourier and Blanc, as well as Robert Owen in England), a situation they shared with inventors and 'men of science'. Innovation is too negative a word for that. The association between social innovation and socialism was first made by the followers rather than the originators of socialist ideas. 2 The critics, like political economists and some Christian writers, rapidly turned the term into a popular and pejorative one. Yet, this representation was only one connotations of the term. To others, including some Christian writers again, social innovation is social reform. "L'évangile, lors même qu'il ne serait pas le livre définitif de la parole divine, sera toujours le guide et le modèle du novateur social" [the gospel, although it is not the definitive book of the divine word, will always be the guide and the model of the social innovator] (Lechevalier, 1834, p. 538). In his *Cours de philosophie positive*, Auguste Comte praises Catholicism for the introduction of a system of general education for all, an "immense et heureuse innovation sociale" [great and happy social innovation] (Comte, 1841, p. 366).

The recent use or explosion of the term social innovation in the literature (its 'newness') is only a *resurrection*. The term re-emerged (in a positive light) in the last thirty years as a reaction to technological innovation and to the hegemonic discourses on

technological innovation. Social innovation is a counter-concept to technological innovation. Social innovation came to mean alternatives to established solutions to social problems or needs, that is, alternatives to technological (industrial) innovation and state or government-supported social reform. In this sense, residues of the nineteenth century's concept of social innovation as socialism are still inherent to the theories. To many scholars, the term is placed within a left-wing ideology, either explicitly or implicitly. Social innovation favours (should favour, to be so named) the non-institutional, the 'alternative' and the 'marginal'. The "community" and non-profit organizations are favoured sources of social innovation and the focus of many studies. Autonomy, liberty, democracy, solidarity and liberation are keywords that came into use in theories on social innovation. Social innovation is "democratic, citizen- or community-oriented and user-friendly"; it assigns significance to what is "personalized, small, holistic and sustainable"; its methods are diverse, not restricted to standard science and include "open innovation, user participation, cafés, ethnography, action research", etc. (Mulgan, 2007). Social innovation is not foreign to the idea of social reform, under a new name. Historically, social innovation is a further development of (and a reaction to) the concept of innovation as a pejorative category. One hundred fifty years ago, it served to make a contrast, a distinction, to other types of innovation. It emphasized something. To early critics, the purpose of 'innovation' in "social innovation" was to equate the 'social' or societal novelty (socialism) to innovation and label it as a pejorative category. To others, the 'social' in "social innovation" was to contrast it to other types of innovation or qualify the innovation: social innovation is innovation of a public or participative nature. It is distributive – and good. To most writers, the distinction is moral. This rhetorical practice has not changed very much today. The 'innovation' in social innovation serves to put (more) innovation into the social. The 'social' of social innovation serves to put the social (more social) into innovation.

CONTESTATION

In the 1980-90s, a series of new terms appeared that compete with social innovation as an alternative to technological innovation and continue the contestation of technological innovation as a hegemonic discourse. To make sense of this linguistic innovation, it is useful to distinguish the X-innovation according to the date of appearance (Table 1). Scholars began theorizing on X-innovation in the 1960s. X-innovation was then concerned with an object, like technology, industry, organization and education. In a second step, namely in c.1980-90s, new forms appeared that define innovation with adjectives: disruptive, open, frugal, responsible and sustainable. Certainly, adjectives existed for a long time in typologies of technological innovation: 1. major, revolutionary, radical, paradigmatic, systemic; 2. minor, incremental. But now an adjective rather than an object defines what innovation is. This has to do with the "quality" of innovation: we need a different type of innovation.

By way of an introduction to this special issue, we may stress two characteristics of what we call X-innovation, as they relate to the conceptual issues discussed above. Firstly, the "social" in X-innovation. On the one hand, namely on the input side – the process –, X-innovation emphasizes inclusion, namely the participation of the public in the deliberations from an early stage and in the decision process. Hence, X-innovation forms like inclusive innovation, democratic innovation and free innovation. On the other hand – the outcome –, X-innovation puts stress on ethical and environmental considerations. There is a moral imperative here. Innovation must be responsible and sustainable. There is also some "exotisation", like frugal innovation: see what Indians and Chinese are doing!

These characteristics are far from new. In the 1960s, what was then called the disenchantment or disillusion with (the effects of) technology led to discussions on "social needs" and "social demand" (Godin & Lane, 2013; Godin, Forthcoming-A). The Brooks report from the OECD is a perfect synthesis of the rhetoric of the time (OECD,

1971). To be sure, the report is concerned with technological innovation and how to change its character rather than how to replace it with completely new kinds of innovation, but the rationale is similar to X-innovation:

There is need to approach the question of the development of societies more comprehensively, going beyond exclusively economic considerations (p. 31).

The problems faced by our societies today constitute new challenges that can be met only by major technological and scientific efforts of different character than in the past (p. 43-44).

Governments of Member States should channel their technological policies into areas capable of producing alternative, socially oriented technologies, i.e. technologies capable of directly contributing to the solution of present infrastructural problems, of satisfying so far neglected collective needs, and finally of replacing existing environmentally deleterious technologies (p. 97-98).

Table 1.

X-Innovation
(with some early authors)

Oldest (an object)	Newest (an adjective/a metaphor)
Technological innovation (Maclaurin, Mansfield) *	Inclusive innovation (OECD)
Product/process innovation (Lorsch; Enos)	User innovation (von Hippel)
Industrial innovation (Myers, Freeman)	Free innovation (von Hippel)
Marketing innovation (Levitt)	Democratic innovation
Organizational innovation (Argyris, Hage, Zaltman) *	Common innovation (Swann)
	Open innovation (Chesbrough)
Educational Innovation (Miles, Carlson)	Hidden innovation
Political innovation (Walker)	Disruptive innovation (Christensen)
Social innovation *	Reverse innovation
	Frugal innovation
	Jugaad innovation
	Responsible innovation (von Schomberg; Owens)
	Sustainable innovation (Boons)
	Grassroots innovation
	Eco-innovation

* Another popular word used in place of "innovation" in these terms is "change".

In many ways, X-innovation is a re-articulation of the contestations of the 1960-70s. Certainly, the "social" issue is addressed differently today and the dimensions of innovation considered are broader than the OECD Brooks report suggested. On the one hand, the anticipation of impacts, or "technology assessment" as it was called in the 1970s, an one explain the pluralization of discourses on X-innovation as a phenomenon capable of achieving or trying to achieve what the contestations of the 1960s did not? In fact, the Brooks report had few hearing and no impact on policy-makers. 3 is still a major characteristic of "responsible innovation", for example. On the other hand, more issues are involved today in the discourses on X-innovation than the 1960-70s, like "sustainability".

A second characteristic of the new terms concerns the "innovation" in X-innovation. Innovation is not a concept exempt of ambiguity and, because of or thanks to this, the concept travels easily between disciplines and different publics. There is a similar ambivalence in the meaning of X-innovation. "Sustainable innovation" is a good example.

There is first the *environmental* sense of "sustainable innovation". Undoubtedly, this sense is the most prevalent. "Sustainable innovation" is innovation that has superior ecological performances. But "sustainable innovation" also has a *business* sense that ignores environment sustainability. Sustainable innovation in this sense is a lasting innovation that allows a company to make ongoing profits. Another meaning within this business sense is "sustainable innovation" as the potential for a firm to renew and repeat its marketing of new products. This amounts to permanently flooding the market with novelties (Godin & Gaglio, Forthcoming).

Responsible innovation is another example of conceptual extension that gives a place to newcomers in discourses of innovation. The term suggests that innovation hitherto has been irresponsible, or at least not explicitly responsible. Innovation should be governed more democratically. This conceptual link between responsibility and innovation gives additional stakeholders a stake in the innovation discourse – e.g. various

publics, users, or politics – and pitches them against traditional ones. Likewise, it allows disciplines more concerned with ethics and morality rather than with the market, like STS, to re-cast themselves as a domain crucial to innovation.

CONCLUSION

From a historical point of view, X-innovation is the latest step in the enlargement of the concept of innovation. The enlargement began with *religion* in the sixteenth century. From the very beginning of the Reformation, ecclesiastical authorities started using innovation against the contestant of orthodoxy. Every opponent to innovation – puritans, ecclesiasts, royalists and pamphleteers – regularly repeated the admonitions of royal and ecclesiastical authorities in support of their own case against religious innovators. This was only the beginning. Soon the meaning of innovation was to be enlarged to the *political*. The monarchists of the seventeenth and eighteenth centuries accused the republicans of being "innovators". No republican – no citizen in fact, even the most famous Protestant reformers or the French revolutionaries – thought of applying the concept to his own project. Innovation is too bad a word for this. In contrast, and precisely because the word is morally connoted, the monarchists used and abused the word and labelled the Republican as an innovator. In a second step, innovation widened its meaning to the *social* in the nineteenth century innovation. The social reformer or socialist is called a "social innovator". As a third step, over the last century innovation widened its meaning to the *economic* and gave rise to thoughts on industrial or technological innovation.

As scholars began studying innovation in the twentieth century, they also enlarged the meaning of innovation. First, from the negative to the *positive*. Innovation is no more a vice but a virtue. Early studies concentrated on the *individual* as innovator (or laggard), like rural sociologists did. Then, scholars began looking at *organizations* as innovative. And then, cultures or whole *nations* were studied as being innovative too.

X-innovation is the latest step in this process of enlargement. Scholars appropriate a concept in order to contest its then-current use and re-invent innovation. They coin new brands, thus giving a new social life to a concept that, in the light of a hegemonic representation, defines the political agenda and fills the social sciences literature. Innovation is a concept so rich in meanings that anyone can appropriate it to their own end or contest it in the name of other goals.

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Disruptive Innovation and the Idea of Technology

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ABSTRACT

From its obscure origins in management theory, disruptive innovation has become one of the concepts used to describe how networked digital technologies and platforms transform industries and institutions. In this paper, I will examine how contested, and at times incommensurable, iterations of disruptive innovation share a similar idea of *technology*. Drawing upon discourses of disruptive innovation from management theory, institutional policies, and popular culture reveals a shared idea of technology whose characteristics include a reified idea of *technology* and a horizon of expectations in which fear of falling behind influences ideas about technological change.

Keywords: Disruptive Innovation; Technology; Conceptual History; Fear; Reification.

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INTRODUCTION

Disruptive innovation has captured the contemporary technological imagination. The term, or more precisely the theory of disruptive innovation, was developed in the mid-1990s by business professor Clayton M. Christensen to explain why successful, competitive, and well-managed firms fail when confronted with technological change (Bower & Christensen, 1995; Christensen, 1997; Christensen & Rosenbloom, 1995). In the time that has passed since then, disruptive innovation has moved beyond its business school origins and is now widely applied across a variety of initiatives. It is championed as a solution for the problems that plague educational institutions (Eryring & Christensen, 2011; Sims, 2017), health care (Hwang & Christensen, 2008; Sharon, 2016), and legal systems (Pistone & Horn, 2016). It is a useful policy tool for proponents of deregulation and market expansion (Christensen, Craig & Hart, 2001), it is used to promote circular economies and transitions to cleaner energy (Tyfield, 2018), and critical social theorists use it to advance the project of a new post-capitalist political economy (Mason, 2015).

Popularity and inclusivity, though, has its critics. Foremost amongst these are business professors and management theorists, who, like all academics, become exasperated when terms and concepts from their specialized fields are used incorrectly. Joshua Gans (2016) describes "the angst" he feels at the misapplication of disruptive innovation: "…use of the term has gotten out of control. Everything and everyone can supposedly be disruptive. Moreover, everyone is supposed to become disruptive…none of these notions are obvious or obviously true" (vii). Christensen similarly bemoans the sloppy inclusivity of his theory: "disruption theory is in danger of becoming a victim of its own success…the theory's core concepts have been widely misunderstood and its basic tenets frequently misapplied…too many people who speak of "disruption" have not read a serious book or article on the subject" (Christensen, Raynor & McDonald, 2015, p. 46). Reading these complaints, the message is clear: disruptive innovation should be studied and applied carefully so as to not contradict its formal theorization. Unintentionally, these

complaints convey another message: what began as a somewhat obscure management theory has moved beyond its business school origins and is now one of the concepts used to describe processes by which networked digital technologies and platforms are endowed with the capability to transform what are seen as anachronistic and inefficient industries and institutions. As a concept, disruptive innovation is intertwined with technology; but, as I suggest in the following, technology in this case does not refer any particular artifact, but rather an idea of technology. As the semantic field of disruptive innovation grows, it has become a framework through which to conceptualize technology. Following the philosopher of technology Andrew Feenberg (2017) who asks "what we do when we envisage the world with a technical intention" (p. 137), I contend that disruptive innovation is a way to envisage the world with a specific technical intention that is distinct from other conceptual engagements with technology, such as sustainability, conservation, or responsibility. If Gans and Christensen are correct in recognizing an almost ubiquitous "disruptive imperative," then the expansion of the term's semantic field, and in particular the idea, or concept, of technology found within it, is as important as debates concerning theoretical fidelity or methodological consistency.

The concept technology, as historians and philosophers have demonstrated, refers to both material artifacts and, borrowing a term from Hans Robert Jauss (1982), a horizon of expectations through which these artifacts are endowed with meaning (Herf, 1984; Kline, 1995; Long, 1991; Marx, 1997; Oldenziel, 1999; Schatzberg, 2006; Schatzberg, 2012). Examples of this include the idea that technologies are essential "male," (Oldenziel, 1999; van Oost, 2003; Schatzberg, 2012) or that technology in and of itself is an indication of progress (Marx, 1997; Oldenziel, 1999). Disruptive innovation, in this sense, performs a hermeneutic function in relation to technology; it is a background of assumptions and attitudes through which technology is thematized and made meaningful, providing a context that directs technological society towards particular ends while simultaneously foregoing other ends. This is similar to the hermeneutic function that intellectual property

performs. As Pamela Long (1991) writes, the development of intellectual property endowed the practice of material invention with particular meanings, including proprietary attitudes towards craft knowledge, the notion that invention is a product of individual ingenuity and genius, and an a priori assumption concerning the commercial value of new technical goods. In this way, the idea of intellectual property directs attitudes and expectations about technology towards particular ends (possessive individualism and the financial incentivization of invention) while foregoing other ends (communal ownership of craft knowledge and invention). It is not insignificant, then, to claim that automation is disrupting the labour market or that Google's foray into health care is disruptive or that Uber is disrupting the taxi industry because in these and many other instances, different sets of shared understandings and expectations regarding technology are drawn upon to explain complex processes through one handy and self-explanatory concept: disruptive innovation.

The following paper attempts to draw out characteristics of this particular concept of technology by first examining in more detail the history and formal theorization of disruptive innovation and explaining its expansion from management theory to popular culture. Moving away from debates about theoretical consistency, I will draw out two characteristics of technology that can be found across both the formal theorization and the popularization of disruptive innovation. First, I point to a characteristic that is co-original with the concept of technology itself – reification. Reification is a complex idea that is realized in a variety of ideas about technology, including attitudes about the inevitability and autonomous trajectory of proposed disruptive technological and the practice of understanding technology by reducing it to function. The reification of technology, though, is not restricted to disruptive innovation. What is unique to disruptive innovation, though, is an idea of technology that is intertwined with fear, and in particular, the fear of falling behind amidst accelerating technological change. To draw out this notion of fear in more detail, I turn to different examples, including ride sharing platforms,

the French-German Joint European Disruptive Initiative, and Clayton Christensen's empirical work on the disk drive industry. Across these different articulations of disruptive innovation, I argue, is a sociotechnical horizon of expectations in which the fear of falling behind as a response to a rapidly changing technological environment contributes to a hermeneutic framework through which technology, and our engagements with it, are made meaningful. I conclude by suggesting that disruptive technology need not be our fate and that recognizing contingent ideas of technology can open up discursive moments of contestation.

DISRUPTIVE INNOVATION: FROM OBSCURITY TO UBIQUITY

The term, or more precisely the theory of disruptive innovation, was developed in the mid-1990s by business professor Clayton M. Christensen (Bower & Christensen, 1995; Christensen, 1997; Christensen & Rosenbloom, 1995). It originated out of case studies that were used to explore why successful, competitive, and well-managed firms failed when confronted with technological change. Successful incumbent firms, Christensen argued, tended to focus on their most profitable customers and so developed "sustaining" technologies that improved products for existing customers: more comfortable seats in trains or on airplanes, increased horsepower in car engines, washing machines with more cleaning features, or phones that take better photos. Sustaining technologies, Christensen writes, can be characterized by a trajectory of technological development that is plotted along a rate of improvement measured against the functional attributes of existing products, enabling a predictable trajectory of improvement towards which innovations should aim (Bower & Christensen, 1995; Christensen, 1997; Christensen, Craig

& Hart, 2001).[1] By prioritizing existing attributes, sustaining technologies tend to overshoot the needs of their consumers. An automobile that can exceed 300km/h, for example, unnecessarily exceeds what is needed.

In theory, developing sustaining innovations is what good firms are supposed to do to increase profits and stimulate growth: listen to customers and improve existing products to better serve those customers. Yet, as incumbent firms focus on improving their products and services for their most demanding and most profitable customers, they failed to meet the needs of other non-consumers: people who don't drive or travel on airplanes or who don't own washing machines or smartphones. This is where disruptive technologies, or disruptive innovations, enter. Entrants that prove disruptive begin by successfully targeting overlooked non-consumers and delivering similar functionality that incumbents do with technologies that tend to be cheaper, smaller, less durable, and more convenient. Incumbent firms, chasing higher profitability, tend not to respond to these entrants. Entrants then move upmarket, delivering the performance that incumbents' mainstream customers require, while preserving the advantages that drove their early success, like lower prices or greater convenience. When mainstream customers start adopting the new products of new entrants in volume, disruption has occurred.

An example of disruptive innovation comes from the photocopier industry. In the early days of photocopying machines, Xerox dominated the market by charging high prices for cumbersome machines that were purchased by large businesses and corporations. The trajectory of technological change was directed towards sustaining innovations that catered to the needs of these customers, such as increasing the number of pages copied per minute. The consequence of this was that individuals and groups such as small businesses and community organizations were priced out of the market and so were

[1] Christensen's ideas on technological trajectories are taken from Giovanni Dosi's (1982) work on technological paradigms, see Christensen & Rosenbloom (1995).

forced to use mimeograph machines or carbon paper. In the late 1970s, new firms introduced personal photocopiers that were smaller, cheaper, less reliable, and more convenient, which led to a new market. Although these machines were technically inferior to Xerox's machines, as the market grew, personal photocopiers became increasingly better and began to challenge, or disrupt, Xerox's dominance of the photocopy machine market (Christensen, Raynor & McDonald, 2015, p. 47).

The case of Netflix and Blockbuster is perhaps more relevant for contemporary articulations of disruptive innovation that refer to digital networked digital technologies and platforms. Netflix began in 1997 on the wave of a new technical format, DVDs, which were smaller and lighter than VHS tapes. This enabled Netflix to use a combination of online tools and postal delivery instead of a bricks and mortar retail outlet. At this time, Netflix was a niche service that appealed to non-users of Blockbuster, largely those who did not have access to retail outlets or cinephiles who were not satisfied with Blockbuster's emphasis on new releases of mainstream popular films. In the early 2000s Netflix changed their business model to a subscription-based service that allowed consumers to pay a flat monthly rate allowing them access to all of the films they wanted without late fees. Blockbuster did not consider the customers who were drawn to Netflix and instead focused on sustaining innovations for their existing, and most profitable, customers who wanted new releases and other impulse purchases. Sustaining innovations, in this case, were an increase in the quantity of new releases and even guaranteeing their availability. Disruption occurred when Netflix shifted to an online streaming service built on its subscription model. Very quickly, Netflix captured a market that was once dominated by Blockbuster (Christensen, Raynor & McDonald, 2015, p. 48-49; Gans, 2016, p. 13-22).

These descriptions, although useful for understanding the theory of disruptive innovation, fail to explain how a management theory become a catch-all term that seems uniquely suited to describe the shift towards using big data, personalization, and

analytics to transform existing ways of producing, distributing, and consuming goods and services. The shift from management theory to popular culture occurred due to two interrelated changes. First, the theory became analytically refined in its description of disruption by distinguishing between disruptive innovations that enter markets through low-end footholds (providing a 'good-enough' product to customers who cannot afford the products of the incumbent firm nor do they require the performance of these products) and new-market footholds (creating a market where one did not exist before, finding a way to turn non-consumers into consumer) (Christensen & Raynor, 2003). This distinction widened the scope of the theory's potential application. Second, and more significantly, disruptive innovation changed its orientation from something to be defended against into a strategy that could be used for economic, political, or philanthropic success (Christensen, 2006). In its original form, the theory developed out of case studies that explained why successful and well-managed companies fail when confronted with technological change. In this sense, Christensen situated his theory within the context of protecting successful companies against disruptive technologies while also pointing out how these same firms could leverage disruptive technologies for their own success (Bower & Christensen, 1995, p. 1-53). At the beginning of the twenty-first century, Christensen realized that a focus on disruptive technologies led to anomalies in his observations and he recognized that success or failure was not "a technological problem; it was a business model problem" (Christensen, 2006, p.43). As a business model, disruptive innovation allowed the theory's proponents to turn their attention away from defending firms against disruptive innovation towards strategizing how to succeed through disruptive innovation. As a management strategy and a business model with an increased scope of application, disruptive innovation became much easier to apply.

Given the ease with which artifacts and processes are termed disruptive, wariness and critique can be expected. In its more simplistic iterations, disruptive innovation is written

about with an aura of inevitability wherein every industry or institution – from education to health care to culture – will become disrupted through networked digital technologies.[2] Wide spread popularization has resulted in increased empirical scrutiny of its accuracy and robustness which has led to questions about the methodological foundations of Christensen's inductive reasoning. Historian Jill Lepore (2014) critiqued Christensen's method of "handpicked case studies" as a "notoriously weak foundation on which to build a theory," and after reviewing his case studies found that his sources "are often dubious and his logic questionable." Researchers in management theory have also found Christensen's reasoning questionable, noting that of the 77 cases used by Christensen and Raynor (2003) to demonstrate disruptive innovation, only 7 cases (9%) contained all of the elements of disruptive innovation (King & Baartartogtokh, 2015; see also Kitroeff, 2015).

Disruptive innovation can also be dismissed as empty rhetoric used to dress up old-fashioned ideas about the triumph of technological progress for contemporary neoliberal ambitions. From this perspective, the term disruptive innovation may be new, as are the sociotechnical processes and changes that are typically associated with it, but the attitudes, assumptions, and ambitions that correspond with disruptive innovation are not bound to its contemporary usage. In *The Communist Manifesto*, Karl Marx and Friedrich Engels (1994 [1848]) describe the nineteenth-century capitalist labour process in terms that today's disruptive innovators could easily claim as their own: "Constant revolutionizing of production, uninterrupted disturbance of all social conditions, everlasting uncertainty and agitation distinguish the bourgeois epoch from all earlier ones" (p.161; see also Berman 1982). Other variations of disruptive innovation include Joseph Schumpeter's (2010 [1943]) idea of creative destruction, which foreshadowed the same microlevel disruptive processes "discovered" by Clayton Christensen in the 1990s

[2] This is evident in book titles like The Laws of Disruption: Harnessing the new Forces that Govern Life and Business in the Digital Age (2009).

at the macrolevel. Beyond political economy, hints of disruptive innovation can be found in the ideas of the Italian Futurists, who sought to integrate the logic of machinery into all traditional art forms, which were stale, decadent, and in need of replacement.[3]

Given these critiques, it would be easy to dismiss disruptive innovation as the latest in a list of promotional buzzwords such as "game-changer," "cutting edge," "next generation," and "out-of-the-box." Yet, empirical shortcomings and ease of applicability should not be mistaken as evidence of the term's superficiality. The significance of disruptive innovation is its alignment with a particular concept, or idea, of *technology*. The widespread applicability of disruptive innovation to describe a number of artifacts and technically mediated processes, in this regard, is useful because it allows one to cast a wide net to better draw out the demarcations and boundaries that are contributing to a redefinition of *technology*. In what follows I explain in more detail the work of historians and philosophers who have traced the semantic and artifactual bounding processes that correspond with the idea of *technology*. Following this, I examine in more detail what it means to consider *technology* through the concept of disruptive innovation.

THE IDEA OF TECHNOLOGY

The English word *technology* absorbs what in many other languages is a combination of two words: technique and technology. As Michel Serres (2015) points out for his English readers, "The French language distinguishes between *techniques* and *technologies*. Very generally, a technique is the practice of fabrication, whereas technology (from the Greek *tekhnė*, technique, and *logos*, discourse or study) is a discourse about techniques" (p. 44; see also Schatzberg, 2006, p. 489). True to its etymological and semantic heritage,

[3] Just as the more enthusiastic proponents of disruptive innovation celebrate the increasing speed of digital networks and come to view the past as a hindrance to their version of progress, the Futurists wanted to "destroy the cult of the past, the obsession with the ancients… (Boccioni et. al. 1910 [1973], p. 26)," and announced that they "will destroy the museums, libraries, academies of every kind (Marinetti, 1909 [1973], p. 22)." As Marshall Berman (1982) writes, "There are no ambiguities here: tradition – all the world's traditions thrown together – simply equals docile slavery, and modernity equals freedom; there are no loose ends" (p. 24).

technology first appeared in English in the seventeenth century in reference to "a kind of learning, discourse, or treatise, concerned with the mechanical arts" (Marx, 1997, p. 966). Until the end of the nineteenth century, the objects of study that today would be referred to as technology went by terms such as machinery, art, applied science, applied arts, useful arts, and craft. By the early twentieth century, *technology* had supplanted these terms:

> …before 1930, issues that historians now discuss in terms of technology were framed in such terms as useful arts, manufacturing, industry, invention, applied science, and the machine. In other words, when historians now address 'attitudes towards technology' before 1930, they are employing an analyst's category not used by the historical actors themselves (Schatzberg, 2006, p. 486).

The introduction of *technology* to account for these objects and practices was not an innocent endeavor. This was a semantic and artifactual bounding process. *Technology* cemented the exclusion of artistic and craft knowledge from industrial modernity (Schatzberg, 2012) and contributed to a gendered ontology of what counts as *technology* and what does not. As Ruth Oldenziel (1999) argues, *technology* became the exclusive purview of (white) men as quilts, corsets and other objects traditionally associated with women were relegated to the status of "craft," thus removing these objects and activities from the privileged realm of modern technology. Omitting the objects produced by artists and craftspeople from the scope of *technology* corresponded with the privileging of professional engineers as the sole producers of technology, effectively fixing its artifactual dimension to large machines and sociotechnical systems like dams, railways, and other technological projects that were the purview of engineers (Marx, 1997; Oldenziel, 1999; Schatzberg, 2002). Railways, dams, and airplanes, which were demonstrated as technological marvels in the early twentieth century, no longer seem to register as *technology*. In the early twenty-first century, the case of disruptive innovation can be used to examine how contemporary semantic and artifactual distinctions are being constructed and performed.

Artifactually, disruptive technology, or more colloquially tech, refers to digital networked technologies that use increasing processing speeds, big data, personalization, and analytics to transform existing ways of producing, distributing, and consuming goods and services. Digital platforms like Uber, which are often pointed to as disruptive innovations, are impossible without smartphones, digital networks, and a myriad of algorithms that rank, rate, personalize, and track the experience. A European Research Council (ERC) call for research funding titled "Transformative Impact of Disruptive Technologies in Public Services" is also telling in this regard. Independent of any formal theory of disruptive innovation, the ERC points to objects and processes such as block-chain, Internet of Things, AI, and big data analytics that, by virtue of their disruptive potential, are defined as technology.[4]

Artifacts and the processes that they mediate, though, do not constitute the extent of *technology:*

> Although in common parlance nowadays this material aspect is what the concept of *technology* tacitly refers to, such a limited meaning… is ambiguous and misleading… the artifactual component only constitutes a part of the whole system (Marx, 1997, p. 979).

For Marx, *technology* is not simply a collection of artifacts, but also the contexts through which those objects defined as *technology* are made meaningful. And, just as the artifactual scope of *technology* is contingent, so too is the hermeneutic dimension. *Technology* has included ideas about progress, standards and measures of civilizational and cultural superiority, and more recently, more sober expectations of the social benefits (and costs) of technology (Marx, 1994; Oldenziel, 1999). In what follows, I begin to trace the hermeneutic dimensions of disruptive *technology* by looking at how

[4] Available at: http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/dt-transformations-02-2018-2019-2020.html (Accessed 16 June 2019).

reification and fear shape the horizon of expectations through which technical intentions are realized.

REIFIED *TECHNOLOGY* IN THE ERA OF DISRUPTION

From its origins in Marxist theory, reification in relation to technology refers to the objectification of capitalism in the design of so-called neutral technologies (Feenberg, 2002; Lukacs, 1973 [1925]).[5] Marx, for example, demonstrated this through reference to cases in which the interests of capital to increase surplus-value influenced the trajectory and design of "neutral" or "objective" machines. In response to the legal restrictions on the length of the working day, for example, capital seeks to compensate itself, "by a systematic heightening of the intensity of labour, and to convert every improvement in machinery into a more perfect means of exhausting the workman" (Marx, 1954 [1887]), p. 393).

A recent critique of disruptive innovation points to a similar process of reification in which an activity (hailing a taxi) is decontextualized from a complex network of people, organizations, knowledge, and history and reduced to a technical function:

> What tech enthusiasts call "disruption" is in fact almost always directed at forms of organization that preserve a modicum of workers' control over knowledge and the products of labor. Because London taxicabs are controlled by people who have built up impressive maps of one of the world's most complex cities in their brains, they ought to be replaced by self-driving cars operating on Google maps…automation isn't a neutral, inevitable part of capitalism. It comes about through the desire to break formal and informal systems of workers' control – including unions – and replace them with managerially controlled and minutely surveilled systems of piecework (*After Capitalism*, p. 10).

[5] The philosopher Herbert Marcuse (1964) wrote that modern technology, "has become the great vehicle of reification – reification in its most mature and effective form. The social position of the individual and his relation to others appear not only to be determined by objective qualities and laws, but these qualities and laws seem to lose their mysterious and uncontrollable character; they appear as calculable manifestations of (scientific) rationality" (p. 168-169). Philosopher of technology Andrew Feenberg (2014) complements these insights about reification: "Existing science and technology cannot transcend the capitalist world. Rather, they are destined to reproduce it by their very structure. They are inherently conservative, not because they are ideological in the usual sense of the term…but because they are intrinsically adjusted to serving a social order that ignores potentialities and views being as the stuff of domination" (p. 180).

Reification has been intertwined with the concept of *technology* since the concept was first developed in the 1930s and continues today through contemporary discourses of disruptive innovation in which technologies are decontextualized from messy social and historical relations and reduced to pure function. Function, in turn, is taken to be the autonomous driver of new and emerging sociotechnical relations that are decontextualized from the rich web of culture and history that permeates our everyday lives. Again, referring to ride-sharing platforms, Eric Schmidt, the former executive chairman for Google, argues in a short essay titled "Embracing a New Digital Era in Europe" that:

> Europe needs to accept and embrace disruption. The old ways of doing things need to face competition that forces them to innovate. Uber, for example is shaking up the taxi market – for the good. It offers riders convenience and cheaper fares, Understandably, the incumbent taxi industry is unhappy.[6]

Schmidt presents a definition of transportation in which it is reduced to the functional capabilities of software applications oriented towards more convenience and cheaper fares for consumers. Questions about regulations that guarantee passenger safety or labour relations that aim to provide security for drivers are not accounted for because these questions fall outside the scope of technical function.[7]

The work of Christo Sims (2017) is also interesting in this regard. Through an ethnographic study of New York's "Downtown School," which was lauded as a technologically cutting-edge philanthropic intervention to disrupt education for the twenty-first century, Sims discovered that concrete attempts to realize disruptive innovation reified class and power relations through reliance on deterministic notions of technology's social autonomy. Embedded class and race relations were not accounted

[6] This essay is part of a series that was sponsored by the European Commission called Digital Minds for a New Europe. Available at: https://lisboncouncil.net/publication/publication/118-digital-minds-for-a-new-europe-.html (Accessed 16 June 2019).

[7] Uber, for example, was banned from London because it failed to meet regulations concerning a "fit and proper" transportation service. As was reported by Transport for London, the regulating body for transport in the city, "Uber's approach and conduct demonstrate a lack of corporate responsibility" in relation to reporting serious criminal offences, obtaining medical certificates, and driver background checks.

for by those who argued for technical fixes for educational problems. Studied in messy and complex real-world settings (especially public institutions like schools and hospitals), it becomes obvious that disruptive innovations are co-constituted with, not distinct from, embedded power relationships regarding class, politics, and socio-economic status.

FEAR AND DISRUPTIVE TECHNOLOGY

The idea of reification resonates across many different concepts of *technology* from the 1930s to today. What is unique to a disruptive conceptualization of *technology* is fear. The connection between fear and disruptive innovation has been pointed out by Joshua Gans (2016) who writes that, "following the dot com bust and 9/11, the world's managers were receptive to a message of fear." Jill Lepore (2014) also recognizes this dimension of disruptive innovation, noting that it is, "…competitive strategy for an age seized by terror… It's a theory of history founded on a profound anxiety about financial collapse, an apocalyptic fear of global devastation." There is much that can be taken from this culture of fear. Lepore's insights, for example, draw out an idea of history implicit in the theory of disruptive innovation in which continuity with the past is subsumed within an intense present of complex and inscrutable forces continually disrupting any collective understanding of history.

In the following, I want to use the insights of Gans and Lepore as a starting point from which to develop more analytical clarity by drawing out a distinct variation of fear. Fear, after all, plays different roles across different ideas of technology: fear of losing human agency and independent thought against an autonomous technology (Heidegger, 1977 [1953]; Marcuse, 1964; Winner, 1977), fear of technology's existential threats (Bostrom, 2014), and fears of unintended consequences (Jonas, 1984), to name only a few. In the case of disruptive innovation, it is a fear of falling behind that shapes, and is shaped by, expectations of technological development and the pace of technological change.

The essay "It's Time to Disrupt Europe" (Chatterjee, 2014), which was collected alongside Schmidt's pleas for Europe to embrace disruption, begins with an ominous warning that "Change is not a luxury but mandatory. The alternative is significant loss leading to oblivion." Concretely, this is manifested in a number of different cases, such as when municipalities and cities feel compelled to invest in technologies considered disruptive, such as blockchain or autonomous vehicles, on the premise of not falling behind. Similarly, the narrative of the "New York Times Report on Innovation" (2014), which drew heavily on the theory of disruptive innovation, begins with the claim that "we are falling behind at the art and science of getting our journalism to readers" (p. 3). This fear of falling behind, though, does not exist in a vacuum; it is a response to, in this case, a frantic media landscape: "the pace of change is so fast that solutions can quickly seem out of date" (p. 58).

The Joint European Disruptive Initiative (JEDI), a French-German public-private initiative, exemplifies this fear of falling behind alongside an intense pace of technological change. JEDI was promoted as providing the resources for what its director André Loesekrug-Pietri calls "moonshots," high-risk and high-reward technological breakthroughs that require public funding so as to not be subjected to unpredictable market forces or policy changes; or, as Loesekrug-Pietri put it in a speech before the working group designing a new Élysée Treaty, "projects that are massively risky but that could potentially completely disrupt an industry and/or lay the technological foundations for a completely new sector."[8] The motive behind these ambitions can be read in the declarations of its proponents: "Europe is losing footing on all fronts…time is of the essence and the goal is to stay ahead of the game rather than follow where others lead…Disruption used to be luxury. Today it is essential to survive."[9] The rhetoric of fear is intertwined with a mindset of accelerated sociotechnical Darwinism in which speed,

[8] Available at: https://www.bundestag.de/blob/556394/ff7f0a1f37e43041096 1b15ceb58e2b4/3--jedi-en-fr-data.pdf (Accessed 16 June 2019).

[9] These quotes are taken from Loesekrug-Pietri's speech before the working group designing a new Élysée Treaty

anxiety, and intensity are necessary for survival. While Loesekrug-Pietri announces that "What matters is speed…be the one that sets the speed and you will set the norms. If Europe doesn't change its rhythm it will become irrelevant," French President Emmanuel Macron pushes for an imperative to move fast so as to not be left behind, "we are not in the middle ages, we are in the global race."[10]

It would be difficult to claim that JEDI (or many other contemporary articulations of disruptive innovation) adheres to the original theorization of disruptive innovation. Yet, there is not a complete and total break with Christensen's work occurring across these disruptive initiatives. Both formal and informal theories of disruptive innovation share an idea of technology that can be found in the empirical work upon which the theory was first developed.

The theory of disruptive innovation grew out of Christensen's interest in why smart, successful, competitive firms fail. He addressed this question through the hard disk drive industry because the rate of change in this industry was so fast and so unrelenting that one could study business cycles over months that in other industries would take years: a kind-of drosophila for management theorists. Christensen's original hypothesis was that the disk drive industry consisted of firms that, although successful, inevitably failed because they could not keep up with the pace of technological change. Christensen called this the technology mudslide hypothesis: "coping with the relentless onslaught of technology was akin to trying to climb a mudslide raging down a hill. You have to scramble with everything you've got to stay on top of it, and if you ever once stop to catch your breath, you get buried" (1997, p. 8). Research revealed that this hypothesis was incorrect. Neither the pace nor the complexity of technological change led firms to fail. In some cases, incumbent firms not only managed to stay on top of technological change, but also managed to prosper and grow when confronted with change. However, in other

[10] Available at: https://www.bloomberg.com/news/articles/2018-03-27/european-technology-irrelevance-feared-as-u-s-china-dominate (Accessed 16 June 2018).

instances of technological change these same firms to failed. The problem was not technological change per se, but distinguishing between sustaining and disruptive technological change. In the disk drive industry, markets where technological change was characterized as sustaining, incumbent firms tended to prevail. When disruptive technologies were introduced, these same firms tended to fail (Bower & Christensen, 1995; Christensen, 1997).

In the disk drive industry, customers valued memory and processing speed and so sustaining innovation were directed towards increasing and accelerating these functions. In the late 1970s disk drive industry, the market was dominated by firms that produced 8-inch drives with storage capacities between 10 and 40 MB (which increased along a trajectory of 40% MB per year). The consumers of these disk drives were manufacturers of minicomputers, objects that because of their price and size were largely restricted to consumers such as the state, industry, and universities. In 1980, a 5.25-inch drive was introduced that had a storage capacity of 5 to 10 MB, which were of no use for minicomputer manufacturers who, following a trajectory of sustaining technologies, required 40 to 60 MB drives at this time. The 5.25-inch drive, though, had attributes (size, price) that appealed to a new market, personal computer manufacturers. In this case the 5.25-inch drives "offered a different package of attributes valued only in emerging markets remote from, and unimportant to, the mainstream" (p. 16). In time, firms that manufactured 8-inch drives were supplanted by firms that manufactured the 5.25-inch drives because the memory capacity of these latter drives improved such that customers of the 8-inch drive found the 5.25-inch drive more appealing (Christensen, 1997, p. 20-21).

Over the course of the past twenty years, Christensen has refined his theory in different ways. What has stayed the same, though, is Christensen's "technological mudslide" hypothesis. Although his original instincts about how firms dealt with this mudslide were incorrect, the assumption that the landscape of technological change

could be equated with a mudslide remained consistent across the theoretical history of disruptive innovation. By selecting the disk drive industry as the basis of a theory of technological change, Christensen built his theory on the presumption that the pace of technological change is not only fast, but, in his own words, "pervasive, rapid, and unrelenting" (1997, p. 3). This assumption, which has had had a decisive influence on contemporary decisions and attitudes about technology, has become normalized across different articulations of disruptive innovation, contributing to an idea of *technology* in which fear of falling behind or being left behind has emerged as the logical, and necessary, corollary to these expectations about the pace of technological change.

CONCLUSION: CONTESTING DISRUPTIVE *TECHNOLOGY*

Considering the idea of technology as an object of study may seem a holdover from the more obscure ends of metaphysical speculation. However, work by conceptual historians and philosophers of technology has pushed scholarship towards more empirical ends through an attention to the processes by which particular artifacts become categorized as technology. This research demonstrates that there is no inherent distinction between those objects that count as technology and those that do not, nor is there any inherent distinction between those vocations or types of knowledge that are valorized as technological and those that are not.

The concept of disruptive innovation can serve as a useful heuristic through which to trace the outlines of the artifactual and bounding processes that have shaped new ideas about technology over the past decade. Artifactually, technology is not what it was when the concept was developed nearly a century ago. Railways, dams, airplanes, and bridges no longer seem to count as technology. A loose survey of recent headlines categorized as technology in newspaper refer to Google, self-driving cars, emojis, hacking, cyber-security, twitter, bitcoin, uber, foodtech startups, Spotify, Silicon Valley, smart houses, Facebook, and Snapchat. The idea of technology, as I have attempted to argue in the

preceding paper, is not only artifactual, but also refers to the question of what we do when we envisage the world with a technical intention. Examining disruptive innovation in this way allows for insights that move away from debates about theoretical consistency or cynical remarks intended to deride the concept in order to better trace the intentions and expectations that precede our engagements with technical artifacts and technically mediated processes.

Any specific ideas of technology, though, need not be our fate. Technology is contingent at both the hermeneutic level and the level of design. Recognizing how an idea of technology emerges through the development of a concept like disruptive innovation can be the starting point to begin thinking about technology in ways the prioritize fears other than falling behind technological change.

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Social innovations as a repair of social order

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ABSTRACT

The paper addresses social innovation both as a mode and as a means of social change. It draws on the recent developments in the sociology of repair to offer a critical reading of pro-innovation discourse on the level of EU policy. It is argued that the practices and concepts of social innovation on the level of EU policy can be fruitfully reframed within a repair narrative, whereas the proliferation of the buzzword social innovation warrants a closer look from an innovation studies perspective. Connecting both repair and innovation studies thus offers a more nuanced understanding of current societal transformations and adds to the conceptual discussion of social change and social order.

Keywords: Social Innovation; Social Change; Social Order; Repair; EU Policy Discourse.

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INTRODUCTION

Social innovations have become a popular topic in academia as well as in politics (Moulaert *et al.,* 2013). The concept of social innovation entered the academic discourse in the 1960s and became increasingly popular in the political discourse of the EU, USA and Canada from the 2000s onward. As theoretical concept and political instrument, social innovations are full of promise, either for understanding the dynamics of social change or for adapting to societal transformations and challenges. They combine academic scholarship with political discourse and societal participation. Social innovations are also linked with related terms, such as social entrepreneurship, social challenges, social experiments, social technologies, social engineering, and, of course, social change. A look at the literature quickly reveals that the term social innovation spans across diverse understandings and uses (Edwards-Schachter & Wallace, 2017).

The origins of an analytic understanding in the social sciences bear close ties with issues of social change, e.g., when social innovations are sparked by the ongoing need to address human problems or when sustainable modes of change are to be implemented. The normative understanding that is prominent in the political discourse, e.g., on the level of EU policy, holds that social innovations enable positive, bottom-up processes of change where large scale policy interventions fail. I will argue that in contrast to the dominant theme of novelty, social innovations in the political discourse can be fruitfully studied through the lens of repair (Jackson 2014). In this sense, social innovations are as much about preservation as they are about creation. While the discourse and practices of social innovation in the political arena share many similarities with repair, the recent popularity of social innovations can, on the other hand, be studied as a process of diffusion and hence as the innovation of a political instrument (Pol and Ville 2009).

The following sections will trace social innovations both as a sociological concept for delineating a specific *mode of social change* as well as a political instrument for

implementing certain *means of societal change*. The history of social innovation as a sociological concept will show that neither the term nor its meaning as a mode of social change are particularly new. With respect to the current political popularity of social innovation as a means for societal change, it marks a distinct entrepreneurial bias in line with techno-economic innovations. I will analyse how these two understandings are related and how the sociology of repair and the sociology of innovation may be linked in the study of social innovation. My contribution thus adds to the analysis of the recent "semantic extension" of innovation as a concept and to the detailed study how the role of the "social" is configured within current understandings of innovation (Gaglio *et al.*, 2017).

The first part of the paper will concern social innovation as a mode of social change and as a sociological concept. The second part will take the discourse on the level of EU policy as an example for framing social innovation as a political instrument and as a means of societal change. I will argue that in both cases, social innovations can be considered as ways of repairing social order. This understanding highlights the role of social innovations for maintaining social order, while at the same time they can figure agents of societal change.

SOCIAL INNOVATION AS A SOCIOLOGICAL CONCEPT

In the long history of the term innovation, social innovations enter the discourse in the early nineteenth century, when they "served to label the social reformer or socialist, accused of overthrowing the established order, namely property and capitalism" (Godin, 2015, p. 122). In contrast to its current positive connotations, social innovation was then used as a derogatory term. The connection to political reforms at the same time relates the term social innovation closely to issues of societal change. As we will see, social innovations can often be found in relation to sociological concepts of social change, where sociology has likewise adopted a generally positive notion of social innovation.

Social innovation in sociology is often related to ideas of positive progress, much in line with the "pro-innovation bias" (Rogers, [1962] 1983, p. 92-103; Godin & Vinck, 2017) of innovation studies.

Whether specific social innovations are considered positive or negative is of course a matter of valuation. From a conservative perspective, they threaten to upset the established order and the ruling elites, from a progressive perspective, they promise to reduce societal inequalities and problematic maladjustments. Within sociological theory this resonates with diverging assumptions about the stability of social order, where social innovations are closely linked to issues of social change and levelled against theories emphasising continuity and cohesion. As Coser (1964, p. 211-212) puts it with respect to Durkheim: "It is said that Durkheim [...] did not duly appreciate the import of social innovation and social change because he was preoccupied with social order and equilibrium [...]." According to Coser, Durkheim excluded interesting problems from his theoretical thinking by taking a conservative theoretical stance towards societal change. This is not because Durkheim did not recognize the turbulent social changes surrounding him, but because he "[...] never really attempt[ed] to analyze such crises in their own terms" (*ibid*., p. 214). Indeed, Durkheim had a keen interest in social reform and saw sociology's task in carefully developing and introducing practical interventions.

I take Coser's critique of Durkheim as a general critique of theories that emphasise the conservative power of social structures over processes of change. This critique is voiced elsewhere in the early 1960s, pointing to an increasing uneasiness with such theories. Social innovation is a concept for addressing this uneasiness. One such study situates social innovations within the dynamic transformations of modern societies (Moore 1960). Moore argues for more conceptual clarity in sociological theories of social change, aiming towards distinct and discernible patterns of social change. Especially, he criticises standard structural-functional analysis and argues for an increased consideration of the sources of social change in theories of social change. Moore's

discussion resonates in three points with more recent positions like Beck *et al.* (1994): first, modernisation has increased the speed of social change; second change must be actively engaged with, and third, modern societies are increasingly confronted with consequences of their own actions. Social change is then considered to be a result of increasing tensions inherent to modern societies and social innovations are one of the numerous ways in which those tensions may be reduced.

Such an understanding closely relates social innovations to neighbouring concepts, like social entrepreneurship or social engineering. The role of the entrepreneur, understood in a broader sense as someone "who undertakes to coordinate the activities of others; [...] makes decisions and meets contingencies" (Hughes, 1936, p. 183), becomes a central feature of modern society under the condition of increasingly rapid social change (cf. Drucker, 1957, for social innovations). Popper, for instance, advocates "piecemeal engineering" in contrast to "utopian engineering" when it comes to introducing social change (1945, p. 138-148). Since "piecemeal social experiments" (1945, p. 143) can be controlled on a local level, they promise a more realistic mode of change than large scale utopian approaches that fail to consider the complexities of modern societies.

Social change and the disruptive maintenance of social order

There is an interesting mismatch between the dominant framing of social innovations as agents of social change, even though they are often targeted at maintaining social order. This discrepancy begs closer inspection. I will argue that social innovations often do not resemble the pattern of "creative destruction", which was succinctly coined by Schumpeter (1942, p. 83) but rather operate as forms of disruptive maintenance[1] that seek

[1] The term disruptive maintenance is, to my knowledge, mostly used in technical references and denotes that a service has to be discontinued in order to make necessary adjustments. The analogy to social innovations is therefore quite limited, since social processes cannot be put on hold for repairs to be made. I use the term here to highlight the disruptive aspects of social innovations as well as their role in maintaining order.

to compensate, repair, or resolve the manifold "lags" found in contemporary societies (Ogburn, 1922, p. 200-213). Creative destruction and disruptive maintenance are not opposing terms. They share the destructive-disruptive moment of novelty and of course the maintenance of social order can and must be a creative process. However, in contrast to the progressive notion engrained in creative destruction, disruptive maintenance entails some form of conservatism. Without overstressing the analogy to technical repair, social innovations can be considered as updates or patches that fix specific societal problems or maladjustments, much in the same way that Popper argued for piecemeal social engineering.

Schumpeter's concept of creative destruction is closely tied to the economic exploitation of invention in capitalist societies (1942, p. 81-86). The driving force is the entrepreneur, who makes profits "from doing things" differently (Schumpeter, [1923] 1939, p. 84). The inventor, according to Schumpeter, is typically a different person than the entrepreneur and thus innovation, in contrast to invention, does not rest on the creation of novelty, but on economic exploitation in processes of long term diffusion.

This mode of economic change is fundamentally different from the notion of social change put forward by Ogburn. His hypothesis of cultural lag highlights the need for adaptation to change within a differentiated society. Ogburn locates the forces of change within the "material culture", which he sees as the dominant, but not singular, generator of change in current societies (1922, p. 202). The need for creatively resolving the misalignments between interdependent social worlds, the material and the adaptive culture, then becomes a salient feature of modern societies. Ogburn's hypotheses of a cultural lag and its resolution thus resonate more with the idea of disruptive maintenance than it does with creative destruction. We could even say that Ogburn has identified the societal adaptations, or repairs, to the transformative dynamics described by Schumpeter. Drawing creative destruction and cultural lags together forms an understanding of social change that is also prevalent in more recent approaches such as

reflexive modernisation (Beck *et al.* 1994). Especially the normative understanding of social innovation found in political discourse buys heavily into the notion of reflexively managing the consequences of modernity (Edwards-Schachter & Wallace, 2017).

I will argue that the use of the term social innovation intensely draws on the positive connotations associated with techno-economic innovation in modern societies (Godin, 2015, p. 122-133), whereas the underlying processes of social change might be more aptly described and analysed by concepts such as cultural lag and repair. I will elaborate this by taking a closer look at the recently emerging sociology of repair and the relation of innovation and repair with respect to social change. The sociology of repair provides fruitful connections for understanding social innovations, especially in the political realm, as modes of disruptively maintaining social order.

Social innovations and the sociology of repair

The sociology of repair is a recent conceptual development that taps into diverse strands of research. One major aspect is a critique of the dominant innovation paradigm in science and technology studies (STS). In contrast to the innovation paradigm, which emphasises the creation of stability and order, the repair paradigm – or "broken world thinking" as Jackson (2014) calls it – emphasises fragility and breakdowns within modern technical and social infrastructures and the subsequent need for maintenance and repair. A second aspect draws on the empirical studies of maintenance and repair practices that reveal the creative and sophisticated ways of dealing with breakdowns and disruptions (Henke 2000).

However, Jackson argues that innovation and repair are not mutually exclusive. Rather, repair is an often overlooked element in innovation processes, either since inventions diffuse and need to be adapted to local situations or since the successful diffusion relies on continuously maintaining the integrity of the invention in the face of

counter inventions or material decay. Godin (2017, p. 24) makes a similar argument for innovation studies by pointing out that the diffusion of innovation is itself an inventive process (cf. the notion of re-invention in Rogers, 1983 [1962], p. 146-149). And recently, scholars of social innovations have also hinted at repair as a fruitful concept to study social change (Howaldt *et al.,* 2015, p. 44). For instance, the Aconchego Housing Program in Portugal was featured in the 2010 report for the European Commission, "This is European Social Innovation". The program "matches older people who live on their own with students who are in need of accommodation" (European Commission, 2010, p. 23), thereby seeking to benefit both parties. It can be seen as an attempt to repair the social cohesion of a society in which the young and the old increasingly inhabit mutually exclusive social worlds.

The sociology of repair generally focuses on processes of "mending social order" in complex material-semiotic settings (Henke, 2000, p. 55). It emphasises the situated practices of repair technicians and how they engage with disruptions of the social as well as the technical order (Harper, 1987; Orr, 1996; Graham & Thrift, 2007; Denis & Pontille, 2015). This entails an understanding of repair that differs from a strong notion of repair in which objects break down, like a car with engine trouble that is moved to a specialised repair workshop in order to restore functionality. In the strong notion, repair is spatially and temporally detached from the contexts of use and the instances of breakdown. The sociology of repair does not emphasise this distinction by pitting the specialised workshops of repair against the mundane use and maintenance of technologies. Rather, it asks how repair figures within the matrix of sociomaterial order, how it helps to maintain stability and how it sometimes transforms the relations it is embedded in. It extends repair to instances where the working order needs to be actively recreated or circumvented so as to enable the continuous flow of activities (Schubert, 2019). The important characteristic of repair however remains, *i.e.,* that it is mostly motivated by a conservative interest in recreating a previously disrupted order, in restoration, and not in initiating

larger processes of change – even though all repair processes carry transformative potential (Graham & Thrift, 2007, p. 6). Such a wider understanding of repair holds several interesting aspects for the study of social innovations.

First, the *study of repair resonates with the basic tenets of current societal change* found in Schumpeter (1942), Ogburn (1922) or Beck *et al.* (1994). The sociology of repair does not build on notions of stability and order but gains its analytic perspective from the numerous insights into the fragilities and ambiguities of highly industrialised countries. The technical infrastructures of modernity suddenly seem much less dependable and much more vulnerable than before (Hommels *et al.,* 2014). A common point of departure for the sociology of repair and social innovations thus lies in the recognition of a *dynamic social reality that constantly produces the need for reflexive intervention* to keep things going. Both repair and social innovations thus sit in the middle between the dynamics of differentiation and interdependence, as modes of readjustment and alignment in a "universe, marked by tremendous fluidity; [that] won't and can't stand still" (Strauss, 1978, p. 123).

Second, insights into *repair can shed light on the complexities of diffusing social innovations*. Taylor (1970) noted the inherent resistance to change of established social orders that poses significant obstacles to the scaling of social innovations in space and time (cf. Mulgan, 2006, p. 153). Like with all innovations, the *diffusion of social innovations is a creative process that transforms the initial invention through processes of adoption*. Jackson (2014, p. 227) points out that repair is therefore not an opposite, but a necessary element of the innovation process. The local adoptions of repair enable inventions to grow past the local situations of their creation. The repair perspective thus focuses on the processes of misalignment, disruption and adaptation throughout the diffusion process. Even if this does not entail a breakdown in the narrow sense, it sensitizes for the dynamics of innovations that go beyond the originality of inventions (Godin, 2017). In this

sense, social innovations can not only be conceived as fixes to human problems, but their diffusion itself depends on repair or repair-like articulations.

Third, repair studies highlight that *repair can be used analytically to investigate economic, material-semiotic and epistemic relations* at the heart of modern societies. For one, they reveal specific economies of worth. Repair in many cases is not confined to simple replacements of spare parts according to prescriptions in a manual, but operates in local forms of competent evaluation and improvisation (Henke, 2000, p. 66-69). Should something be repaired or replaced? Is the repair necessary for the intended function? From this perspective, *repair is not only an economic cost/benefit calculation, it ties valuations of longevity or status into the questions if and how something should be repaired*. In addition, the repair of technical devices offers analytic insights into such social structures and dynamics. In the same way that repair should not be considered a strictly technical phenomenon, social innovations should not be conceived as purely social (Degelsegger & Kesselring, 2012). The material-semiotic constitution of repair (Denis & Pontille, 2015) thus mirrors the material-semiotic constitution of social innovations.

By looking more closely into the practices of repair and social innovation, the similarities tend to become more evident than the differences. This is not only true for the above aspects from the sociology of repair as ways to think about social innovations. We can also note that much of the current work on the revival of do-it-yourself and repair cultures follows narratives of social innovation, social movement, sustainability, and counterculture (Rosner & Turner, 2015).

I have so far discussed social innovation as mode of social change and as an analytical concept in sociology. I have also outlined an understanding of social innovation that draws less on Schumpeter's notion of creative destruction for initiating change but rather on an Ogburnian understanding of disruptive maintenance to resolve cultural lags. This understanding was extended with ideas from the sociology of repair and how they might be instructive for the study of social innovations. I will use this as a conceptual

prism to break up the current discourse on social innovations on the level of EU policy. The main aim of this exercise is to critically assess this social innovation discourse by showing how a latent repair narrative is superimposed by a dominant innovation narrative. If social innovations are not only understood as a mode of social change, but as a reflexive means of political agency, they can be conceived as a specific form of repair work that seeks novel means to attain established ends and to resolve the strains of cultural lags. The dominant innovation narrative, however, frames social innovations largely as political instruments or social technologies. This interlocking of repair and innovation has become the dominant mode of funding social innovations on the level of EU policy. Shedding light on this package will help to gain a deeper understanding of social innovation as repair while at the same time questioning the innovation imperative in political discourse.

SOCIAL INNOVATION AS A POLITICAL INSTRUMENT

The study of social innovations has recently sparked growing interest in the governance and policy domain (van der Have & Rubalcaba, 2016). This development is accompanied by a shift from an analytical understanding to a normative conception of social innovations (Edwards-Schachter & Wallace, 2017) and by a turn towards an entrepreneurial/neoliberal attitude (Jessop *et al.,* 2013; Fougère *et al.,* 2017). I will argue that this shift also entails a repair narrative embedded in the framing of social innovations as solutions to societal challenges and that it forms, in combination with the recent entrepreneurial bias from the innovation narrative, a distinct instrumental understanding of social innovations as social technologies that perform disruptive maintenance on societal structures. This argument is based on a previous qualitative study of EU social innovation programmes and publications (Schubert, 2018). The following discussion relates social innovation and repair along two main lines. First, it outlines the framing of social innovations on the level of EU policy as a form of repair. Second, it conceives this

particular form of repair itself as a social innovation, *i.e.,* as the diffusion of a new social technology.

Social innovation as means of repair in the EU policy discourse

Historical research on social innovation shows that despite its long career, the concept received broader attention only recently and that there is considerable variation in its uses (Godin, 2015, p. 122-133). The ambiguousness of the term itself might be instrumental to becoming a buzzword in the late 2000s (Pol & Ville, 2009). But as social innovation becomes popular by remaining vague in the academic realm, it also becomes popular by limiting its scope in the realm of policy. The shift from a diverse analytic understanding to a narrow normative concept reduces interpretative flexibly and purifies the term so it can be inserted into political agendas.

The academic discourse is driven from different fields and revolves around a set of shared issues. Van der Have and Rubalcaba (2016) identify four scholarly communities that show interest in social innovations: community psychology, creativity research, research on social and societal challenges, and local development. These clusters share a basic notion of social innovation first as a process that "encompasses change in social relationships, -systems, or -structures" and second that "such changes serve a shared human need/goal or solve a socially relevant problem." (*ibid.*, 1930). Edwards-Schachter and Wallace (2017) come to a similar conclusion. They discern three thematic clusters within the discourse on social innovation: social change, sustainable development, and the service sector. The three clusters again represent two distinct perspectives on social innovation: first a "characterization of SI as 'transformative' in relation to systemic change" (social change and sustainable development) and second a "more 'instrumental' approach, present in most policy and practitioner narratives, related to the social services provision addressing to societal needs and social market failures" (*ibid.*, p. 73).

The policy discourse narrows social innovation down to such an instrumental understanding, as prominent definitions in EU publications highlight the role of social innovations predominantly for addressing societal challenges. For instance, in the report "This is European Social Innovation" for the European Commission (2010), social innovation is briefly defined as follows: "Social innovation is about new ideas that work to address pressing unmet needs" (*ibid.*, p. 9). The report was compiled by three European social innovation proponents: the Social Innovation eXchange (SIX) at the Young Foundation, the Euclid Network, and the Social Innovation Park, Bilbao. The definition drew upon the Open Book on Social Innovation (Murray *et al.* 2010), where social innovations were defined as "new ideas (products, services and models) that simultaneously meet social needs and create new social relationships or collaborations" (*ibid.*, 3) and which was published on behalf of the Young Foundation and the British National Endowment for Science, Technology and the Arts. Other EU publications from 2010 also use this basic definition, for instance the report of the Bureau of European Policy Advisers "Empowering people, driving change. Social Innovation in the European Union" (BEPA 2011). Later definitions extend the instrumental application of social innovations: "The notion has gained ground that social innovation is not only about responding to pressing social needs and addressing the societal challenges of climate change, ageing or poverty, but is also a mechanism for achieving systemic change. It is seen as a way of tackling the underlying causes of social problems rather than just alleviating the symptoms" (BEPA 2014, p. 8). Even though the instrumental perspective on social innovation dates back to the 1970s (Edwards-Schachter & Wallace, 2017, p. 73), it becomes specifically dominant in the EU policy discourse of the late 2000s.

A closer look at this instrumental understanding reveals that social innovations are not neutral means to final ends, but embody distinct normative dispositions and as such are transformative of the "ends in view" (Dewey, 1939, p. 25). One disposition is that social innovations should be beneficial for society, the other links social innovation with an

entrepreneurial understanding of social change. Societal beneficiality is a prominent *addendum* to the definition of social innovations, since they are "social in both their ends and their means" (European Commission, 2013, p. 6). Social innovations are aimed at "improving human well-being" and in addition "are not only good for society but also enhance individuals' capacity to act" (*ibid.*). Such a normative narrowing of the term first curtails its analytic scope. The "social" in social innovation acts as a normative handle by which the term is inserted into the repertoire of legitimate political instruments. In addition, it demarcates specific conditions of felicity under which social innovations are deemed successful, *i.e.,* fulfilling a social need. Last not least, it contrasts social from economic or technical innovations by pointing out that they are not for profit. The contrast to economic innovations, however, becomes questionable when looking at the entrepreneurial bias of social innovations in EU discourse.

Even though one of the main arguments for social innovation is that they provide solutions to "social demands that are traditionally not addressed by the market or existing institutions" (*ibid.*), the proposed mode of social innovation strongly draws on economic innovation driven by a Schumpeterian entrepreneur: "It is worth adding that one important, but certainly not sole agent type spearheading Europe 2020 social innovations is the social enterprise. Social enterprises are ventures in the business of creating significant social value, and do so in an entrepreneurial, market-oriented way, that is, through generating own revenues to sustain themselves." (*ibid.*, p. 15). The response to societal challenges is specifically framed as a "willingness to take risks and find creative ways of using underused assets" (*ibid.*, p. 16). The political instrument of social innovation is therefore not only *integrated into the policy discourse through a normative notion of the social* but also *deeply engrained with neoliberal ideas through an economic notion of innovation* (cf. Fougère *et al.,* 2017). By promising to tap into creative and transformative potentials on a local level, to create bottom-up grassroots initiatives that address pressing global problems, the discursive framing of social innovations on an EU policy

level at the same time introduces the figure of the entrepreneur, now social entrepreneur, as the prime mover of such change. Even if these social entrepreneurs are not primarily motivated by economic profit, they operate along economic rationales, such as cost/benefit calculations.

This resonates with Drucker's (1957, p. 39-45) claim that the most important social innovation of all in the 20th century was indeed the institutionalisation of business enterprises and rational management processes as predominant forces of societal change. Even though Drucker might be overly optimistic about the potential of enterprise formats to tackle social needs, his distrust in large scale reforms mirrors Popper's earlier call for "piecemeal engineering" to introduce social change (1945, p. 138-148). Both Drucker and Popper subsequently conceive social change more as a task for a diligent social engineer than a creative social entrepreneur. The EU has likewise identified the need to generate more systematic knowledge on social innovations. For instance, the programme Theoretical, Empirical and Policy Foundations for Social Innovation in Europe (TEPSIE, www.tepsie.eu) was funded from 2012-2014. A look through the mentioned EU documents shows that social innovation, however, is largely framed by economic references such as the entrepreneur. Technical references such as engineering or repair are remarkably absent.

But how is this entrepreneurial bias in EU policy related to an understanding of social innovations as repair? My main argument is that the EU discourse frames social innovations predominantly in terms of demand-pull, rather than a supply-push (Godin & Lane, 2013). Whereas the latter is very much in line with Schumpeter's understanding of entrepreneurial invention and creative destruction, the former requires a need to be fulfilled and can be understood in Ogburn's terms as solution to an existing maladjustment (see Godin & Lane, 2013, p. 638-642 on the difference between "needs" and "demands" in innovation studies). Pull-models of innovation have been used in the political realm since the 1960s, albeit with an emphasis on technical inventions to fix

social problems (*ibid.*). Social innovations continue this political uptake on innovations as solutions to social needs, to quote the European Commission (2010, p. 9) again: "Social innovation is about new ideas that work to address pressing unmet needs".

The main argument against a reconsideration of social innovation as repair would then be the novelty aspect, the "new ideas", that are found at the centre of inventions and supposedly not in repair. However, the sociology of repair highlights the creative and original aspects tied in with each repair as long as it transcends simple replacement (Henke, 2000; Jackson, 2014). And of course, repair is not confined to reproductive "restoration" of original states, but extends to more transformative modes such as "remediation" and "reconfiguration" of social and technical relationships (Sennett, 2012, p. 212-220). Like innovation, repair largely develops as an open-ended process, not a predetermined sequence of events. Scholars of innovation have argued on the other hand, that innovation does not require large amounts of creativity or originality but merely any "doing things differently", even to the point of stating that "innovation is possible without anything we should identify as invention and invention does not necessarily induce innovation" (Schumpeter, 1939 [1923], p. 84). Merely referring to creativity then does not suffice to demarcate innovation from repair. It could even be argued that the diffusion of innovation is less creative that most instances of repair, as long as diffusion operates along simple modes of imitation (Tarde, 1903 [1890]). Yet the creative aspect of invention, which the European Commission emphasises by "new ideas that work to address pressing unmet needs", can be understood as an approach to fixing a cultural lag in Ogburn's sense and as forms of disruptive maintenance.

Repair, social innovation and social entrepreneurship are not mutually exclusive in this reading. Rather, the need for repair, for resolving cultural lags and societal tensions, derives from the endless dynamics of modern societies and capitalist modes of production and is addressed in EU policy, among others, by mobilising social innovations and social entrepreneurs. What we can see on the level of EU discourse is, however, an

interesting detachment of the rhetoric of innovation and repair. The dominant use of entrepreneurial vocabulary on the level of EU invokes an understanding of innovation in terms of Schumpeter. The underlying definition of a problematic societal situation, in contrast, follows the concept of cultural lags and the promises of repair. I have argued that this gap can be resolved by drawing on insights from the sociology of repair and to analyse the concrete programs of EU policy not in a framework of innovation, but in one of repair. This way, we can avoid the "pro-innovation bias" from EU policy as well as in innovation studies (Rogers, 1983 [1962], p. 92-103; Godin & Vinck, 2017) and technology studies (Jackson, 2014, p. 226-229). This leaves the question how the term social innovation became popular within the policy discourse (cf. Pel, 2016, for a similar discussion of "capture" dynamics). My answer will look at the social innovation of the term social innovation itself, how it became a legitimate discursive solution to existing societal challenges.

Diffusing the concept of social innovations in the EU policy discourse

How did a neoliberal notion of social innovation as entrepreneurial form of social repair become dominant within the discourse on social innovation in the EU? As previously said, social innovation as a mode of social change has been discussed within the academic literature at least since the mid-20th century. The recent interest in academia and politics dates from the early 2000s and larger EU programmes on social innovation start around the year 2010 (Moulaert *et al.,* 2017). These EU programmes now follow a rather narrow definition of social innovation by emphasising entrepreneurial agency while dismissing or neglecting the broader state of the art in the field (*ibid.*, p. 19-20).

One important actor in this selection was and is the London based Young Foundation (youngfoundation.org). In 2006, the director of the Young Foundation, Geoff Mulgan, published an article that sketches out a programmatic agenda of social innovation that would become a blueprint for the EU initiatives (Mulgan, 2006). According

to Mulgan, social innovations have increasingly accompanied modern societies since the large scale transformations of industrialisation and urbanisation and should now be systematically harnessed to cope with the societal challenges of the 21st century. This again invokes an Ogburn-like understanding of social change in which the transformations in material culture (industrialisation and urbanisation) occasion changes in the adaptive culture, for instance concerning childcare, housing, community development, and social care. Despite these promises, Mulgan identifies a severe deficit concerning the conceptual understanding of social innovations in contrast to economic or technical innovations. At the same time, social and economic innovations share a similar architecture: "Social innovation refers to innovative activities and services that are motivated by the goal of meeting a social need and that are predominantly diffused through organizations whose primary purposes are social. Business innovation is generally motivated by profit maximization and diffused through organizations that are primarily motivated by profit maximization." (*ibid.*, p. 146). Social innovation is thus portrayed as an understudied twin of commercial innovation that differs from its popular sibling only in the normative orientation towards social needs and purposes.

This implies that social innovations are best driven and organised by social entrepreneurs and social enterprises (*ibid.*, p. 147). Linking social innovation tightly to social entrepreneurship creates a specific nexus, in which an economic understanding of innovation serves as the model for social innovation. At the same time, it positions established actors in the field, like the Young Foundation, as central agencies for organising societal change. They coordinate social innovation processes based on a pull-logic of innovation in which "the starting point for innovation is an idea of a need that isn't being met, coupled with an idea of how it could be met" (*ibid.*, p. 149). Mulgan places the entrepreneurial perspective on social innovation within a larger context of societal challenges such as ageing, climate change, health issues or diversity management. The proposed pull-mode of social innovations to solve societal problems is thus accompanied

by a push-mode of social entrepreneurship as a legitimate political resource on the level of EU policy. This calls for an entrepreneurial approach in order to successfully diffuse inventions from the local level to larger formats. It also calls for more research to be conducted on social innovations vis-à-vis the amount of research on commercial innovations.

If we consider Mulgan's programmatic paper from an innovation studies perspective, he proposes social innovation similar to a "standardised package" (Fujimura, 1988), *i.e.,* as a combination of problems and solutions, in order to create a bandwagon dynamic for developing social innovations as a legitimate political instrument. Like the necessary scaling of social innovations, the concept itself needs to be scaled in order to become a legitimate political option. In short, the package contained the following problem-solution combination: *Social innovations represent an untapped reservoir of creative ideas* at the local level. Policy may *harness social innovations for solving unmet social needs* if the *knowledge gap is overcome and local inventions can be scaled up to larger innovations*. Both deficits can be overcome by first generating more knowledge on social innovations and second by drawing on social entrepreneurship for organising the transformative process.

The resonance of the package in the EU policy discourse can be traced through the official documents. For instance, the Open Book on Social Innovation, which was co-authored by Mulgan (Murray *et al.,* 2010), proposed social innovations as an effective measure to tackle pressing problems where existing policies failed, since "existing structures and policies have found it impossible to crack some of the most pressing issues of our times" (*ibid.*, p. 3). The main challenge to social innovation is the main challenge of innovation itself: generate systemic change from small yet successful experiments (*ibid.*, p. 12-13). This document largely mirrors the report by the European Union and the Young Foundation's "Study on Social Innovation" (European Union/Young Foundation, 2010), in which social innovation is framed as an "emerging field", that

"remains ill-understood and poorly researched in comparison to its counterparts in business, science and technology" (*ibid.*, p. 14). These documents state that social innovation is a broad field, encompassing a large variety of empirical cases conceptual approaches, yet they also converge on the social innovation package proposed by Mulgan and the Young Foundation. In addition, Mulgan and the Young Foundation also provided input into the Bureau of European Policy Advisers report "Empowering people, driving change. Social Innovation in the European Union" (BEPA, 2011, p. 9), where "social innovation offers a way forward by providing new solutions to pressing social demands while making better use of available resources" under the conditions of budget cuts. Again, the problems of current societies are coupled with the promises of social innovations and the knowledge deficits on social innovation are coupled with the assurance of creating this knowledge through EU policy programs.

The time around the year 2010, when all these reports were formulated, can be seen as the nascent phase of social innovations within EU policy. From an evolutionary understanding of innovations, they are still in a niche, a protected space where their promises are evaluated before they might become part of the mainstream policy regime (Geels, 2004). Over the following years, the problem-solution package was stabilised in subsequent reports like the "Guide to Social Innovation" (European Commission, 2013), where social innovations are prominently defined as a "process by which new responses to social needs are developed in order to deliver better social outcomes" (*ibid.*, p. 6). The report of the Bureau of European Policy Advisers in 2014 suggests that the social innovation initiatives on the EU level are becoming more noticeable and that there is change within the EU funding and governance structures towards social innovation: "within a few years, policy support for social innovation has moved towards the centre of the political agenda" (BEPA, 2014, p. 9).

The efforts of defining and marketing the package of social innovations as a political means of societal change in the EU, *i.e.* the social innovation of social innovation,

at least created prominent visibility within the EU discourse and according to the BEPA report 2014, they also generated dedicated funding from EU sources, *e.g.* pilot programmes funded by the Structural Funds (*ibid.*, p. 8). The dominance of a neoliberal/entrepreneurial notion of social innovations within this discourse simultaneously generated critical reactions from the scientific social innovation community for reducing and counteracting the broader potential of the concept (Jessop *et al.*, 2013; Fougère *et al.*, 2017).

In sum, we can see that the diffusion, or the popularity for that matter, of social innovations as practice and concept first originates from a growing field of research and action in which social innovation is defined and understood in a plurality of ways (Pol & Ville, 2009). It is because of its lack of an exclusive definition that it can serve as a "boundary concept", linking many different interests and thereby facilitating institutionalisation (Pel & Bauler, 2014). However, on the level of EU policy discourse, we see a diffusion dynamic that pushes a narrow neoliberal/entrepreneurial social innovation package advocated by actors like the Young Foundation. This package draws heavily on the positive connotations of innovation in general and on economic and technical innovation in particular. It emphasises an entrepreneurial approach for fixing current societal challenges while at the same time supporting an instrumental/engineering perspective that makes use of social innovations as social technologies. This is not to say that this approach may not be productive, but it shows that the diffusion of social innovations as practice and concept in EU policy can itself be understood as a contested innovation process.

CONCLUSION

This article had two main aims. In the first part, it elaborated an analytic understanding of social innovations as a mode of social change. It drew on Ogburn's theory of social change and cultural lag in order to disassociate social innovations in EU policy discourse from the dominant techno-economic innovation paradigm and to connect it with the recent sociology of repair. From this reading, innovations and repair are not seen as opposites. Repair practices may be quite innovative or creative, diffusing innovations may depend on local repair and adoption, and inventions may be thought of as a fix for broken or deficient sociomaterial orders. Social innovations in particular can then be conceived as a form of repair or disruptive maintenance. The second aim was to unpack the popular discourse on social innovation in EU policy discourse in the following part. I tried to show how the concept of social innovation in EU policy documents is shaped in a distinct manner: that it carries an entrepreneurial notion of innovation closely related to an economic perspective and a neoliberal agenda, that it also embodies an engineering image of fixing social relations by employing distinct social technologies, that it draws heavily on the positive connotations of techno-economic innovations, and that it is targeted, last not least, at issues of repair much more than on genuine innovative novelty. If social innovation is understood in this way as a normative means of societal change and not as an analytic concept to study different modes of social change, I argued that it can be conceived more accurately in the (politically unfashionable) terms of repair and disruptive maintenance rather than the popular terms of innovation. The 'innovativeness' of social innovations on the EU policy level becomes more obvious when looking at the popularity of the term since 2010, where we could see how the social innovation package was designed and marketed by interested parties such as the Young Foundation.

A more cautious approach to the benefits of organised social innovation seems warranted since research suggests that it is not simply a new and effective governance tool but that it cuts both ways and encounters strong resistance also on the local level (Bartels, 2017). If social innovations are forms of disruptive maintenance, these

disruptions are likely to be countered by conservative forces and institutionalised practices. Focussing on social innovations analytically as a mode of social change and a disruptive maintenance of social order could then help to counter the pro-innovation bias found in (social) innovation studies. A more rigorous analysis of processes of social change lends itself to a comparative evaluation of related terms, for instance social engineering and social technologies that share a mutual heritage with social innovation and whose basic premises still seem to carry some weight in governance circles. Social innovation as a normative means of societal change can then be analysed with respect to changing governance structures, competing rhetorics, and the overall proliferation of innovation as a buzzword in policy frameworks (Osborne & Brown, 2011).

The sociology of repair is a relatively novel and small field, but it can lend a valuable contribution to not only to innovation studies in general but to social innovation in particular. It can also help to bridge some gaps between dichotomous understandings of social and technical repair. Just like innovations are never purely social or technical, repair must always be understood in relational terms. When something is broken, it always initiates a process of valuation on the necessity of repair. Repair, like innovation, is traversed by heterogeneous orders of worth and both shed light onto the mode and means of current social change.

More specifically, a repair perspective can help to unpack dominant innovation narratives with respect to societal change. It can generate inquiries into the active modes of preservation that address societal challenges but without buying into an instrumentalist innovation discourse. This opens up research questions at the intersection of social science, policy and society not only by regarding innovation and repair as two sides of the same coin, but by highlighting the often-neglected issues of maintenance and repair that constitute a central element in processes of change.

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Counterhegemonic Narratives of Innovation: Political Discourse Analysis of Iberoamerican Countries

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ABSTRACT

From the 1970s onwards, changes in economic theory began to draw attention to the relationship between economic growth and technological innovation. Technological innovation has come to be considered fundamental to boosting international trade, increasing productivity and generating more and better jobs, among other benefits. However, more recent academic narratives began to change through considering the importance of technological innovation for social purposes such as social inclusion and sustainable development. This recovered the concept of social innovation and alongside the development of a plethora of alternative innovation concepts – such as sustainable innovation, open innovation, responsible innovation, green innovation, among other "x-innovation" concepts (Gaglio *et al.*, 2017). Nevertheless, little is known about the extent to which these counterhegemonic concepts emerge and feature in Science, Technology, and Innovation (STI) policy discourses. In this sense, this article aims to understand the use of "x-innovation" concepts and the role attributed to innovation for (allegedly) counterhegemonic purposes in the STI national policies of Iberoamerican countries within the framework of disclosing the specificity of this discourse.

Keywords: Science, Technology and Innovation; Discourse analysis; Political discourse; Iberoamerica; National Plans.

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INTRODUCTION

From the 1970s onwards, changes in economic theory began to draw attention to the relationship between economic growth and technological innovation (Lundvall & Borrás, 2004; Nelson & Winter, 2005; Freeman & Soete, 2008). Technological innovation has thus now come to be considered as fundamental to boosting international trade (Krugman, 1990; Lall, 2000), reducing costs (Penrose, 2006), increasing productivity (Nelson, 2006), and competitiveness (Fagerberg, 1996), while generating new – and better – jobs (Garcia, Jaumandreu & Rodrigues, 2002; Harrison *et al.*, 2006), among other benefits.

However, more recent narratives about innovation began to advocate the role of innovation for counterhegemonic purposes, beyond (or at least hereinto) business competitiveness and economic growth. Approaches to innovation have also included its essential role for social purposes such as social inclusion, sustainable development, among others. This change results from a simultaneous process of appropriating and challenging the concept of innovation from the perspective of social values and criticizing technological innovation in the hegemonic discourse, given its strong economic connotations. In this sense, the concept of 'social innovation' re-emerged in conjunction with the proposition of a plethora of alternative innovation concepts – for example, 'sustainable innovation,' 'open innovation,' 'responsible innovation,' 'green innovation,' among other "x-innovation" concepts (Gaglio *et al.*, 2017, p. 4).

These discourses convey messages and shape behaviors. "What governments say is as important as what governments do" (Dye, 2013, p. 66). This means they grasp the intentions behind these discourses, as well as the socio-political contexts in which they developed, hold relevance to the policy debate. Nevertheless, little is known on how these counterhegemonic concepts are actually incorporated and presented in Science, Technology, and Innovation (STI) policy discourses.

Accordingly, the OECD report entitled *Megatrends affecting science, technology and innovation* precisely demonstrates the international awareness regarding these revamped

visions on innovation discourses: "New concepts such as social innovation, frugal innovation, inclusive innovation and social entrepreneurship are leading to new innovative business models and can contribute to a more inclusive approach to innovation." (OECD, 2016, p. 17)

The European Union also provides an updated 'state of the art' rationale, especially prolific concerning the conceptual frameworks and correspondingly adopting the most sophisticated discourses from academia. In the report *New Horizons: Future Scenarios for Research & Innovation Policies in Europe*, a policy formula is set out whereby innovation represents the ends and the means for solve all sorts of economic and societal challenges.

> The end result of all this will be an enhanced positive impact of R&I* on the achievement of a range of EU policy goals, as well as on growth and on the well-being of EU citizens. Europe and its knowledge economy will be competitive and serving society. Social innovation, business model innovation, governance and institutional innovation contribute to success. (European Commission, 2017, p. 60)

The Footnote (*) even duly gives warning that 'Research and Innovation' should henceforth be understood in "the broadest sense of the term" (European Commission, 2017, p. 60), therefore by "including ICT, biotechnology, life sciences, nanotechnologies, renewables and other green technologies and eco-innovations as well as *social innovation, business model innovation, governance* and *institutional innovation*" (*Idem,* p. 60). Thus, the days when innovation ought simply to be a matter of production processes and market products now seem long gone.

In fact, this does constitute an ongoing 'movement' in academic and international forum milieus that results from a simultaneous process of appropriation and contestation. This appropriation falls within the terms presented by Gaglio *et al.* (2017) when demonstrating – by historical documental analysis – how people "appropriate a word (innovation) for its value-ladenness" (p. 4) down throughout history. "A word such as polysemic as innovation is a multi-purpose world" (idem) that hence explains the plethora

of alternative concepts of *technological innovation*: "Over the twentieth century, linguistic appropriations proliferated in the literature" (p. 5). In this sense, our goal involves extending the analysis made by these authors in considering the usages of the innovation concept in defence of social values and correspondingly therefore challenging technological innovation in the hegemonic discourse.

Most intuitively, the narrative presented in adopting these alternative concepts maintains that a different kind of innovation is needed to generate desirable social impacts – such as inclusion, sustainable development, the democratization of knowledge. This 'social dimension' to innovation would encapsulate the scope for eliminating the unintentional consequences or the undesired effects of technological innovation couple with a new mantra of 'more innovation in the social' and 'more social in innovation' (Gaglio *et al.*, 2017, p. 9). Such narratives are able to influence the social imaginary and potentially impacting Science, Technology and Innovation policy processes.

In this sense, the goals of this paper are to map and analyse the deployment of these "x-innovation" concepts and the role attributed to innovation for counterhegemonic purposes in the national STI policies of Iberoamerican countries. By undertaking analysis of the political discourse presented in these strategic documents, we aim to enlighten the general understanding on how political discourses and conceptual uses border political actions and, in this way, anticipating the kinds of changes the public should expect from those policy narratives.

This paper is therefore organized into three sections. The first attributes significance to this kind of conceptual debate and the meaning of these discourses to policy analysis. The second section then presents our empirical study and the framework applied to dealing with the research corpus before the third section delves further in our findings, conducting a discussion on the trending discourses and the 'x-innovation' concepts that

emerged from our empirical analysis. The final section puts forward a summary and some concluding remarks.

1. THEORETICAL FRAMEWORK, METHOD AND OBJECTIVE

Ever since *The Argumentative Turn* in the 1990's, Policy Analysis has increasingly focused on the argumentation process as an essential variable not only within the political cycle but also as an analytical dimension for consideration in empirical studies. Discourses and narratives express messages, model behaviors and build the frameworks that shape policies. As Majone stresses (1989, p. 1) "…public policy is made of language. Whether in written or oral form, argument is central in all stages of the policy process". The very definition of the policy problem arises from an argumentation process more than any strictly 'rational analysis' (Stone, 1989). Symbolic languages thus become tools in the hands of public actors.

In this sense, political discourse constitutes a relevant dimension for policy analysis. We here conceive such discourse as defined by Fischer and Gottweis (2012, p. 12), "…[covering] all of the topics that would come up in matters political—concepts, terms, theories, relevant policy issues, and the like…". Our efforts are thus more closely focused on identifying the effects of the communication process than contemplating the formal validity of arguments or even the eventual policy results.

As regards the methodology, due to the significant amount of information, we opted to organize the research corpus through recourse software specifically designed for qualitative analysis and correspondingly enabling the categorisation of the different concepts under study. This kind of methodology has already served as the basis for some intellectual and conceptual research in the innovation studies arena. For example, the Mónica Edwards-Schachter transdisciplinary approach deployed a database and 'coded categories' for the compilation of the 'social innovation' definitions in the academic

literature (e.g., Edwards-Schachter & Wallace, 2015, p. 15). Additionally, Benoît Godin's (e.g., 2008, 2015) intellectual history project applies some of the techniques we adopted here in terms of mixing qualitative methodologies, combining content analysis, linguistic categories (such as 'semantic field', 'polysemy', 'appropriation', etcetera), with appeals to authorship perceptions from the intellectual history disciplinary praxis in addition to the genealogical type approach drawn from the history of ideas field.

Along with this policy analysis discursive perspective, this builds up a framework particularly relevant to comparatively analysing changes in the discursive spaces of the Science, Technology, and Innovation (STI) policies in Iberoamerican countries over the 2000s. Some political actors have come to advocate the role of innovation for counterhegemonic purposes, in addition to (at least hereinto) business competitiveness and economic growth. This emerges as counterhegemonic in the Gramscian sense, revealing contradictions and tensions in what has hitherto been virtually consensual (hegemonic) (Gramsci, 1971, Williams, 1977).[1] Counterhegemonic, in this sense, means the original intention of some scholars in proposing new policy frameworks (Godin, 2009), which were generally formulated to challenge the Neo-Schumpeterian mantra of innovation as a systemic approach for a strictly benign process of 'technological change' (and its social correlation, entrepreneurship), without considering the unintended consequences of Schumpeterian 'destructive creation' – or, alternatively, the social and environmental consequences of modernization, progress or material development. This counterhegemonic trend reflects in recent years in the application of concepts such

[1] Regarding the concepts of hegemony and counterhegemony, there is acceptance that Gramsci did not use the concept of 'counterhegemony' with this term corresponding to an interpretation of Gramsci's concept of hegemony from a critical perspective (e.g. Konder, 2002, and Coutinho, 2006, 2007): "To paraphrase Marx, it can be said that all hegemony carries within itself the germ of counter-hegemony. There is, in fact, a dialectical unity between the two, one defining the other. This is because hegemony is not something static, a ready and finished ideology. A living hegemony is a process. A process of struggle for culture." (Coutinho, 2008, p. 77) The concept of counter-hegemony is also associated with that of resistance as a result of the work of Cultural Studies. (Souza, 2013, p. 55-56) However, the concept of counter-hegemony is not a formulation of Gramsci, but was added to the Gramscian theoretical corpus, most notably by Raymond Williams in his work entitled Marxism and Literature (1977, p. 114, 116). Henceforth, the counter-hegemony concept has been associated with Gramsci's thinking.

'inclusive innovation', 'responsible innovation', 'eco-innovation', among other "x-innovation" concepts (Gaglio *et al.*, 2017).

> Like many other adjectives attached to "innovation" nowadays (e.g.: responsible, frugal, user-centered), it suggests a new normative aspect for innovation, in comparison with the dominant view (economic imperative, key for growth). This normative aspect includes moral issues, environmental respect, participation of new populations (the poor, the users) and reflectiveness about the consequences of innovation. (Godin & Gaglio, Forthcoming, p. 8)

Although the efforts to drive innovation for these purposes are less expressive in many cases than expected, when not strictly symbolic policies, these discourses convey messages and are able to shape behaviors. This thus reflects how grasping the underlying intentions holds relevance to the policy debate.

In sum, by carrying out analysis of the political discourse present in national plans and strategic documents, our goal is to understand the role awarded to innovation for counterhegemonic purposes (i.e., in addition to economic growth) in the STI national policies of Iberoamerican countries while also seeking to disclose the specificities of this discourse.

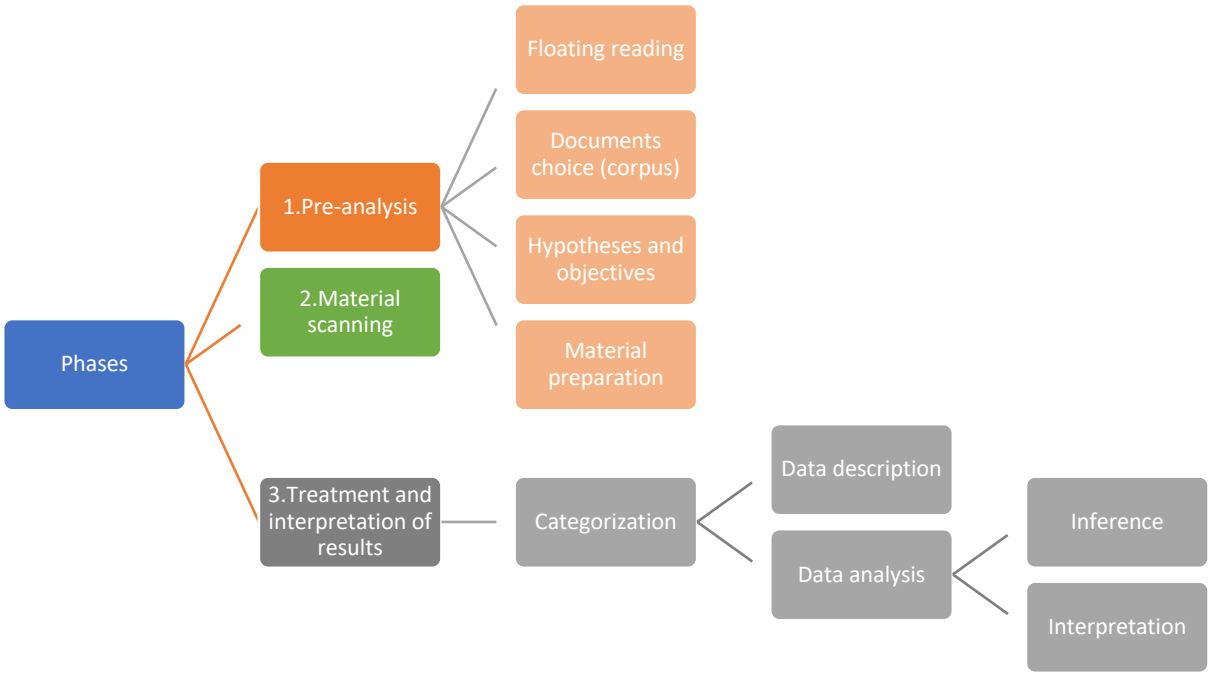
2. EMPIRICAL FRAMEWORK: ANALYSIS OF POLICY DEFINING CONCEPTS

To guide the empirical endeavor, we chose Content Analysis (Bardin, 2016) as the research method. Thus, the empirical analysis was correspondingly organized into three phases: 1. Pre-analysis, 2. Material scanning and, 3. Treatment and interpretation of results. Figure 1 details the steps included in each phase.

The pre-analysis started with the floating lecture – our first contact with the documents. Subsequently, we initiated the choosing of the documents, defining, out of every kind of policy document existing (national plans, legislation, speeches, policy evaluations, among others) just what would be subject to analysis. In keeping with our

goal, we decide to limit our analysis to national plans as they are the type of document in which governments (usually) express their positions and intentions in any particular field of public policy. The research corpus was established according to the principles of exhaustivity, representativeness, homogeneity, and pertinence. We therefore analysed sixteen policy documents from 8 (eight) Iberoamerican countries – especially national Science, Technology and Innovation Plans: Argentine, Brazil, Chile, Colombia, Mexico, Spain, Portugal, and Uruguay. Together, these countries account for 93% of total expenditure on Scientific and Technological Activities in the Iberoamerica (RICYT, 2018) – which conveys the sample's representativeness. Despite the differences among them being large, as our analysis here is strictly qualitative – concerning the narratives and not budgetary, infrastructure or other scale variables according to country size – we consider this does not compromise the methodological approach. The number of documents varied by country mainly in accordance with to documentation available. Table 1 provides some information about these documents.

Fig. 1: Content analysis phases



Source: prepared by the authors based on Bardin (2016).

Table 1. Selected policy documents by country

Country	Document	Number of pages
Argentine (AR)	*Plan Estrategico Nacional de Ciencia, Tecnologia e Innovacion "Bicentenario" (2006-2010)* [National Strategic Plan of Science, Technology and Innovation "Bicentennial"(2006-2010]	99
	Argentina Innovadora 2020: Plan Nacional de Ciencia, Tecnología e Innovación - Lineamientos estratégicos (2012-2015) [Innovative Argentina 2020: National Plan of Science, Technology and Innovation – Strategic Guidelines (2012-2015)]	140
Brazil (BR)	*Diretrizes de Política Industrial, Tecnológica e de Comércio Exterior – PITCE (2003-2006)* [Guidelines for Industrial, Technological and Foreign Trade Policy – PITCE (2003-2006)]	23
	Plano de Ação de Ciência, Tecnologia e Inovação para o Desenvolvimento Nacional (2007-2010)	406

	[Action Plan of Science, Technology and Innovation for National Development (2007-2010)]	
	Estratégia Nacional de Ciência, Tecnologia e Inovação (2012 – 2015) | *Balanço das Atividades Estruturantes (2011)* [National Strategy of Science, Technology and Innovation (2012-2015) | Balance of Structuring Activities (2011)]	220
	Estratégia Nacional de Ciência, Tecnologia e Inovação (2016-2022) [National Strategy of Science, Technology and Innovation (2016-2022)]	136
Chile (CL)	*Plan Nacional de Innovación (2014- 2018)* [National Innovation Plan (2014-2018)	16
Colombia (CO)	*Plan Estratégico Institucional (2007-2010)* [Institutional Strategic Plan (2007-2010)]	23
	Libro verde 2030: Política Nacional de Ciencia e Innovación para el Desarrollo Sostenible [Green book 2030: National Science and Innovation Policy for Sustainable Development]	64
Mexico (MX)	*Programa Especial de Ciencia y Tecnología (2008-2012)* [Special Program of Science and Technology (2008-2012)]	68
Portugal (PT)	*Um Compromisso com a Ciência para o Futuro de Portugal: Vencer o Atraso Científico e Tecnológico* [A Commitment to Science for the Future of Portugal: Overcoming Scientific and Technological Delays]	12
	Plano Tecnológico: uma estratégia de crescimento com base no Conhecimento, Tecnologia e Inovação [Technological Plan: a Growth Strategy Based on Knowledge, Technology and Innovation]	57
	Diagnóstico do Sistema de Investigação e Inovação: Desafios, forças e fraquezas rumo a 2020 [Diagnosis of the Research and Innovation System: Challenges, Strengths and Weaknesses towards 2020]	306
Spain (ES)	*Estrategia Española de Ciencia y Tecnología y de Innovación (2013-2020)* [Spanish Strategy for Science and Technology and Innovation (2013-2020)]	43
	Agenda Ciudadana de Ciencia e Innovación (2011) [Citizen's Agenda of Science and Innovation (2011)]	100

Uruguay (UY)	*Plan Estratégico Nacional de Ciencia, Tecnología e Innovación (2010)* [National Strategic Plan for Science, Technology and Innovation (2010)]	56
TOTAL		1769

Source: prepared by the authors.

In keeping with our previously defined research objectives, after establishing the corpus we moved onto the indexing process and developing the indicators employed in the textual analysis of the selected documents. The pre-analysis phase revealed four usages of the term *innovation* in Science, Technology, and Innovation (STI) national plans:

1. Characteristics and constraints of the innovation process.
2. Innovation as a goal.
3. Innovation as a means (to achieve):
    a. Economic purposes.
    b. Social purposes.
    c. Both (economic and social purposes).
4. Concepts of innovation:
    a. Established innovation concepts: such as technological innovation, business innovation, organizational innovation, marketing innovation.
    b. Counterhegemonic ('x-innovation') concepts: such as social innovation, inclusive innovation, open innovation, among others.

Among these, the last two categories emerged as the most relevant for our analysis. They correspondingly (i) identify the role assigned to innovation for economic purposes (growth, competitivity, productivity, international trade, generating employment) and to social purposes (social inclusion, reducing inequality, sustainable development) and, (ii)

refer to counterhegemonic innovation concepts. After defining the most relevant categories, we then prepared the material for analysis by the WebQDA®[2] software program. The option of making recourse to a software for data analysis stemmed from the sheer amount of material and the need to facilitate analysis and interpretation.

We began the material scanning (phase 2) by searching for radical "inov," in documents in Portuguese (from Brazil and Portugal), and "innov," in documents in Spanish (further countries). All the usages of 'x-innovation' concepts or mention of innovation as a means to achieve economic or social purposes were categorized and codified separately by WebQDA® in keeping with the aforementioned categories. Finally, we advanced to the treatment and interpretation of the results phase.

In total, we identified seven different 'x-innovation' concepts in the corpus as set out in Table 2.

Table 2. Usages of "x-innovation" concepts

"x-innovation" concepts	BR	AR	CL	CO	MX	EX	PT	UY	Occurrences of the concept
Associative innovation	-	2	-	-	-	-	-	-	2
Environmental innovation	-	-	-	1	-	-	-	-	1
Inclusive innovation	-	11	-	2	-	-	-	1	14
Open innovation	2	-	-	-	-	3	2	-	7
Responsible innovation	1	-	-	-	-	-	-	-	1
Social innovation	1	2	1	2	-	3	-	2	11
Sustainable innovation	-	3	-	-	-	-	-	-	3
Occurrences by country	4	18	1	5	0	6	2	3	39

Source: prepared by the authors.

[2] WebQDA® - Qualitative Data Analysis Software. Available at: https://www.webqda.net/?lang=en.

Preliminary analysis identifies how the use of "x-innovation" concepts is uncommon and much less frequent than might otherwise be expected given their recent abundance in the literature (Boons & Lüdeke-Freund, 2013; Cajaiba-Santana, 2014; Carrillo-Hermosilla *et al.*, 2009, 2010; Chesbrough, 2003; Edwards-Schachter & Wallace, 2015; Edwards-Schachter, 2018; Howaldt *et al.*, 2014; Owen *et al.*, 2012; Pol & Ville, 2009; Stilgoe *et al.*, 2013; among others). This profusion of accounts might stem from several different concerns but mostly seems to be the consequence of two contemporary trends; i.e., the process of innovation democratization (von Hippel, 2005) and a symptom of proposing innovation as the modern panacea and buzzword for the resolution of all human problems.

The main change in the narrative encapsulates the scope of technological innovation from which the benefits would reach far beyond economic progress (Table 3). This may suggest that more than the incorporation of these counter-hegemonic innovation concepts into policy documents – which would reflect some degree of agreement with academic criticisms of the potential of technological innovation for social needs – national governments instead mostly continue to defend how technological innovation *per se* is capable of achieving social goals. In other words, the critical content around technological innovation, expressed by the adoption of alternative and counter-hegemonic innovation concepts (usually targeting social goals such as social inclusion, reducing inequalities, environmental sustainability), rarely get identified in the policy documents covered by our analysis.

By examining the counter-hegemonic concepts that we encountered in the national plan sample (Table 2), we may observe that two emerge most frequently: inclusive innovation (14 occurrences in total) and social innovation (11 occurrences). However, mentions of inclusive innovation are strongly concentrated in just one country

(Argentina accounting for 11 of the 14 occurrences). [3] This correspondingly means that, after pondering the frequency across the eight countries analysed, the most common "x-innovation" concept is actually social innovation. Nevertheless, as we shall discuss below, this concept is not always employed in the policy documents with the social connotation observed in the literature.

Table 3. Citations of technological innovation as a means to achieve economic and social purposes

Countries	Economic purposes	Social purposes	Economic and social purposes	Total
Brazil	53	17	13	83
Argentina	18	9	6	33
Chile	4	2	0	6
Colombia	1	0	5	6
Mexico	12	8	1	21
Portugal	17	0	0	17
Spain	11	8	7	26
Uruguay	5	3	4	12
Total	121	47	36	204

Source: prepared by the authors.

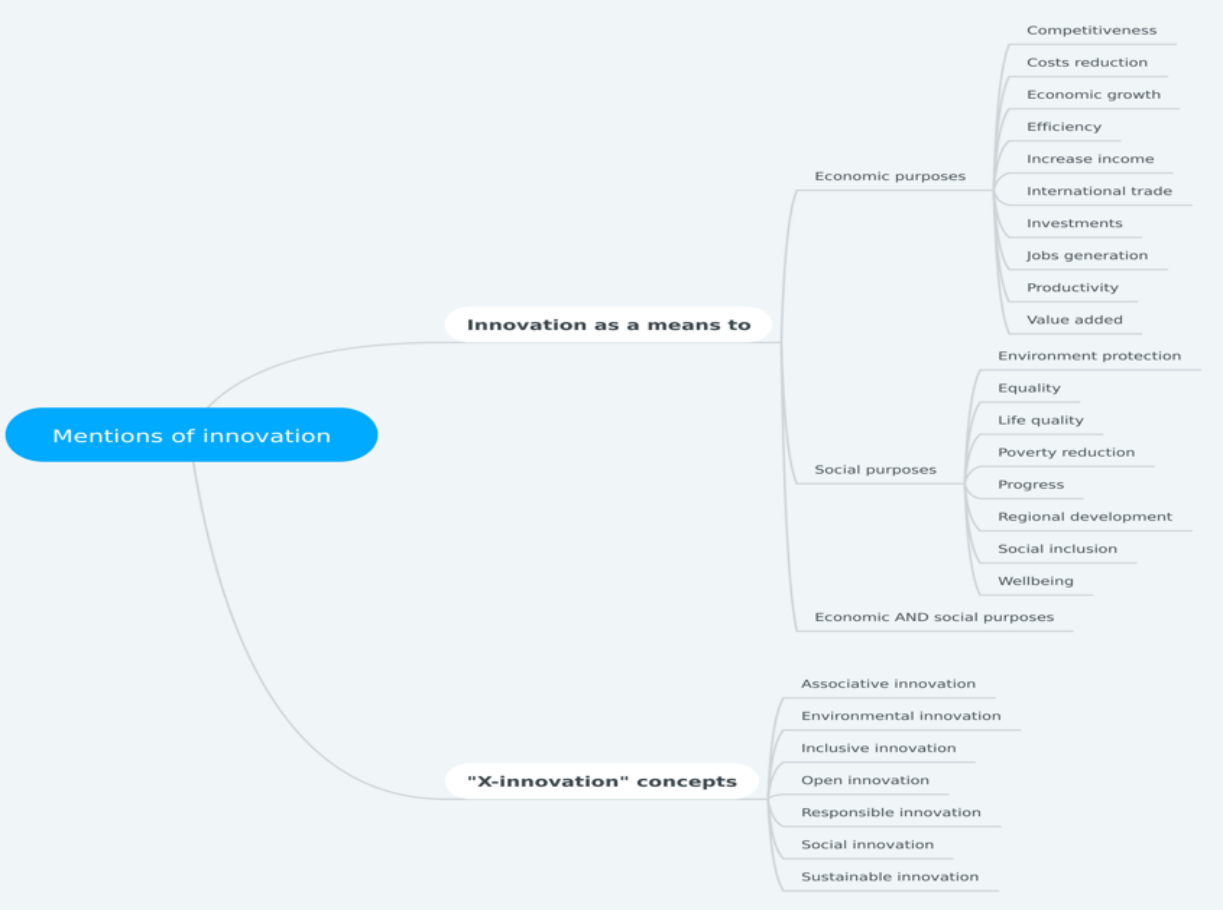
Regarding references to 'innovation' as a means of achieving economic or social purposes, as expected, we may report far more citations of innovation for the purpose of achieving economic goals (Figure 2): increasing efficiency, productivity and competitiveness; stimulating investments, reducing production costs, raising the value added; promoting international trade and, in sum, generating economic growth, new (and better) jobs, and boosting the level of national income.

On the other hand, we have the narratives considering technological innovation in its own right as the sufficient means for achieving social goals: bringing about reductions

[3] This might be explained by the greater level of politicization perceived in Argentinian civil society in keeping with a certain autonomy and awareness of the social movements there, at least in comparison with other peripheral countries. (Fausto & Devoto, 2004, p. 43-44)

in poverty, social inclusion and equality; increasing quality of life and wellbeing, generating regional development and progress coupled with environmental protection. Although far less frequent than those advocating economic purposes, they still rank as more common than the adoption of "x-innovation" concepts.

Fig. 2: Identified mentions of innovation as a means to economic and social purposes and "x-innovation" concepts



Source: prepared by the authors.

There are also references to the simultaneous innovation potential for both economic and social purposes. Adding these citations to the analysis (Table 4) still further emphasises the lower adhesion of official documents to the academic production involving these alternative innovation concepts. Once again, this would seem to

demonstrate that there is a prevailing view amongst policymakers that they do not need to consider other kinds of innovation beyond the technological type. The only country analysed with a different policy discourse correlation, between technological innovation for social purposes *versus* counterhegemonic innovation concepts, is Argentina, which (as mentioned) may well reflect the broader politicization of the debate compared to the other Iberoamerican countries alongside the greater influence and inclusion of academic actors within policy milieus as well as political alignments more open to adopting such new, legitimizing discourses for ST&I policies.

Table 4. Citations of technological innovation as a means to achieve social purposes *versus* "x-innovation" concepts

Countries	Technological innovation as a means to social purposes or economic and social purposes	"x-innovation" concepts
Brazil	30	4
Argentina	15	18
Chile	2	1
Colombia	5	5
Mexico	9	0
Portugal	0	2
Spain	15	6
Uruguay	7	3
Total	83	41

Source: prepared by the authors.

When assuming the emergence of these counterhegemonic innovation concepts ('x-innovation' according to Gaglio *et al.* (2017)) results from a simultaneous process of appropriation and challenge to the technological innovation concept in defence of social values (idem), its low frequency in the policy documents might suggest that the technological innovation hegemonic concept has not been sharply questioned in the ST&I

policy arena. Apparently, this process remains more circumscribed to academic contexts and environments.

However, despite this frequency analysis – useful for indicating the permeability of these alternative innovation concepts in political narratives –, we essentially need to understand how these concepts actually get deployed. Hence, the intentions of the following qualitative analysis, which provides the focus to the next section, involve identifying to what extent these terms are employed in the policy documents evoking social values.

3. COMPARATIVE ANALYSIS OF X-INNOVATION IN IBEROAMERICAN COUNTRIES

Making sense of trending discourses

As one might intuitively grasp, innovation has become a sort of panacea for all sorts of human endeavors. From aesthetics to economics, almost every human activity wants to appeal to some innovation buzzword. However, one type of innovation has led the way in our societies: 'technological innovation.'

This has been the case since at least the post-World War Two period, when innovation began to increasingly (spontaneously and implicitly) mean 'technological innovation.' However, in recent decades, as mentioned above, the concept of 'social innovation' has experienced a revival as well as the proliferation of alternative innovation concepts, such as sustainable, open, responsible innovation, among others – what Gaglio *et al*. (2017) call 'X-Innovation.'

This trend contains an implicit criticism towards technological innovation in perceiving this as somehow too narrow or too market-oriented even while there is the enduring appeal and recognition of innovation as the engine of this 'new economy' irrespective of the unintended consequences of technology and growing levels of

inequality: "On the one hand, innovation is necessary in order to enable [underdeveloped] regions to catch up economically. On the other hand, innovations lead to further redundancies and increasing disparities" (Guth, 2005, p. 334). As expressed by Godin, "people contest a term (technological innovation) because of its hegemonic [economic] connotation. They coin alternative ones that often become a brand." (Forthcoming A, p. 205) This furthermore encapsulates the sense in which we consider all these alternative innovation concepts as counterhegemonic as they reveal contradictions and tensions in what has hitherto been virtually consensual – i.e., an ideological stance that considers only the benefits of growth, industries and technologies without contemplating the social and environmental problems deriving from modernization, progress or material development. (Williams, 1977, p. 115-116; Eagleton, 1997, p. 107)

Some of the documents analyzed are quite remarkable now only in revealing the tensions and contradictions in those discourses but also how the traditional and more conservative views still predominate and correspondingly demonstrating how challenging insights are yet to be incorporated into the outlooks of national techno-bureaucracies. One example is the Portuguese strategic document entitled *A Commitment to Science for the Future of Portugal: Overcoming Scientific and Technological Delay*, which reports just a single occurrence of the word 'innovation' (in fact, 'entrepreneurial innovation') and also seems to adopt a rather linear and market-oriented perspective of investment in Science and Technology:

> We know that the public resources invested under rigorous international evaluation are sources of new knowledge, of advanced training of new human resources for society and the economy, and of ideas and processes that, more and more rapidly, result in business innovation, modernization of institutions, quality of life, external competitiveness and better employment. (MCTES, 2006, p. 4)

We furthermore encountered a similar tone in another Portuguese strategic document, more recent and produced under a more progressive government, entitled *Higher Education, Research and Innovation in Portugal: Perspectives for 2030* (MCTES, 2018), with

an abundant profusion of the word 'innovation' but without any reference to the 'social dimension' for innovation. Additionally, the neighbouring country, Spain, in its *Spanish Strategy for Science and Technology and Innovation (2013-2020)* fails to reveal much in the way of 'x-innovation' conceptualization, preferring to stress that entrepreneurial leadership is the engine of innovation (MEyC, 2012, p. 4). Still furthermore, and most astonishingly, the *Citizen Agenda for Science and Innovation* report, with textual analysis revealing not a single mention of any of the pro-social 'x-innovation' concepts. Those social dynamics ascribed to innovation, as one might expect from citizenship rhetoric, were only reference as regards 'entrepreneurial spirit' and the impact of 'innovations' on the everyday life of citizens. (FECYT, 2011, p. 5)

Ambiguity, tensions and even contradictions, in addition to a significant gap between scholarly production and policy practitioners, thus encapsulate what we deal with in the subsections below in keeping with the different usages of the 'x-innovation' concepts identified over the analytical corpus of official policy documents.

Social and inclusive innovation

One concept gaining in momentum is that of 'social innovation' and applied in diverse areas and by differing actors, ranging from social movements to private management entities, entrepreneurship and public management while also creatively used by both practitioners and scholars. However, as regards its conceptualization, 'social innovation' indeed remains a troubled concept with several overlapping meanings invoking such diverse notions as institutional change, social purposes and the public good. (Pol & Ville, 2009; Cajaiba-Santana, 2013)

As studied by Godin (2010), over the twentieth century, "social invention was a counter-concept to that of technological invention" (Godin, 2010, p. 25), although its meaning and its ultimate aim remained fuzzy. Representations of social innovations

generally hold historical connotations with socialism and social reform but are indeed uncertain and have become increasingly dubious.

Initially, its meaning was linked with a subversive political project, even with a pejorative connotation, before gradually taking on a reformist ethos. Especially from the 19th century onwards, social innovation became defined as the search for "alternative solutions to social problems, particularly those of the 'marginals' … like the unemployed, the elderly, the poor…" (Fairweather *apud* Godin, 2010, p. 23). Social innovation was 'innovation for the people' (Godin, 2010, p. 17), innovation that should humanize capitalism and counter poverty.

Nowadays, however, social innovation encompasses different dimensions, from specific inventions and products to entrepreneurial strategies while passing through *adjustments* to market failures or societal problems. As with the general narratives of innovation, this provides a *catchword* whose outcome is change 'for the sake of change.' Naturally, theoretical efforts duly report these contradictions. From sociologists such as Gabriel Tarde to management theorists like Peter Drucker, including the likes of Thorstein Veblen or William Ogburn along the way, it is easy to find very different propositions for 'social innovation.' (e.g. Godin, 2012, Howaldt *et al.*, 2014)

This tension and polysemy are evident in the discursive analysis carried out. Of the eleven mentions to the term social innovation, six (i.e., over half) are not clearly and explicitly employed as having social values or societal purposes as their motives. For example, one reference to the term found in the *National Strategic Plan for Science, Technology and Innovation* (2010) of Uruguay terms social innovation as a "learning process that enables the development of effective methodologies" (GMI, 2010, p. 22).

Another example arises from usage of the term in the *Innovative Argentina 2020: National Plan of Science, Technology and Innovation – Strategic Guidelines (2012-2015)* document that presents social innovation as a sector (along with agribusiness, information and communications technology, biotechnology, nanotechnology and

energy) (MCTIP, 2012, p. 25). The same document also repeats the term, again in a vague form, defining it as "a virtuous dynamic of interaction between the knowledge-generating institutions and the potential beneficiaries of scientific and technological advances, that is, between the different actors involved in the process of social and productive innovation." (MCTIP, 2012, p. 59)

Meanwhile, in the *Spanish Strategy for Science, Technology and Innovation (2013-2020)* document, the concept appears as the plan's objective described as the "*adaptation* [our italics] that technological change and innovation imply", "transversal to all the challenges of society", playing "a vital role in making available to citizens, businesses and administrations, new developments that mobilize the economy and digital society in this process of transformation." (MEyC, 2012, p. 30)

Indeed, it has nowadays become very common to encounter references to 'social innovation,' "a term that almost everyone likes but nobody is quite sure just what it means" (Pol & Ville, 2009, p. 881). However, the general 20th century trend was to present social innovation as a remedy or 'adjustment' to technology or technological innovation, which means that those discourses and theoretical efforts around social innovation "are a reaction to the dominant and hegemonic discourses on technological innovation." (Godin, 2012, p. 9) Definitions may be presented based on this socially worthwhile and humanitarian bias as "social innovation came to mean alternatives to 'established' solutions to social problems or needs," especially via "government-supported social reform." (Godin, 2012, p. 6)

However, according to some perspectives, companies represent the source of social innovation and, simply put, any businessman is a 'social innovator.' (Godin, 2012, p. 20) This same logic uncritically presents states and governments as social innovators irrespective of their respective actual commitment to social reform. It is not its content that matters but rather the easy feat of presenting any societal actor as a societal

benefactor with the impacts of their interests and activities uncritically presented as widely beneficial.

Peter Drucker provided an eloquent example of that meant by social innovation. A well-known management guru and prolific author, who extensively defined social innovation as business practices essentially for productivity. In his book *Innovation and Entrepreneurship: Practice and Principles* (1985), Drucker identifies two areas where our society allegedly needs substantial social innovation: in his words, i) "[t]he first is a policy to take care of redundant workers", by means of *displacing* them from their jobs; ii) "[t]he other social innovation needed is both more radical and more difficult and unprecedented: to organize the systematic abandonment of outworn social policies and obsolete public-service institutions." (Drucker, 1985, p. 257-260)

The political project behind this conceptual understanding of social innovation is pretty clear:

> These two social policies needed are, however, only examples. Underlying them is the need for a massive reorientation in policies and attitudes, and above all, in priorities. We need to encourage habits of flexibility, of continuous learning, and of acceptance of change as normal and as opportunity – for institutions as well as for individuals. (Drucker, 1985, p. 260)

It then becomes understandable that a proportion of the literature distinguishes social innovation from business innovation with the latter's purpose "necessarily driven by profit". (Pol & Ville, 2009, p. 881) However, others, mainly from within the management literature or biased by a narrow economist viewpoint, insist that all innovations are social and, strictly speaking, 'social innovation' is redundant. However, should one wish to take this concept seriously, social innovation must refer to "new ideas that resolve existing social, cultural, economic and environmental challenges for the benefit of people and planet". (Pol & Ville, 2009, p. 880)

In order to arrive at a true meaning for 'social innovation', Pol and Ville put forward an interesting point: "A true social innovation is system-changing – it permanently alters

the perceptions, behaviours and structures that previously gave rise to these challenges." (2009, p. 880) That would constitute the meaning of being 'counter-hegemonic' in the sense of being able to alter the schemes of domination that generate extreme inequalities in society.

On the other hand, we have the concept of 'inclusive innovation' that emerges as an interesting and enlightening alternative to the concept of 'social innovation.' Although we may also identify different perspectives as regards inclusive innovation, it seems to be less polysemic than social innovation. Generally, inclusive innovation is defined as "the means by which new goods and services are developed for and/or by those who have been excluded from mainstream development; particularly the billions living on the lowest incomes". (Heeks *et al.*, 2013, p. 1) This presupposes "a change in institutional culture and mandates the involvement of the poor in identifying their development priorities and in providing incentives for various actors to serve their needs more effectively." (World Bank, 2010, p. 338) Regarding the system, "[t]he challenge here is to build inclusive and poverty-oriented innovation systems: 'inclusive' in terms of ensuring that the percentage of the workforce and enterprises involved in innovative activities increases; and 'poverty-oriented' in the sense that the technologies developed help to achieve the Millennium Development Goals." (Altenburg, 2009, p. 39)

In sum, despite the distinctions, there prevails a social dimension in the different definitions produced by the Argentina, Colombia and Uruguay documents – although the occurrences are concentrated in the first: the Argentine documents return eleven of the fourteen total mentions. The *Innovative Argentina 2020: National Plan of Science, Technology, and Innovation – Strategic Guidelines (2012-2015)* defines inclusive innovation as "structuring actions aimed at guiding the creation and usage of scientific knowledge, technological production, and innovation aimed at social development." (MCTIP, 2012, p. 60-61) Still, another section does put forward a more complete perception:

> Development and usage of technologies aimed at the generation of products and production systems with inclusive socio-productive purposes tending to the satisfaction of rights and access to goods and services, participation in decision-

> making and distribution processes and the guarantee of accessing and exercising the right to decent work. (MCTIP, 2012, p. 64)

Uruguay's *National Strategic Plan for Science, Technology and Innovation (2010)* defines 'inclusive innovation' in order to "develop capacities and opportunities for the social appropriation of knowledge and 'inclusive' innovation" while defending its potential for "generating more and better opportunities for the use and appropriation of technological change for people, with special emphasis on the most disadvantaged and excluded groups and sectors." (GMI 2010, p. 40) In the Colombian case, the term 'inclusive innovation' is even more clearly deployed as a (synonymous) alternative to 'social innovation.'[4] The Argentine case applies the following understanding:

> (…) the S & T are tools for inclusive innovation throughout the country, responding to social development needs and improving the quality of life of the population (…). (MCTIP, 2012, p. 46)

In fact, for some authors and organizations (e.g. the OECD[5]), the question of 'quality of life' deserves presentation as a watershed in terms of social understanding. The 'micro' or 'macro' implications of innovation(s) for the quality of life, as expressed by Pol and Ville (2009), seem to be "an integral part of our definition of social innovation." (p. 882) [6]

Overall, the mentions of 'inclusive innovation', both in the documents analysed and in the literature, would seem to contain less polysemy in their understanding of this concept and therefore running counter to the situation we identified for the 'social innovation' concept.

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[4] According to the Colombian Green Book. "In fact, despite the emergence of perspectives such as social innovation or inclusive innovation, the economic logic tends to be predominant." (Colciencias, 2018, p. 20)

[5] An example is the OECD LEED Forum on Social Innovations for Economic Development and Local Job Creation that presents "Social innovation" as seeking new answers to social problems by "(…) [i]dentifying and delivering new services that improve the quality of life of individuals and communities", as well as by "[i]Identifying and implementing new labour market integration processes, new competencies, new jobs, and new forms of participation, as diverse elements that each contribute to improving the position of individuals in the workforce". Available at: http://wwwa.oecd.org/fr/cfe/leed/forum-social-innovations.htm [Accessed on 18 November 2018].

[6] Although there is no agreed definition of 'quality of life' and values such as happiness are not easy to define. Within this scope, however, some may agree that "social innovation can be slightly redefined as any new ideas with the potential to improve either the macro-quality of life or the quantity of life." (Pol & Ville, 2009, p. 882)

From Open Innovation to Associative and Responsible Innovation

Some concepts, in their academic origins, emerge as less revolutionary than the intuitive understandings of them. Moreover, when considering the European rhetoric around 'open innovation,' for example, high expectations seem to be nurtured:

> Overall, the acceleration of innovation has brought not only the economic benefits of better services and products but also the social benefit of cohesion in Europe, where citizens are able to shape the future of rapid change together. Indeed, the creation of a coherent vision and of a more coherent conversation on *open innovation* in the EU [European Union] has been key to navigate the challenges, and achieve the desired outcomes in productivity, growth and jobs, but also in social inclusion and sustainability. (European Commission, 2017, p. 49)

At the European level, this emerges as one of those cathartic concepts in which 'openness' becomes able to answer all hopes for transparency and participation.

> Important steps in that direction have been taken in Horizon 2020 with the promotion of openness in EU R&I policy, including *openness* to the participation of a wide range of stakeholders in mutli-stakeholder configurations. Key in this is the recognition that scientific findings generated with taxpayer money are public goods and should be made public to increase social returns. Thus, *open innovation*, *open science* and *open data* must become the norm, and the right incentives and tools must be put in place to foster scientists and other actors to share their knowledge. (European Commission, 2017, p. 59)

Moreover, this openness is due to be complemented by 'Responsible Research and Innovation (RRI),' a key value to ensure that research and innovation are motivated by "social benefit," holding whether intergenerational, ethical, environmental, cultural or economic implications.

'Open Innovation' is presented in accordance with the virtuosity of its adjectivation, regarding collaboration, accountability, and regulation:

> *Openness* can help the EU deal effectively with value conflicts that could have perilous consequences for science and for investment in innovation. As science and innovation become ever more pervasive, they also become subject to demands for regulation (…). (European Commission, 2017, p. 60)

Responsible innovation also stresses those values of collective awareness. Stilgoe et al. (2013), for example, follows the von Schomberg definition[7] of *Responsible Innovation* but simultaneously claim its definition is broader: "Responsible innovation means taking care of the future through collective stewardship of science and innovation in the present." (Stilgoe *et al.,* 2013, p. 1570)[8]

This need for transparency, accountability, and regulation may be related to recent trends, such as the *advent of digitalization and virtualization*, simultaneously a result and a cause of *the pace of innovation* in the last decades, responsible for "completely new models of research and innovation, associated for instance to notions like Science 2.0, enabled by big data techniques, digital platforms, and various forms of experimental and 'open' approaches to research and innovation (…)." (European Commission, 2017, p. 59-60)

However, regarding the concept of 'open innovation,' this European reading seems much more comprehensive than that found in the Iberoamerican national plans. The internal understanding of this concept is indeed very limited as regards their possible extrapolations as described by the European documents. This tends to convey how the updated discourse ongoing in international forums does not encounter any similar parallel at the domestic level. For example, all seven identified references to the concept of 'open innovation' are far more closely aligned with an understanding common to the business management and administration perspectives.

Concepts such as 'open innovation' (as well as 'sustainable innovation,' as we shall see below) only recently entered the business environment and the scope of organizational business studies. It was Henry Chesbrough, an administration studies guru,

[7] According to von Schomberg, responsible innovation is: "A transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society." (von Schomberg apud Stilgoe et al., 2013, p. 1570)

[8] According to Godin and Gaglio (Forthcoming, p. 8), "responsible innovation" is a fashionable concept in European policy circles, emergent in recent years, more focused on institutional issues, a strong insistence on deliberation and procedural democracy, as well as ethical issues. As expressed by the above-mentioned Horizon 2030 report, "RRI does not seek to dictate thematic priorities, but rather to help research providers and users to understand what is "responsible" and accordingly devise a responsive approach to research and innovation strategies." (European Commission, 2017, p. 60)

who first presented 'open innovation' and in the following terms: "Open Innovation means that valuable ideas can come from inside or outside the company and can go to market from inside or outside the company as well." (Chesbrough, 2003, p. 43) Indeed, through this concept we do receive a new paradigm but strictly for corporate milieus dealing with R&D departments and striving to absorb good ideas from outside their walls while avoiding monopolies and intellectual property and patent rights. It is not by chance that Chesbrough acknowledges that "inevitably, the technologies will evolve to serve the needs of the dominant." (Chesbrough, 2003, p. 194)

In a similar fashion, the usages we encountered very much resemble the same tone. The Brazilian report, for example, highlights "a highly collaborative innovation model promoted by so-called 'innovation intermediaries' and as an effective way of addressing the high complexity and cost inherent to software development" (MCTIC, 2016, p. 54). Far more appropriately designed for the logics of corporate governance or public-private clusters involving "multiple internal and external agents, this incorporates new tools for the management of property rights and knowledge valorization and contemplates all the intangible dimensions of the process" (MEyC, 2012, p. 34), as also duly identified by the Spanish strategy for the 2013-2020 period.

However, a sort of appropriation of the 'open innovation' concept seems to occur with the 'associative innovation' concept as exemplified in *Innovative Argentina 2020*. This document formulates a policy instrument for strengthening and expanding innovation with reference attributed to consolidating "the trend developed in recent years towards associative or network innovation, endowing it with a growing systematicity and consistency and deepening the interaction between the different implementing institutions." (MCTIP, 2012, p. 58) In this sense, 'open innovation' is extrapolated as some kind of 'associative networking' ongoing among institutions.

Another concept interpreted in terms of its institutional impact is that of 'responsible innovation.' In particular, in the case of a Brazilian document, the authorities

seem to point to a regulatory framework: "Regulatory research and the interactions of these research groups with regulatory agencies, industry, and legislators form the framework for responsible innovation, and this is one of the global trends identified by the OECD for ST&I." (MCTIC, 2016, p. 51). That is, 'responsible' serves to point in the direction of a regulatory apparatus coupled with intellectual property management.

In sum, some of these new concepts run contrary to intuition; that the social dimension ends up being limited whether to the market sphere or the corporate milieu. In those cases, the business model and the profit motive still prevail and with some new accounts thriving by retooling an understanding of the 'social dimension' clearly within the entrepreneurial innovation narrative and hence in keeping with the Schumpeterian tradition.

Sustainable and ecological innovation

Finally, a concept such as 'sustainable innovation' seems to have been particularly overlooked by the public authorities. After all, despite dubious interpretations of its meaning in some stances, policy discourses seem to constantly avoid the implied 'moral narrative'. As the literature details:

> (…) sustainable innovation questions the economy and the market ideology by focusing on sustainability rather economic growth. In so doing, it provides morality to innovation – once again – and contributes to the enlargement of the concept of innovation to dimensions (social, environmental) that are said to ensure sustainability. (Godin & Gaglio, Forthcoming, p. 9)

On the other hand, the fact nevertheless remains that 'sustainable innovation' is also now treated as just another way of looking at 'business models' (Boons & Lüdeke-Freund, 2013). Another related concept, 'eco-innovation,' also gets proposed clearly within the capitalism worldview and certainly within an entrepreneurial management perspective: as Carrillo-Hermosilla *et al.* (2009) described in their seminal book on 'eco-innovation'

with its most illustrative caption being *When Sustainability and Competitiveness Shake Hands*.

Sustainability however draws on far deeper roots than these recent discourses. The term 'sustainability' was first used in German forestry circles by Hans Carl von Carlowitz (1645-1714). (Pisani, 2006) However, especially from the 1960s and 1970s onwards, the awareness of international organizations as regards ecological challenges founded the basis for the Stockholm Summit in 1972, a United Nations Conference 'on the Human Environment'. Along the way, the concept of sustainability fell within the scope of the debates shaping initiatives such as the Rome Club (1968) or *The Limits to Growth* (Meadows *et al.*, 1972) report. Furthermore, the common *definition of sustainability* stems from the Brundtland Report of 1987[9], which set out 'sustainable development' as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (WCED, 1987, p. 43)

It is important to note that of the eight countries analyzed, only Argentina elaborates on the concept of 'sustainable innovation.' Even though, despite being provided three times, it is the same definition repeated on every occasion the document explicitly mentions its policy objectives. In other words, the term appears only once inside the analyzed corpus, arising in the following terms:

> To promote inclusive and sustainable productive innovation based on the expansion, advancement and full exploitation of national scientific and technological capacities, thus increasing the competitiveness of the economy, improving the quality of life of the population, within a framework of sustainable development. (MCTIP, 2012, p. 38)

We would duly note there is only a general reference to 'sustainable development' without any explicit environmental considerations. This represents an interesting example

[9] Formerly known as the World Commission on Environment and Development (WCED), the mission of the Brundtland Commission was to unite countries to jointly pursue sustainable development. The Chairperson of the Commission was Gro Harlem Brundtland, a Norwegian politician and former Prime Minister of Norway (1981, 1986-89, and 1990-96), as well as Director-General of the World Health Organization from 1998 to 2003. The Brundtland Report was entitled Our Common Future and was published by Oxford University Press.

of the creativity common in policy formulation, as we have been analysing above, wrapping several contradictions in just a single definition.

In another national case, however, the concept of 'environmental innovation' – as rendered by the *Colombian Green Book 2030* – appears in its full meaning:

> This is how policy initiatives focused on environmentally and socially sustainable innovation strengthen, for example, the promotion and development of clean technologies, inclusive innovations, and social innovation. In this way, the policy began to broaden its understanding of the STI, including civil society and citizens, not only as consumers of knowledge and innovations but also as promoters and generators of them to address social and environmental needs. (Colciencias, 2018, p. 22)

It should be noted that environmental issues are here associated with social issues, including the problems around the innovation inclusiveness deficit in our societies.

Regarding the so-called 'ecological innovation' – another derivative of 'sustainable innovation' –, Carrillo-Hermosilla *et al.* (2010) put together several definitions for eco-innovation – and sustainable innovation, concepts drawing on the same semantic field. (Godin & Gaglio, Forthcoming) Those definitions are, of course, naturally quite general as they intend to cover the ways in which human societies may potentially harm the environment. However, above all, these definitions appear as rather mutually diverse.

From *eco-innovation* being "any form of innovation aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment or achieving a more efficient and responsible use of natural resources, including energy" to *sustainable innovation* presented "as a process where sustainability considerations (environmental, social, financial) are integrated into company systems from idea generation through to research and development (R&D) and commercialization." (Carrillo-Hermosilla *et al.*, 2010, p. 3) There are indeed definitions that are less environmentally motivated and more economically sustained in terms of the business model durability and soundness and correspondingly taking into consideration

the old cost-benefit analysis of products, services, and technologies as well as lucrative opportunities for new business and organization models. As Godin and Gaglio explain:

> (...) It may seem odd at first glance, but sustainable innovation also has a business sense that ignores environmental sustainability. Sustainable innovation in this sense is a lasting innovation in a competitive economy that allows a company to make ongoing profits: innovations must be introduced into a rapidly-evolving economy (...) (Godin & Gaglio, Forthcoming, p. 6)

This business profit-oriented sense has also duly been observed by other authors (Golovatchev *et al.,* 2010) and is present in the other concepts hereby considered, such as 'open innovation' or even 'social innovation.' The former environmental meaning and the later business meaning reflect how, "like innovation, sustainable innovation is a sustainable concept: it travels easily among scholars and between scholars and officials; it changes meaning according to use; and it is eminently performative…" (Godin & Gaglio, Forthcoming, p. 1) As these authors point out, "Sustainable innovation, like innovation as a general concept, is polysemic" (*Idem*, p. 7), which is an essential facet to understanding the diversity of discourses and conceptual nuances over the documentation support to analysis in this study.

CONCLUDING REMARKS

Following our analysis, we may summarize the findings by pointing out that, while there are indeed references to the potential of innovation for both economic and social purposes, the lower adhesion of official documents to the contents of academic production involving these counterhegemonic or alternative innovation concepts still remains clearly evident. There is little consonance between the academic production and the conceptualization present in the official documents, which may result from one of two explanations: either the techno-bureaucratic apparatuses are poorly attentive (updated) as regards the production of knowledge, or the recent outputs produced under the auspices of 'x-innovation' concepts have failed to persuade policy-makers.

Even following the guidelines of the research method employed (Content Analysis), we recognize that our data interpretation was subjective to some extent. In any case, national policy plans account for just one (among many) types of policy documents. Future studies should incorporate other sources of policy discourse. Furthermore, it would be interesting to examine to what extent these national policies reflect symbolic only policies. Nevertheless, we believe these limitations do not invalidate our findings as these policy documents are expressive as regards the political narratives ongoing in the ST&I field.

This would seem to demonstrate that the prevailing view among policymakers does not perceive any need to consider other kinds of innovation for social purposes other than technological change, which may result from some dissonance (or a temporal mismatch) between academic production and official documents. Our analysis of policy documents ('explicit policy') demonstrates that the presence of these concepts is both rare and insipient – despite their widespread application in academic discourses and papers.

This furthermore seems to indicate that the expansion of these discourses has not yet had any significant impact (at least not evident) on the dominant interpretation of

innovation prevailing in the discursive space of Science, Technology, and Innovation policy in this geographic region. At most, what we here identify amounts to a change in the narrative as regards the extent of the benefits of technological innovation – i.e., innovation as a technology providing new products or optimizing processes. General acknowledgement that the impacts generated would reach far beyond economic progress (such as growth, exports and competitiveness) is not unusual, which are in any case already classically claimed by the Schumpeterian tradition; and also incorporating open innovation, sustainable development, etcetera and even social innovation into policy discourse, does not mean establishing any new practices or aims.

The old saying of 'new labels, old bottles' would therefore seem to make sense: "Today the concept of innovation takes various specific forms, many of them as a contestation of the technological view: social innovation, common innovation, responsible innovation, inclusive innovation, etcetera. Yet many of these new forms have the same function as technological innovation." (Godin & Gaglio, Forthcoming, p. 4) This is an important point in revealing how idiosyncratic such discourses are, immersed in tensions and contradictions.

Our purpose here was to contest neither the relevance of the original narratives nor even the efforts applied by the techno-bureaucracies in updating their policy argumentation. In fact, there are nevertheless still several clues for further research. For example, at least three more variables might add insights to this discussion: a) the political orientation of governments within the framework of which conservative governments have often placed more emphasis on the traditional vision of innovation while progressives have been more open to revamping such discourses; b) in relation to the former, the participation of academic communities in the design and discourse of policies (which are also more present in certain types of governments than in others); c) the degree of national development and its commitments to international organizations (the influences of the European Union, OECD, IDB, World Bank, etc.) in the formulations

of STI policy. Additionally, this might explore whether or not there is any correlation with the proportion of the population facing poverty or exclusion in the countries considered. There is, in sum, several contextual variables that might generate explanations for the differences between countries and their different policy generation processes.

However, we would nevertheless emphasise that this transversal analysis does demonstrate how the deployment of alternative concepts or theories of innovation have not yet reached beyond rhetoric and the means of obtaining the social make recourse to the same old deterministic (and market) value of technology without effectively considering the social determinants behind the problems that technology seeks to solve. Hence, one must be aware that understanding social innovation as some kind of 'adjustment' to technological invention may not be either for the sake of social reform or for the aim of producing social inventions but might instead strive to return sustainable profits for specific social agents. This does indeed reflect the quite remarkable difference between innovations for fostering the needs of individualistic and artificial consumption or, quite differently, innovations for addressing the societal problem-solving issues of development and equity.

Therefore, it seems clear that a critical awareness of conceptual derivation is central to understanding the recent uses (and abuses) of several 'x-innovation' concepts. As detailed above, many of these concepts are clearly marked by fuzzy definitions and ambiguities. Once more, there is the need for a more rigorous and critical vision. Otherwise, one should remain sceptical just like the economist Fritz Machlup several decades ago: "A term which has so many meanings that we never know what its users are talking about should be either dropped from the vocabulary of the scholar or 'purified' of confusing notations." (Machlup, 1974 [1963], p. 43 *apud* Pol & Ville, 2009, p. 880)

As regards this looseness, one must inquire whether those concepts are really helping the cause of social reform. Alternatively, one might also even ask whether innovation (or at least its rhetoric) is also actually helping us to resolve our problems. An

interesting warning comes in a footnote of Horizon 2030 that states: "An implicit risk is that of research and innovation making too high promises for the short- to medium-term, which, if not fulfilled, would erode the credibility and confidence of people in science, research and innovation." (European Commission, 2017, p. 54) This is a risk that cannot be disregarded.

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Transition or Tradition: Imagining National R&D Innovation in South Korea

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ABSTRACT

From the late 1990s, many national policies for research and development (R&D), focusing on innovation, were established in South Korea. In May 2015, the Korean government announced another bold blueprint for R&D innovation emphasizing a serious approach toward overcoming outdated ideas and practices regarding the governance of the science and technology sectors. This emphasized very high expectations for the country, though in the end it brought brutal criticism and bitter disappointment. This paper conducts a critical analysis of the discourse surrounding the notion of national R&D innovation by focusing on the case of the 2015 Government R&D Innovation Plan. Various (un)published papers were examined as mediators to reproduce, construct, and deliver a particular imagination. By analyzing not only the final policy documents but also the initial policy draft, this paper highlights a substantive discontinuity in the formation of the 2015 Government R&D Innovation Plan that illuminates different imaginations of so-called national innovation in terms of R&D. It illustrates a tension occurring in national R&D innovation in South Korea between the desire to reproduce past glory by following previous experiences and a willingness to embody semantic meanings of innovation with novel approaches. This paper reveals a discursive oscillation of imaginations in national R&D innovation which resulted in its conceptual and practical ambiguity.

Keywords: National Innovation; R&D policy; Imagination; Discursive Oscillation; Developmental State.

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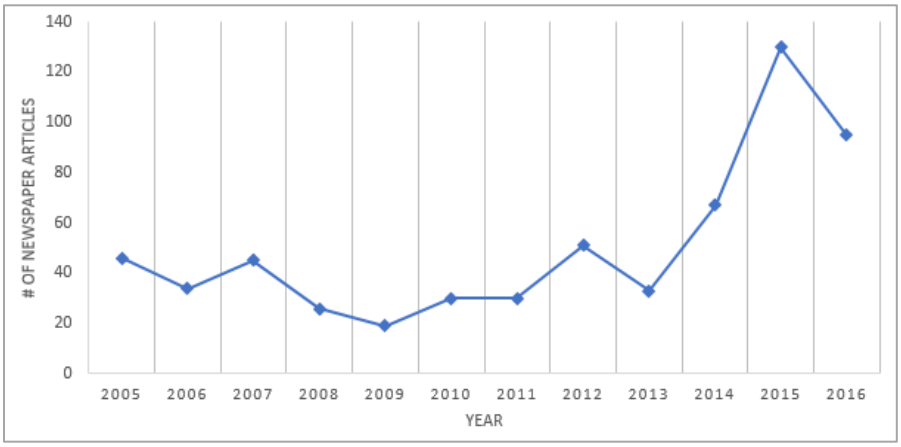
INTRODUCTION

The word *innovation* and its accompanying meaning gained attention in South Korea in the late 1990s. Since then, the Korean government has employed and promoted *innovation* in various parts of the society, especially in its national research and development (R&D) activities. In 2018, South Korea ranked first in the Bloomberg Innovation Index, hailed as the most innovative nation, followed by Sweden, Singapore, and Germany (McKenna, 2018; Jamrisko & Lu, 2018). In this index, South Korea's "patent activity", "R&D intensity", and "manufacturing value-added" were lauded, as announced by the Ministry of Strategy and Finance (MOSF, 2018).

In spite of the prevailing use of *innovation*, however, its meaning has not been obvious or straightforward in South Korea. Also in other countries, as Benoît Godin (2015) has noted, the notion of *innovation* has been a "contested concept" where different ideas and practices have formed and been in conflict for centuries. This paper aims to reveal a tension which has resulted from conflicting concepts of *innovation* in South Korea by focusing on the formation and transformation of the 2015 Government R&D Innovation Plan. The establishment of this plan was symbolic, attracting tremendous attention from the public and researchers in South Korea regarding the significance of national R&D innovation. Figure 1 shows the number of newspaper articles with either of two key phrases, *National Innovation* or *R&D*, between 2005 and 2016.[1]

[1] The authors searched newspaper articles with a Boolean search – 'National Innovation' and 'R&D' – from Naver, the largest search engine in South Korea (accessed on 22 August 2018).

Fig. 1: The Number of Newspaper Articles related to National Innovation and R&D in South Korea



Source: elaborated by the authors (Shin & Jeong, 2019).

By analyzing the development of the 2015 Government R&D Innovation Plan, this paper shows different imaginations on R&D innovation in South Korea and their discursive oscillation. Indeed, there were two documents addressing the 2015 plan – one drafted in early February, which was not publicly released, and the other officially announced in May by the Korean government. By focusing on those two documents, this paper aims to dismantle and disassemble underlying ideas, values, and goals embedded in each document and assemble particular imaginations on national R&D innovation in South Korea.[2] As noted anthropologist Matthew Hull (2012) asserted, a document is a good analytic medium as a "mediator that shapes the significance of the linguistic signs inscribed on [it]" (p. 13). Hull emphasized a need to "look through" documents to uncover a particular order and form in which a set of ideas, values, and goals are imagined.[3]

This study is a document-based discourse analysis. Discourse analysis has been regarded as a useful tool in science and technology studies (STS) to understand how science and technology shape and are shaped by society and rethink their reflective

[2] The initial draft of the 2015 Government R&D Innovation Plan was retrieved by requesting an information disclosure to the Ministry of Science, ICT, and Future Planning (MSIP).

[3] Benoît Godin (2015) mentioned that there are basically two types of source materials for those who study innovation in terms of intellectual history, "one that confines itself to titles on innovation specifically" and the other one which does not (p. 14). The former may provide diverse context on the delicate use of innovation, and it is the main focus of this study.

aspects, for example in knowledge-making, community interaction, and institution building. Following words, text, and references are common ways to reveal the contents and contexts of scientific discourse (Law, 2017). In discourse, different types of knowledge, materials, and images are entangled, creating room for any element to be contested. By disassembling and delineating the entanglement of scientific knowledge, socioeconomic contexts, and legal and institutional settings, interpretive flexibility of concepts and artifacts become visible (Pinch & Bijker, 1987; MacKenzie, 1990; Noble, 1999). This study aims to describe how contents and ideas of innovation are imagined and resisted when policymaking process are underway.[4] By taking a qualitative approach, we will delve into how the notion and connotation of innovation paired with R&D are suggested by a government and how it is developed and imagined.

With both the initial and final policy documents of the 2015 Government R&D Innovation Plan, this paper ultimately shows a substantive discontinuity between the two and illuminates different depictions of R&D innovation in South Korea. In doing so, this paper aims to conduct a critical discourse analysis on the meanings of innovation with the case of the 2015 Government R&D Innovation Plan. Published and unpublished documents from various forms – press releases, policy documents, or research reports – which focus on discussing innovation are examined. It will ultimately highlight a situation of dynamic equilibrium between the two imaginations of R&D innovation, resulting in a conceptual echo that persists in South Korea even today. Before probing the formation of the 2015 Plan, the paper begins by introducing how innovation has been conceptualized in and spread through R&D policy in South Korea since the 1970s.

[4] By doing so, this paper addresses the importance of analyzing contents of policy instead of focusing only on its making process. Recent policy studies have had a tendency to focus more on "how policies are made rather than on the substance or content of policies" (Dye, 2012, p. 59; Sabatier, 2007; Theodoulou & Cahn, 2013).

NATIONAL R&D INNOVATION IN SOUTH KOREA

The first official governmental document created to address the concept of the term *innovation* was the Five Year Plan for Science and Technology Innovation released in 1997 (MST *et al.*, 1997; Song, 2005). By adopting the perspective of the National Innovation System (NIS) from Lundvall's book *National Systems of Innovation*, the document's ultimate aim was to recognize and promote innovative activities in a systematic way. From this viewpoint, innovation was not just a coincidental result that came out of one or two acts of genius but instead from "all parts and aspects of [a certain] economic structure and the institutional set-up affecting learning as well as searching and exploring" (Lundvall, 1992, p. 12). When introducing the concept of the NIS, the Korean government decided to "use a translated Korean word meaning 'National Technological Innovation System' which provided additional emphasis on the importance of technological innovation in companies and highlighted the need to focus on improving national institutions in general to achieve that" (Song, 2005, p. 110). The ultimate goal of the Five-Year Plan, then, was to realize technological innovation that could be a "crucial factor in determining a future national capability" in the 1990s in South Korea (Kwun, 1997, p.2).

Indeed, South Korea has a long history in which the government has taken the lead of governing the direction of the development of both science and technology. A series of five-year national development plans were set up periodically, tightly coupled with a centralized R&D support system, since the early 1960s. The advance in science and technology has been regarded as a national symbol of modernization and economic development (Sun, 2008; Jeon, 2010; Kim, 2016; Moon, 2017). In particularly under the dictatorship of Chung-Hee Park (1963-1979), the military regime touted tremendous support for a policy action plan as a part of its efforts to reconstruct the nation's economic system via science and technology (Kim, 2018; Moon, 2007; Jasanoff & Kim, 2009; Kim & Vogel, 2011). The dictatorship lingers still in the national consciousness, especially its

myth of Park as a "science president", and retains even now potent sociopolitical influence.

This reductive myth deeply resides in South Korean political culture and has been continuously deconstructed and analyzed from the perspective of a complementary relationship between collective imagination upon social order and science and technology. STS scholars have spent great amounts of time and energy on such analysis, and sociotechnical imaginary has become a representative analytical framework to unfold the coproduction of such collective imaginations, and in South Korea it has been done under the influence of nationalism and developmentalism (Kim, 2017a; Kim, 2017b). It is so strong and universal that the imaginary gives huge power to the underlying logic of the national research agenda throughout various scientific disciplines, from biological science (Kim, 2014) to nuclear engineering (Jasanoff & Kim, 2009; Jasanoff & Kim, 2013).

Counting imaginary in science and technology, McNeil *et al*. (2017) argued that it is composed of 1) cultures, communities, and practices; 2) nations, institutions, and policies; and 3) bodies, subjects, and differences. It implies that the social sector is also affected by the same imaginary, as knowledge of science and technology are overseen by people and either supported or limited by societal settings. In other words, the interpretation that science, technology, and the social repeatedly coproduce each other and shape a collective imaginary is applicable to science and technology. In South Korea, for instance, sociotechnical imaginary dominated by developmental nationalism has exerted widespread effects in the form of national science – the definition of R&D and its governance system. This approach provided a significant context for understanding innovation and its link to science and technology. And because of this link, discussing innovation in South Korea is inseparable from the larger history of science and technology policy.

Innovation as a coproductive outcome of legal, economic, and institutional settings, as well as the material consequence of science and technology, has been

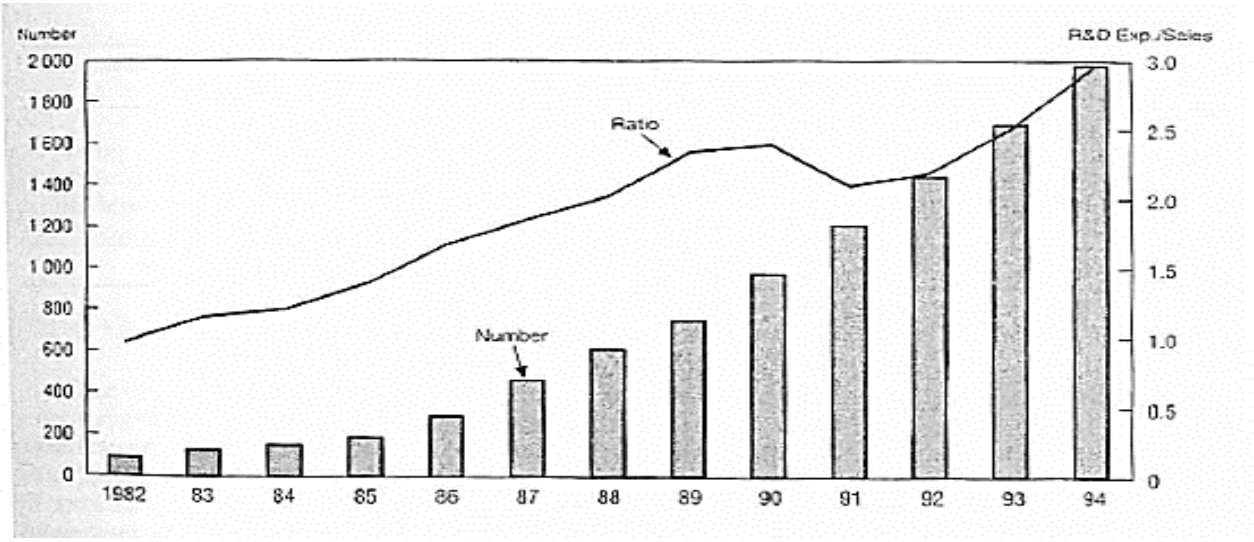
constructed and mobilized by the same imaginary. In the 1960s, government-supported research institutes (GSRIs) were symbolically founded and became "the most important tool at the government's disposal for increasing and orienting the national research effort" (OECD, 1996, p.15). The first GSRI was the Korea Institute of Science and Technology (KIST) established in 1966. Afterward, 19 additional GSRIs were launched mainly in the 1970s, each specializing in a specific field like chemistry, mechanical engineering, or nuclear engineering (Park, 2006; Lee, 2016). From its establishment, KIST was expected to play a vital role on the frontlines of Korean nation-building. The amount of governmental funding given to KIST was unprecedented, with Chung-Hee Park showed his support by often by visiting the KIST in person (Kim, 1990; Moon, 2004). All of the researchers in the KIST received the highest salary among all researchers in South Korea and were exempted from obligatory military service – which was quite a provocative offer, given the contentious political situation between both South Korea and North Korea. The researchers in the KIST were aligned with soldiers in warfare protecting the nation's safety and prosperity. Their research interests were highly restricted. Only several selected researches that were required urgently by the government or the industry could begin at the KIST. A person who dreamed of publishing an article or pursuing academic interest were not welcomed (Choi, 1995; Moon, 2010). It was these assiduous researchers working day and night, while thinking of building the nation who were appreciated as the respectful personhood in South Korea in the 1960s and 1970s.[5]

While connoting and representing a particular way of governing R&D activities in science and technology, the GSRIs also contributed to paving the way toward the rapid industrialization of South Korea. However, their role came into question and was even challenged from the late 1980s as private sector research capabilities expanded. Figure 2 shows the increasing number of private research institutes in South Korea and their R&D expenditure per sales (OECD, 1996, p. 95). By 1994, roughly 2,000 private research

[5] "Never Turn Off the Light of a Laboratory" was the title of a memoir by Hyung-Sup Choi, the first head of KIST and later the Minister of Science and Technology (Choi 1995).

institutes were active, while only 53 had been officially registered in 1981. There was a need to recalibrate the mission of GSRIs to react to the rise of new actors in the R&D activities of South Korea (Ministry of Science and Technology 2008).

Fig. 2.: The Growth of Private Research Institutes and Their R&D Intensity



Source: KITA.

The national R&D system, imagined for nationalistic development and embodied by GSRIs, required innovation in the 1990s. The Five Year Plan for Science and Technology Innovation focused heavily on the issue of innovation in GSRIs. It addressed the importance of "properly dividing the role between the government and the private sector" (MST *et al.*, 1997, p. 53). By "recognizing the demand [that had changed] from developing countries to advanced countries," the Korean government tried to readjust and reestablish a particular role for the GSRIs as well as for private research institutes (MST *et al.*, 1997, p. 59). Instead of concentrating on many kinds of R&D activities, the GSRIs were encouraged to pay specific attention to key aspects of public values of science and technology. The promotion of basic research, combined with emerging and public welfare technologies, was handled by the GSRIs in addition to their support of science

education and science culture. Furthermore, by dividing the roles between different stakeholders, the government's aim was to use a limited amount of funding in a more effective and efficient way without duplicating its investment (MST *et al.*, 1997, p. 22).

In the late 1990s, South Korean R&D system faced a great threat. The Asian Financial Crisis hit countries across Asia, particularly Thailand, Indonesia, and South Korea. The Korean government applied to the International Monetary Fund (IMF) for a bailout in 1997, and in response an urgent measure was required to overcome the crisis. The R&D investment in science and technology was under greater pressure than ever from all parties (Jo, 1997). Innovation, in this particular situation, was seen as the core of saving the nation, and such expectations served to spur greater imagination. This was directly reflected in the Special Act on Innovation in Science and Technology. The act aimed to "push ahead with special supportive and strategic policy measures to realize science and technology innovation that would contribute to the prosperity of the national economy and the overall improvement of the peoples' quality of life" (Special Act on Innovation in Science and Technology, 1997). The government also put additional emphasis on the need to "gather national efforts on science and technology innovation" (MST *et al.,* 1997, p. 7).

It was an establishment of a new way of governing the national R&D system, and this entailed imagining the system in light of the collective imagination. It was a tangible outcome for the time and is one of the most unique characteristics of the national R&D system of South Korea. It has since become a great success story and has been introduced to other countries as well. For example, V-KIST, planned to be built by 2020 with the aid of the United States in the Hoa Lac Hi-Tech Park in Vietnam, is hoped to play a similar role as KIST, which "[served] as a catalyst for the promotion of S&T in Korea" (Mizuno *et al.*, 2018, p. 185; Nguyen, 2018). While globally selling this great success of sociotechnical imaginary that even overcame the Asian Financial Crisis, the South Korean R&D system is actually suffering from a multifaceted critique upon its innovation policy

for repetitiveness, vagueness, and uselessness. The development of the 2015 Government R&D Innovation Plan, one of the most controversial R&D innovation policies ever in South Korea, shows how successful imagination can prevail today when different imagination tried reaching out to the front (and being invisible sooner or later) from seemingly different registers. Tracing the formation and subsequent transformation of the 2015 Government R&D Innovation Plan may provide significant thought for innovation.

FORMATION AND TRANSFORMATION OF THE 2015 GOVERNMENT R&D INNOVATION PLAN

On November 13, 2014, in South Korea, approximately 300 people – from industry, academia, government ministries, media, and civil society – gathered for the Grand Forum for R&D Innovation. It was organized by the Ministry of Science, ICT, and Future Planning (MSIP) to codify the 2015 R&D innovation plan. The ministry identified the forum as the official beginning of the policy process for the 2015 R&D innovation plan. The forum consisted of three successive debates. The first was open to the public and streamed live online, while the second and third were closed. At the inception of the forum, the Minister of MSIP, Yang-Hee Choi, clarified its purpose:

> Over the past 20 years, we have increased our investment in science and technology by about eight times, and, over the next 18 years, over 18 trillion won has been invested in public R&D. However, as you may know well, the taxpayers who pay taxes and civilian taxes here, and the entrepreneurs who take the technology here, are very frustrated. […] I think our country is now in a very urgent transition period. We are confronted with such a severe reality that we have to overcome this without losing the Golden Time.[6]

For former KIST director Kil-Joo Moon, who was present at the debate, it was quite an unusual meeting in a sense that "it was the first time [for him] to see that a minister joined [the debate] from the beginning to the end." At the meeting, the "frustration" regarding

[6] For the full video, see "The Grand Forum for R&D Innovation," Korea Institute of Science and Technology Evaluation and Planning, YouTube, accessed March 19, https://www.youtube.com/watch?v=47BwvIK5Spo.

the effectiveness of the investment in science and technology in South Korea was highly raised as addressed by the Minister Choi.

South Korea has invested a large amount of funds to develop its science and technology sectors. The total R&D expenditure has exceeded 53.5 billion USD since 2014, and public funds have covered approximately 25 percent of the total expenditure. Meanwhile, a crisis theory has lifted its head and made objections to the positive assessment of various R&D policies. According to the report Direction and Standards for 2018 Government R&D, there have been two main points of criticism. First, government R&D had been increasing, yet its rate is now decreasing (7.0% in 2013 and 1.9% in 2017). The R&D activities of conglomerates has also decreased. Second, the quality of R&D outcomes has not been up to market expectations, whereas the number of patents and articles published in science citation index (SCI) journals remains appreciable (MSIP, 2017). South Korea's R&D seems to have entered a "Sweden Paradox", that is, a breakdown of the proportional relation between the increase in R&D investments and the actual economic growth of the country.

Chang-Moo Lee, head of the National Science and Technology Council (NSTC) and the moderator of the first debate of the forum, emphasized the need for "transition" in South Korea's national R&D system. He said that "a transition…[cannot] be delayed" and that "[South Korea has] to figure out where the problems comes from – whether the government is to perpetually oversee the entire management, such as the research and development and commercialization beyond the inter-departmental barriers, or whether it is still bureaucratically rigid, or whether there are problems in our research and industrial fields." Lee was not alone in urging for a "transition" in South Korea's R&D system, with innovation stated as a clear requirement in the transition process.

After the Forum, on May 13, 2015, the Korean government announced its Plan of Government R&D Innovation. Indeed, its first draft, entitled "The Plan for Building Creative

Government R&D Innovation", was composed in February, though it was not publicly released (Government Task Force for R&D Innovation, 2015).[7] Instead, the draft was rewritten and published in May. While the latter version brought serious discussion among scientists, engineers, and the government nationwide, the first draft did not receive any attention from the media or academia.

In the first draft, the government mainly problematized "the stagnant R&D government model" of South Korea. Before the 2000s, the government's main strategy had been to set a clear goal in R&D activities and emphasize the importance of achieving it as fast as possible. This highlighted a "standardized" and "uniformed" control of R&D activities by the government. According to the first draft, what the Korean government needed, then, was a new "model", something that would change the way the government set its goals and managed its R&D activities. For example, as shown in Figure 3, a "transition" was emphasized in terms of the way supporting R&D activities in South Korea (Government Task Force for R&D Innovation, 2015, p. 10). While the government had been focused on supporting R&D "projects", the draft addressed the need to instead support R&D "people". In this way, the government's criteria for the selection of funded research was expected to change from "research proposal" to "researchers' capacity or idea".

[7] "Creative economy" was the Korean government's flagship under the regime of Geun-Hye Park (2013-2017) and referred to "the convergence of science and technology with industry, the fusion of culture with industry, and the blossoming of creativity in the very borders that were once permeated by barriers." See, "The Presidential Inaugural Address," KTV, E-image History Information, accessed March 22, 2019,

Available at: http://www.ehistory.go.kr/page/view/movie.jsp?srcgbn=KV&mediaid=29999794&mediadtl=456720&gbn=DT. (Accessed 19 june 2019).

Table 1. Transition from Project-Oriented to People-Oriented

[Transition from Project-Oriented to People-Oriented]		
	Project-Oriented	**People-Oriented**
Selection	- Based on research proposals	- Based on researcher's capabilities and ideas
Research Support	- Technical support for researchers - Short-term support	- Personalized support for researchers - Lifelong support for outstanding researchers (long-term support)
Corporate Support	- Support only technologies - Support mainly for direct cost	- Support technologies + manpower - Support manpower of technology
Outcomes	- Quantitative achievement	- Qualitative achievement - Human resource development

Source: translated and redrawn by the authors (Shin & Jeong, 2019).

The action plan's table of contents consisted of six major tasks, described in the form of "from A to B", from projects to people; from producer to consumer; from competition for projects to competition for duties and support of corporate growth; from quantity to quality; from fragmentary to systematic; from domestic to global (Government Task Force for R&D Innovation, 2015). In that regard, the first draft stressed the need of "transition" in the government's perspective regarding supporting, managing, and regulating R&D activities.

With this new perspective, the plan aimed to resolve "a big gap between the industrial needs and the R&D activities" and to "activate technology transfer and commercialization of R&D achievement through market-centered research and development." In order to "make the national R&D a key driving force for the creative economy", the following five pillars were set for the "rapid implementation and fieldwork": 1) Resolve duplication in the government and private sectors as well as in industry, academia, and public research; 2) innovation of the GSRIs; 3) development of the GSRIs and universities as research centers for small- and medium-sized enterprises; 4)

innovation of R&D planning and management systems; and 5) enhancement of government as an R&D "control tower".

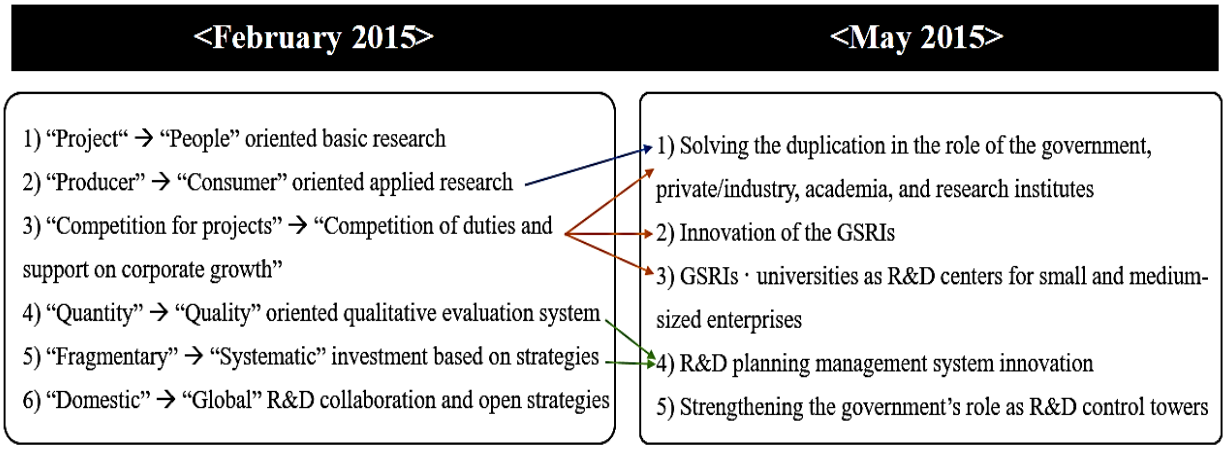
Duplication and vagueness of the distribution role of the R&D system was stressed as a significant problem, but it did not necessarily require strong oversight from the government. The GSRIs, in this narrative, were depicted as one of the pillars of the national R&D system. They always appeared in the draft in connection with two other pillars, universities and industry. For example, a problematic situation – exaggerated competition and vague boundaries regarding the role of researchers – was not due to the GSRIs' excessive concentration on government projects to secure labor costs. Instead, other stakeholders were juxtaposed at the same level, though the mode of their contributions may differ from those of the GSRIs, and so the policy paper retained a systematic view.

The main thesis of the first draft was "to innovate the government R&D's framework at the fundamental level." It aspired to achieve a new "framework" or "model" that would lead to a more "open", "flexible", and "non-standardized" governance policy for R&D activities in South Korea. This document was drafted by the task force, with contributions from multiple government ministries. Multiple ministries had scheduled regular meetings, especially among the vice ministers. For instance, MSIP and the Ministry of Trade, Industry, and Energy (MTIE) met five times before the first draft was created (MSIP & MTIE, 2013; 2014a; 2014b; 2014c). The fifth meeting was about the 2015 R&D innovation policy, and the press release was titled "MSIP and MTIE for R&D innovation" (MSIP & MTIE, 2014c).

It was not until May 2015 that the Plan of Government R&D Innovation was officially announced (Ministry Concerned, 2015a). After the negotiation process had continued for three months, the first draft was made and the strategy and action plans were transformed, while most of its terminology, language, and phrases remained as they

were. They were rearranged and rephrased, and so the plan as a policy document that created a different imagination of R&D innovation in South Korea than that of the initial draft. Both drafts recognized that the key question was the gap between the R&D policy, research practices, and market dynamics, yet they showed different ideas and visions of what desirable R&D innovation policy should be. Figure 4 reveals the development of the Plan of Government R&D Innovation and different key agendas identified in the two documents.

Fig. 4: The Transformation of the 2015 Government R&D Innovation Plan



Source: translated and redrawn by the authors (Shin & Jeong, 2019).

While the first draft problematized the lack of "model" as a key problem, the final plan addressed the lack of "strategy" as a major issue. What the final plan stressed was a need of more "strategic" governance in order to resolve its inefficiency. According to the final plan, South Korea could not get enough outcome from its massive investment for R&D because of its ineffective use and control of funding. It required more strategic decision-making and management by the government. In Figure 3, the agenda for a transition from "project-oriented to people-oriented", suggested as the first task of innovation in the first draft, was substantially reduced in the final plan. Instead, the first mission of the final

plan was to resolve "the duplication in the role of the government, private/ industry, academia, and research institutes." Another significant change was the role of the government. The final plan added a new task of "strengthening the functions of government R&D control towers" and proposed a modified "R&D planning management system innovation."

The final plan inherited a useful amount of strategies and action plans from the first draft but reorganized them in a way that would emphasize the practices of the R&D conducted by specific participants, mostly under the institutional control of the government. The first draft suggested ways to change various elements – investment, evaluation, education, and governance – composed of contrasting objectives, such as projects and people, suppliers and consumers, quantity and quality, and domestic and international contexts. The final plan took a different approach and provided strong guidelines for who is responsible for each assignment. Tasks such as the "innovation of the GSRIs", "GSRIs, universities as R&D centers for small- and medium-sized enterprises", and "strengthening the government as a R&D control tower", indicated specific targeted amendments.

Through this allocation process, the GSRIs became the most obvious target, given their symbolism of R&D. Among the five major tasks, three included the GSRIs in the action plan. "Innovation of GSRIs" was a key task to accomplish through the construction of the centralized control tower. The plan suggested to expand the portion of the project entrusted from the private sector so that the GSRIs would become a "forward base" for innovative national R&D. Plans for establishing a Korean(ized) Fraunhofer Institutes were depicted, which encompassed the existing GSRIs. At the same time, the plan introduced measures to increase the legibility upon the field practiced by improving the evaluation system and promoting movement in the practical field. Several action plans were proposed, including incentives to the best institutions, which would make a good example of private-entrusted projects, extend the term of directors from three to five

years, and add industry-academic cooperation results to the evaluation criteria of professors.

Development, or the restructuring of the plan by the combination of deletion, addition, and (de)composition of each action plan, displayed the first draft as a description of an idea-centered innovation, while the final draft describes innovation centered on the responsibilities of each participant and the following changes. The restructured plan was more diagnostic and prescribed the treatment for national R&D. The final version defined a problem as a "crisis of innovation" due to the expansion in R&D without strategy. The biggest issue of concern was a "gap between the R&D and that of the industrial needs", so the whole plan was focused on filling in certain gaps and ensuring that R&D successfully supported a creative economy (Ministry Concerned 2015a). To make innovation happen, each participant in the R&D system – industry, academia, and GSRIs – were to be in charge of resolving specific missions, while the government is responsible for the proper role allocation and centralized control to prevent each participant from overlapping a certain function. If every participant were performing effectively, then the whole R&D system would become optimized (Ministry Concerned, 2015a).

Once the plan was released publicly, it was followed by detailed action plans listing 38 independent projects within 17 subcategories and five main categories. Once the specific action plans were officially created, its execution was almost immediate. It took roughly a month from the release of the innovation plan paper, and seven action plans were performed by then (MSIP, MOSF & MTIE, 2015). In December 2015, the government announced that 31 out of 38 plans had been completed. As it recalled the past experience in which "[government R&D] had led to economic and social innovation through strategic R&D since the establishment of KIST of 1966 and the Ministry of Science and Technology in 1967," innovation was conducted in a straight way to affect national R&D most efficiently (Ministry Concerned, 2015b).

OSCILLATION OF IMAGINATIONS BEHIND THE NATIONAL R&D INNOVATION

Immediately after the announcement of the final plan, researchers, especially at the GSRIs, raised critical opinions about it. The Scientists and Engineers' Association of National Research Institutes (SEANRI), an umbrella organization composed of research groups including those of the GSRIs, issued a statement asserting that "the government should first present a clear philosophy and a long-term vision for national science and technology," and "it should be an expert in science and technology [instead of governmental officials] who plays a leading role in drafting national science and technology policies and determining the budget plans" (Kang, 2015). They criticized the unchanged way the government had handled and managed scientific activities in South Korea. Hyun-Sil Ahn, an editorial writer focusing on industrial policy, wrote that "neither philosophy nor logic is seen by what they are trying to do" (Ahn, 2015).[8]

In spite of criticism from the media that there was no legitimate policy procedure in the 2015 Government R&D Innovation Plan, the Korean government replied that it was there by highlighting a series of public hearings on the initial draft, although the initial draft had not been officially released. Without knowing the contents of the initial draft, dissenters could not criticize the substantive discontinuity between the two differing policy documents. An existence of policy procedures was insufficient to explain the result of the particular policy. Only by focusing on the transformation of the content of the 2015

[8] The GSRIs' researchers raised their own ideas regarding R&D innovation in South Korea. In June 2015, the Korean Union of Public Sector Research and Professional Workers (KUPRP) suggested four innovation plans and three development plans. The former included 1) independent and unified R&D budget management; 2) unification of R&D support for the small- and medium-sized businesses; 3) intensifying regional R&D centering on the local government; and 4) dismissing duplicated R&D allocated to public and private companies. The latter included 1) full-scale reform of R&D planning and evaluation system; 2) a guarantee of three fundamental rights of labor and the application of "same work, same wage" principles; and 3) securing the autonomy of (tentative) Science and Technology Strategy Headquarters and public sector's research institutes (KUPRP, 2015). The seven action plans revealed that GSRI researchers have also achieved understanding on national innovation in R&D by considering both institutional changes within the system (the former) and a critical retrospective performing R&D under national means and perspectives (the latter).

Government R&D Innovation Plan could the divergent values, ideas, and goals that made up of a particular imagination of national R&D innovation be revealed.

In the final plan, innovation was imagined as a neatly controlled and well-organized set of discrete missions to be resolved by designated stakeholders like the GSRIs. In this line of reasoning, then, the role of the government would be critical as a conductor and strategist. The final plan highly problematized the lack of governmental "strategy" which had resulted in an inefficient use of funding in science and technology. What South Korea needed, according to the final plan, was a more effective strategy that would clearly and properly allocate different roles and resources among specific stakeholders. In contrast, in the initial draft, innovation was imagined as the outcome of unpredictability or uncertainty that should be guaranteed by a more "flexible", "open", and "non-standardized" government policy for R&D activities. The government's role would be less of a conductor and more of a coordinator. It was an attempt to build a new perspective as to how the government could conceive, control, and evaluate scientific activities in South Korea. The initial draft's utmost problem was a lack of a "model" within the government. By diagnosing the major problem for R&D innovation in different ways, the two documents showed different actions plans, solutions, expectations for the role of government, and possible outcomes which led to a specific imagination regarding innovation in R&D activities in South Korea.[9]

Considering long-standing government activities as a major conductor in science and technology policy in South Korea, it was indeed not surprising that the plan was eventually designed in a way to reaffirm the importance of the government. However, it was surprising that, despite the momentum to extend the Korean government's developmental model, a new attempt was initiated – in a form of the draft of the 2015 Government R&D Innovation Plan – to bring a new method and perspective to

[9] Pfotenhauer *et al.* (2018) suggested a theoretical framework that can capture "the dynamics and normative implications…of deficit framing around innovation" having five pillars: problem diagnoses, proposed, remedies, the role of expertise, implied social orders, and measures of success (p. 895).

governmental R&D policy. While the final plan reflected the Korean government's desire to achieve innovation, as it had done before, by adjusting the stakeholders of the national R&D system, the initial draft embodied its desire to innovate the Korean government's mode of thinking of national R&D innovation. In short, the (trans)formation of the Government R&D Innovation Plan showed tension between the inertia to reproduce past glory by following previous experiences and a willingness to embody semantic meanings of innovation with novel approaches.

In spite of similar words, terms, and phrases in the two documents, they put forward disparate goals, means, values and ideas. An effort to move beyond a long-standing catch-up strategy in South Korea, addressed as a top priority issue in the initial draft, was hard to locate in the final document. Instead, the task of innovating the GSRIs and coordinating duplicated roles among different stakeholders was prioritized. In doing so, the government would play a significant role as it has done in South Korea so far. The strong emphasis on the transition from "project and quantity" to "people and quality" mentioned in the first draft, which clarified the government's direction to depart from the past in a form of "from A to B", was diminished further during its transformation.

How can we make sense of this transformation? What happened during this process of policymaking? Was it produced by the strong power of sociotechnical imaginary regarding the R&D system in South Korea? By uncovering a substantive discontinuity between the initial draft and the final plan, this paper shows how important it is to ask such questions. Relying on the power of a long-standing sociotechnical imaginary cannot fully explain this (trans)formation. For example, there was a bureaucratic conflict between the Ministry of Science, ICT, and Future Planning and the Ministry of Strategy and Finance regarding the (trans)formation of the 2015 Plan. Both ministries had their own criteria, methods, and processes for making an agenda for R&D activities. For example, the Ministry of Strategy and Finance had long been examining the ineffectiveness of national R&D with its In-Depth Assessment (MOSF, 2014). Initiated

in 2010 by the extension of the financial evaluation system, this In-Depth Assessments aimed to evaluate the appropriateness and effectiveness of government intervention and provide an analysis of its executive performance (Oh, 2014). Using criteria like "technical payment/research fund X 100(%)" to evaluate the "productivity of research", the In-Depth Assessment addressed the inefficiency and ineffectiveness of the R&D policy in South Korea (STEPI, 2015).

Likewise, there is much more to be said about the process of the policymaking which resulted in the release of the final document, more than can be said by relying on its explanation on the power of sociotechnical imaginary. By questioning a given power of a certain sociotechnical imaginary, it is possible to highlight not only the emergence of substantive alternative imagination, though it can be hardly visible, as in this case, but also a delicate process of making the power of imaginary. The "power" of a sociotechnical imaginary was not a given feature but the outcome of continuous conflict and contests with alternative ideas and practices. What this paper shows is both the emergence of a "transitional" imagination as to national R&D innovation and the still prevalence of its "traditional" imagination in South Korea. It spotlights how its "traditional" imagination was powerful but at the same time, undogmatic. Specific ways in which various imaginations were conceived, conducted, and conflicted, resulting in the (trans)formation of a particular sociotechnical imaginary in a country, may provide a deeper understanding of how innovation mobilizes itself.

What we can see from the government texts (and the periphery) is that similar politics occurs within "a group" in which we have usually thought of as a single political entity in science and technology policy – in this case, the government. Different images do not sprout from different interest groups only. The constant struggle around national innovation in the case of R&D is not only a fight between images of different social groups – government vs. researchers vs. citizens – but can also be found between different stages of the texts in a single (or mixed) group. The 2015 Government R&D Innovation

Plan was a typical ping-pong game of the creation and implementation of national R&D policy in South Korea. Discontinuity between the two drafts left a trace of complicated tension around the actual understanding of national R&D innovation.

Nevertheless, the term *national R&D innovation* was used to the point that it ultimately added to a confusion of meaning and a substantive discontinuity in the establishment of the 2015 plan. It obscured heterogeneous imaginations of national R&D innovation in South Korea. Unfortunately, without an in-depth analysis and review of each discourse, underlying struggles will remain hard to see in South Korea. This has left a group of people to feel like nothing had been accomplished. Instead, the case of the 2015 national R&D innovation plan shows how different ideas about national R&D innovation were developed and confronted. It alluded to a situation in which a diverse set of imaginations of national R&D innovation remained in a state of dynamic equilibrium, and it appeared as if nothing had happened despite numerous actions and conflicts. Innovation was continually reinvented for R&D activities despite the different meanings in which it was referred.

Innovation has replicated itself and sometimes reshaped its meaning. Furthermore, it transcends the domain and transplants its value and success to others. Extensive use of innovation allows the terminology across the domain to expand its territory, but sometimes it can become discursive and have difficulty in reinventing itself as a stable single product. The conclusions integrated into a single imagination do not necessarily appear, nor can they exist in only this form. In the final and post-evaluation, the practice, the image, and the context in which it was imagined may be different in the overall process of innovation. The 2015 national R&D innovation is now being addressed by 2018 and is sometimes used as evidence of lagging (Ahn, 2016) and sometimes as evidence of government effort (Cho *et al.*, 2017).

Similar stories have been repeated until now. The government officially announced the confirmation of the 2018 National R&D Innovation Plan on July 26 (MSIT, 2018a). Prior to this decision, there was an open forum on May 2 (MSIT, 2018b), and another forum was held by the Korean Academy of Science and Technology (KAST, 2018) to collect opinions from researchers and other field workers. By calling it "national", innovation has become discursive, repetitively summoned by different sets of groups, rather than varying and adjusting into a new homogeneous model in an immigrated domain. This reinvention does not guarantee a single definition. If reinventions occurred across the different political cultures of science and technology, then it would become unstable and discursive between several definitions and practices of innovation within the same word. Without resolving the tensions arising from the process of its extension, the reinvented innovation is still valid symbolically as well as practically. Oscillating between different meanings and practices allows innovation to keep its seat, as it were.

CONCLUSION

South Korea has achieved rapid industrialization since the 1960s in spite of its wartime devastation. Known as the "Miracle of the Han-River," the rapid development has been a nationalistic pride for Koreans. In terms of economic growth, it was what Koreans wanted to reacquire, especially when after a serious economic crisis challenged the rising status of South Korea in the late 1990s. In the name of national R&D innovation, the government's initiatives were launched and required national growth through the advancements of R&D activities. In the meantime, the Korean government struggled between the inertia to reproduce past glory by following previous experiences and a willingness to embody semantic meanings of innovation with novel approaches. A clear definition of the national R&D innovation has not been addressed since the beginning when the term *innovation,* arriving from abroad, was used along with many other Xs, i.e. *National R&D*.

The formation and subsequent transformation of the 2015 Government R&D Innovation Plan demonstrated its confusion, which resulted in a substantive discontinuity between the two policy documents. A closed-reading on the policy documents revealed a distinct underlying idea, value, and goal in each document. The content of the policy documents deserved greater attention from researchers as policymaking procedures are immersed in political studies. This paper has highlighted the overt tension of imagining and practicing innovation in national R&D in South Korea. Without an in-depth analysis of the ecology of texts – including orders of words, phrases, and sentences and their relations – it would be hard to grasp an underlying meaning and understand the struggle between various documents. This paper argues that it has led to a status of dynamic equilibrium within national R&D innovation in South Korea despite looking highly repetitive and a continuous conceptual confusion still remains.

After more than two decades since the first innovation plan was established, has South Korea made innovation in its R&D developments? Sporadic discussions of continual science and technology innovation suggest that no satisfactory innovations have yet to emerge. In 2013, the 6th Industrial Technology Innovation Plan was established, and the 3-Year Plan for Economic Innovation was announced in 2014. In 2015, the Creative Economic Innovation Center was established, which was responsible for regional innovation, and the OECD Ministerial Meeting was held in Daejeon with the theme of "Creating a Global Future through Science and Technology Innovation". How do we understand the endless desire for innovation despite any achievements? If we could not find an answer with the question of what is innovation, then, focusing on the expanding nature of innovation, asking how the expansion of innovation is defined and how it is implemented may suggest an alternative answer. The case of the 2015 R&D Innovation Plan reveals the ambiguity of the unanswered questions that show the existence of the discursive and precarious state of innovation.

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Business innovation statistics and the evolution of the Oslo Manual

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ABSTRACT

After the publication of the fourth (2018) edition of the Oslo Manual, a key methodological reference for producing innovation statistics at international level, a review of the definitions of innovation – or, better, business innovation – used by the community of official statisticians has to be recommended. The main reason for such a review is the need to assess to what extent the current Oslo Manual has benefited from the rich economic and management literature on firms' innovation produced since the publication of the previous edition in 2005. It should also be pointed out that the current Manual was expected to fix some long-standing issues like that of properly accommodating service innovation in a statistical framework constantly biased towards innovation in tangible goods and technology-related phenomena. This article argues that these challenges have been only partially met. By reviving some concepts used in the past, such as the object-oriented approach to measure innovation, and being especially concerned to make the statistical framework designed to measure business innovation applicable in other sectors of the economy (including individuals and households), some specific features of the business innovation processes may have been neglected. The Manual discusses a wide array of issues regarding the economics of innovation and management practices, however it does not define a new consistent framework able to accommodate the demand for indicators about the influence on business innovation of the ongoing processes of digitalization, servitization or open innovation and, at least partially, to adopt a service-dominant logic.

Keywords: Innovation statistics; business innovation; service innovation; value co-creation.

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[1] Views and information set out in this article are those of the author and do not necessarily reflect the official opinion of ISTAT.

INTRODUCTION

In October 2018, forty-two months after the launching of the revision process[2], a new edition – the fourth – of the *Guidelines for collecting, reporting and using data on innovation*, better known as the Oslo Manual[3] (OM), was published by the OECD. It replaces the 2005 edition of the Manual and raises great expectations as it displays two key features.

On the one hand, it comes thirteen years after the previous edition. The interval between the second and the third edition was of eight years while only five years had elapsed between the first and the second edition. In a rapidly evolving context of digitalization and globalization, it seems that innovation statistics are becoming less reactive to external inputs. If the next edition of the OM were to come out thirteen years from now, we should expect the current edition to accompany the measurement efforts of innovation statisticians' well into the third decade of this century. In this scenario, the OM 2018 should prove to have been a wise forward-looking exercise.

On the other hand, the OM, which was designed as a short technical manual back in 1992, has seen its size progressively increasing (+40% of words/characters in the 2005 edition compared to the 1997 edition and +100% in the 2018 edition compared to 2005). Rather than just a collection of technical guidelines for statisticians, it now appears to combine in an original way the traits of a statistical manual with those of a treaty on a general theory of innovation.

Although larger and with a broader scope than in the past, the OM 2018 is not expected to trigger dramatic changes neither in the procedures used for data collection,

[2] In April 2015, the OECD's Working Group dealing with innovation statistics – that of the National Experts of Science and Technology Indicators (NESTI) – gave a start to the process of revising the 2005 Oslo Manual. Official meetings, scientific conferences and workshops, policy papers, journals' articles and surveys have contributed to feed with general ideas and specific proposal the OM revision process that has been managed by an OECD-led Steering Group including international experts and delegates from Eurostat and the Unesco Institute of Statistics. Previous editions of the OM were published in 1992, 1997 and 2005.

[3] The Manual, named after the city of Oslo, was originally intended as a further addition to the family of methodological manuals issued by the OECD in the field of science and technology (S&T) statistics. As the oldest, which deals with research and development (R&D) statistics, was named after the town where the meeting approving it took place – Frascati, in Italy – also the other manuals have been following the same rule.

nor in the structure of innovation surveys' questionnaires. This is mainly due to the reluctance by producers and users of official statistics to introduce substantial changes in the well-established definitions of phenomena under measurement. It is to be expected that the OM 2018's main impact will be delivered in the conceptualization of innovation with a few but relevant changes introduced in it. With reference to the basic innovation concepts, the key features of the OM 2018 are the following:

- As far as statistical concepts and classifications are concerned, a higher consistency of the OM with the International System of National Accounts (SNA)[4].
- A wider concept, and definition, of innovation to be potentially adopted across all the SNA sectors, thus beyond the business enterprises sector whose innovation measurement the Manual is formally devoted.
- A strong focus on the "innovation objects" that are now the main targets of the statistical analysis.
- The revival of the dualism "product/process innovation", abandoned in the OM 2005 (by introducing two additional dimensions of innovation: organization and marketing) and now revived in a more comprehensive fashion.

In this article, the implications of these changes will be discussed with reference to some key issues currently under debate in the economic literature regarding the influence of digital transformation[5] on the economics of innovation and, more specifically, on innovation statistics.

A starting point is the demand for more accurate indicators to address both long-standing, but still unmet, challenges in economic statistics – like the availability of a proper classification by economic activity – and new emergencies, such as the impact of digital transformation on the overall range of statistical indicators. Innovation statistics are fully affected by these shortcomings that lead to some key measurement issues:

- How can the concept of "product innovation" be understood in a context of servitization of manufacturing, dematerialization of the industrial output and diffusion of customer-based value co-creation processes.
- To what extent the definition of "innovation implementation" given in the OM 2018 is consistent with an evolving market environment.

[4] SNA classifications and definitions are codified in United Nations (2009).

[5] To be intended as "the systems-level restructuring of economies, institutions and society that occurs through digital diffusion" as defined in Unruh and Kiron (2017).

- How are the digitalization processes affecting business innovation strategies and to what extent their influence can be statistically measured.

Such issues will be discussed in the next paragraphs with reference to the OM 2018 guidelines and, more broadly, to the evolution in the measurement of business innovation by considering the extent to which economic theories and management practices have been able to influence the way business innovation is currently perceived and measured.

BUSINESS INNOVATION OR INDUSTRIAL INNOVATION?

Innovation statistics, as a branch of business statistics, have flourished in the '80s of the last century in the context of a Schumpeterian revival often identified with the publication of several seminal contributions to the economics of technical change (Smith, 2005). They include: Rosenberg's re-consideration of the role of R&D in the innovation process (Rosenberg, 1982), the overcoming of the linear model of innovation (Kline & Rosenberg, 1986), the Nelson and Winter's evolutionary theory of economic change (Nelson & Winter, 1982) as well as the Freeman's economics of industrial innovation (Freeman, 1974) "which for a long time had a virtual monopoly in presenting the 'state of the art' of knowledge in the field" (Fagerberg *et al.,* 2012; Fagerberg & Verspagen, 2009).

The concept of industrial innovation has been a cornerstone of the pioneering efforts of surveying the enterprises' innovation activities. The first two editions of the OM (1992 and 1997) were extensively using such concept, which is still used, although in the broader realm of "industrial statistics", by several countries' official statistics agencies (including the United States' ones) as well as by the statistical institutions of the United Nations.

In its current use, however, *industrial innovation* solely refers to the innovation performed by industrial enterprises, which is only a fraction of the more comprehensive

business innovation that encompasses innovation undertaken by both industrial and service enterprises.

Indeed, around the turn of the century, the increasing relevance of service industries, both in the economy as a whole and in economic statistics, led a number of statistical institutions, like the Statistical Office of the European Commission (Eurostat) and the OECD's Statistical Directorate to adopt the broader definitions of "business statistics" when defining data production regarding activities undertaken by businesses, or for-profit, units[6]. Thus, the term business innovation became popular in the literature by replacing that of industrial innovation[7].

Since the publication of the OM 1992 and the launching of the first Eurostat's Community Innovation Survey (CIS), many criticisms were raised on the focus of both the Manual and the survey on an innovation model largely based on the production of artifacts (technological product and process innovation) and a sectoral coverage restricted to manufacturing firms. Referring to the criticisms directed at the Oslo Manual and related surveys at their early stage, Smith (2005) argues, "… *it seems to be the case that CIS works well for manufacturers, but not for the extremely heterogeneous services sector and its often intangible outputs. The analyses of Djellal and Gallouj (2001) and Tether and Miles (2001) suggest the need for quite different approaches to data gathering on services. In defence of the CIS approach it can be argued that it is, and was intended to be, manufacturing specific and that extension to services would always be problematic*"[8]. An

[6] In this perspective, "industrial statistics" is meant to be a sub-category of "business statistics", i.e. economic data on the following industries: mining, manufacturing, electricity and water supply, sewerage, waste management and remediation activities (ISIC Section B, C, D, and E). For a discussion about the blurring boundaries between manufacturing and services, see De Backer *et al.* (2015).

[7] It is interesting to note that in a key reference work in innovation studies – the 1995 Handbook of Industrial Innovation edited by Dogson and Rothwell – which was assumed focusing on "industrial innovation", a chapter by Ian Miles was devoted to "innovation in services". On the other hand, Google Trends confirms that the term "business innovation" has been constantly more searched than "industrial innovation", at World level, at least since 2004 (although "industrial innovation" was very popular in Web searches from Canada and Germany until 2009).

[8] Godin (2002) was even more categorical: "… The measurement of science and technology had been biased by a hierarchical approach ever since the first edition of the Frascati manual. The manufacturing industries took precedence over the service industries in surveys, for example, and national R&D surveys were initially concentrated on the natural sciences and only later included the social sciences. Finally, related scientific activities have always been systematically excluded from surveys. All in all, current statistics "were built on the bricks and mortar model"."

answer to the need of including services in innovation statistics was given in the OM 1997 (second edition) but the change was only formal. Eight years later, the OM 2005 (OECD/Eurostat, 2005, p.11) thus described its new effort to meet the needs of service industries in the OM framework: "*While the second edition of the Manual covered services, it primarily focused on manufacturing industries. However, innovation in services-oriented sectors can differ substantially from innovation in many manufacturing-oriented sectors. It is often less formally organised, more incremental in nature and less technological. In order to establish a framework that better accommodates this broad range of industries, this edition modifies a number of definitions, terms and concepts.*".

THE EMERGING OF SERVICE INNOVATION

Conceptualization and measurement of service innovation have attracted scholars' attention since the mid-Nineties in parallel with the efforts of giving services a definite role in the economic disciplines (Gallouj & Savona, 2010; Carlborg *et al.*, 2014). Many contributions have shed light on the peculiar role played by the service sector in the innovation processes – among others, Gallouj (1994), Gallouj and Weinstein (1997), Miles (1995) and (2005), Den Hertog 2000; Howells and Tether (2004), Tether (2005) – with the aim of rejecting the *technologist* view, largely influenced by Pavitt (1984), of a service sector as pure adopter of technologies and equipment developed by the manufacturing sector. The complexity and heterogeneity of innovation in the service sector was further acknowledged as a result of a remarkable research effort that set the basis for a broader conceptual and measurement framework[9] able to accommodate most of the cases

[9] Djellal and Gallouj (2018) have identified fifteen advances achieved, over the last twenty years in service innovation studies (SIS):

Advances in the recognition of SIS, in general theoretical perspectives and in understanding of the nature of innovation

1. From non-innovative services to services as simple adopters of technological innovations

2. From services as simple passive adopters to services as active adopters – and even producers of technological innovations

3. From services as adopters/producers of technological innovation to services as producers of specific innovation forms

emerging from innovation surveys which were extended, since 1997, to cover a range of service industries (Djellal & Gallouj, 2001; Drejer, 2004).

This new body of literature often highlights the evolution from a *technologist or assimilation approach* (which argues that innovation is mostly technological and developed in manufacturing industries, with service industries only adopting it) to a *differentiation or demarcation approach* thus emphasizing an increasing awareness of the role of service industries as generators of innovations (not necessarily technological ones). This process has also influenced the evolution of the Oslo Manual and related surveys through a three-stage process that can be described as follows:

a) starting with the measurement of only product and process (i.e. technological) innovation in manufacturing firms (OM, 1992, and CIS, 1992: industrial innovation),
b) then evolving by including service firms in innovation surveys' samples but still within the OM 1992 conceptual framework (OM, 1997, and CIS, 1996),
c) finally, introducing an industry-neutral terminology (business innovation) and a broader concept of innovation, with respect to the previous focus on technological innovation, in order to improve the coverage of service innovation (OM, 2005).

Even though, because of such evolution, "demarcation" surveys have become a standard after the year 2005, the controversy about the role to be given to service innovation was

4. From innovation in certain specific service sub-sectors to innovation across all service activities
5. From innovation in services to innovation through services
6. From innovation in services to service innovation (everywhere)
7. From publications in existing journals to the creation of specialized journals

Advances in innovation operating modes and institutional and regulation arrangements

8. From the 1992 edition of the Oslo Manual to the 2005 edition
9. From assimilation surveys to demarcation and integration surveys
10. From assimilation policies to demarcation and integration policies
11. From the search for productivity to the search for performance
12. From natural interactivity to linearization and back to interactivity
13. From services industrialization to goods servitization
14. Balancing the intrinsic tension between service standardization and service customization
15. Balancing the intrinsic tension between service extension and service regression

not yet settled when the last OM revision started in 2015. The OM 2018 was expected to address the issue conclusively.

Indeed, service innovation is a concept the OM 2018 extensively uses. On the one hand, the progress achieved by the OM 2005 is acknowledged ("*The identification of product and process innovation with technological change was abandoned in order to include service innovations that significantly improved user experiences without necessarily having a technological component*", OECD/Eurostat, 2018, p.15) and, throughout the Manual, the need to systematically include both goods and services in the definition of new products is constantly stressed.

- On the other hand, some technical and conceptual issues are not yet fully covered:[10]
- distinction between goods and services;
- integration of goods and services in servitization strategies;
- distinction between processes and services (as products).

THE GRAY AREA BETWEEN GOODS AND SERVICES: THE SERVITIZATION ISSUE

As already mentioned, a key feature of the OM 2018 is that of reinforcing its consistency with the SNA framework. Thus, innovation statistics are now fully dependent on SNA definitions, including those on goods and services (OECD/Eurostat 2018, p.40). The challenges to be faced in order to operationalize the SNA distinction between goods and

[10] A broader issue, not discussed here, is that about the ability of current statistical classifications to separate manufacturing and service firms (Christensen, 2013). The limitations of the official classification by economic activity, ISIC, in taking into account the growing diffusion of multi-activity firms are extensively discussed in the literature. Nonetheless, the results of innovation surveys (including the European CIS) are regularly diffused according to an industry breakdown (with service firms accounting for 50.8% of the total EU reference population of CIS firms in 2014).

services – when dealing with business, including innovation, surveys – are well known and extensively discussed in the OM 2018 both in chapter 2[11] and in chapter 3.[12]

Unfortunately, no guidelines are given in the OM 2018 (OECD/Eurostat, 2018, p.61) on how to meet such challenges when collecting data on innovation. The Manual just recommends: "*At a minimum, […] to collect data on both goods and services. Surveys should specifically refer to services to ensure that the questions are relevant to respondents from service sector firms*.". In general, OM 2018 acknowledges that goods and services cannot be easily split into two distinct groups but, at the same time, argues that such a distinction is needed for a range of purposes: a) to classify innovations by type (OECD/Eurostat, 2018, p. 60), b) to report the share of sales accounted for by product innovations (OECD/Eurostat, 2018, p. 164[13]) and c) to report about the characteristics of the focal, most important innovation (OECD/Eurostat, 2018, p. 204).

Totally ignored in the OM 2018 is also the issue of the servitization of manufacturing products[14], which is both a driver and a consequence of the digital transformation affecting the manufacturing sector and is usually referred to as the fourth

[11] OECD/Eurostat, 2018, p. 41: "The boundary between a good and a service can be difficult to identify and is subject to constant change. The provision of goods can shift to service-based models and vice versa. Furthermore, some products can combine features of both goods and services, for example, knowledge-capturing products that concern the provision, storage, safekeeping, communication and dissemination of information that users can copy, share and access repeatedly have features of both goods and services (see Chapter 3). Digital technologies have contributed to an increase in the variety of information and knowledge-based products available, as well as the ways in which production (understood in a general sense) and consumption takes place in all SNA sectors.".

[12] OECD/Eurostat, 2018, p. 61: "As noted in Chapter 2, the dividing line between goods and services can sometimes be difficult to establish and some products can have characteristics of both. A company can sell goods to its customers or rent their use as a service, as is often the case for durable consumer goods and for assets for business production. Firms can also bundle ancillary services such as service contracts or insurance with their goods.

Knowledge-capturing products (as identified in the SNA) can have the characteristics of either a good or service and concern the provision, storage, safekeeping, communication and dissemination of digital information that users can access repeatedly. These products can be stored on physical objects and infrastructure, such as electronic media or the Cloud. An example is when access to digital products such as music, films and books is provided on demand to consumers for a fee. Knowledge-capturing products are similar to a good if consumers can share or sell them to others after purchase, but they are similar to a service if the consumer's rights are limited by a license that restricts sharing or selling. Digital technologies, through reducing the cost of copying and exchanging information to a negligible amount, have contributed to the proliferation of knowledge-capturing products.".

[13] OECD/Eurostat, 2018, p. 164: "Under some conditions it may be possible to disaggregate the innovation sales share by type of product innovation (goods or services), or by the location of sales (domestic or foreign markets). However, disaggregation by type of innovation will be difficult for firms that combine goods and services into a single product, such as when capital equipment manufacturers combine equipment sales with a service maintenance contract.".

[14] To make a distinction from the overall servitization process. i.e. the increased importance of the service sector in industrialized economies (Available at: https://en.wikipedia.org/wiki/Service_economy Accessed in 6 July 2019). Examples of firms' experiences can be found in West (Shaun) *et al.*, 2018.

industrial revolution[15] (or Industry 4.0). That of servitization is neither a new trend – dating back to the pioneering introduction by Rolls-Royce of the *power-by-the-hour*[16] concept in the '60s – nor is it unknown in the literature (Vandermerwe & Rada, 1988; Baines *et al.*, 2009; Santamaria *et al.*, 2012; Lightfoot *et al.*, 2013; Lanz & Maurer, 2015; Fontagné & Harrison, 2017).

Not surprisingly, as a well-established trend within the process of digitalization of manufacturing firms, many contributions and analyses on this subject can also be found in business management literature. An interesting concept used in management is that of an "outcome-based economy" i.e. "*an economy in which value is driven by the delivery of complete solutions that meet a need—in other words, outcomes. In this type of economy, companies will compete on their ability to provide outcomes, rather than just products*" (Accenture,[17] February 2017). This could be seen as the essence of servitization that is not at all a minor phenomenon as it is already quite widespread in manufacturing firms[18] and further fueled by the new capabilities made available by the adoption of advanced digital technologies (mostly by the smart use of Big Data and the Internet-of-Things). This trend will probably radically affect the future measurement of business innovation. At stake, here, it is not the ability to make a distinction between goods and service innovation but rather the meaningfulness of the concept of product innovation itself.

[15] The term is usually credited to Klaus Schwab, Chairman of the World Economic Forum (Schwab, 2017). More information can be found at the WEF website (https://toplink.weforum.org/knowledge/explore/4th-industrial-revolution).

[16] In 1962, Rolls-Royce developed a new business model by selling fully maintained aero engine use by the hour, rather than by the unit.

[17] Available at: https://www.accenture.com/us-en/blogs/blogs-outcome-based-economy-emergence-chemicals (Accessed in 6 July 2019

[18] In a survey among UK industrial firms (sample size not known) carried out for the Annual Manufacturing Report 2018 (Hennik Group, sponsored by PwC and others, May 2018), 79% of surveyed manufacturers said "digital technologies will help broaden their customer base via service-based offering (servitization)" (Available at: https://www.themanufacturer.com/wp-content/uploads/2018/05/AMR-2018-Amended-May-2018.pdf) Accessed in 6 July 2019. A survey of 750 manufacturers in 16 countries (Antony Bourne, Servitization: Preparing The Manufacturing Industry For What's Next, Ifs White Paper, February 2017) found that 70% of respondents were offering some level of servitization (Available at: https://www.ifsworld.com/corp/sitecore/media-library/assets/2017/02/16/servitization-and-manufacturing-white-paper/ Accessed in 6 July 2019).

VALUE PROPOSITIONS AND BUSINESS MODELS

Business management literature offers another useful concept to extend our understanding of business innovation: that of *value proposition:*[19] literally, "an innovation, service, or feature intended to make a company or product attractive to customers"[20] (Hassan, 2012; Osterwalder & Pigneur, 2010; Osterwader *et al.,* 2014). It implies that every time a new product is marketed, customers will rate it according to several criteria. They include the assessment of some key features of the good or service, such as price, quality, speed of delivery and completeness of the supporting services but also of a new dimension: that of the relationship between the customer and the producing company. This encompasses the value of the company's brand, the options of linking it to additional devices or services and even the emotional appeal of the company (or of its goods and services) for customers (factors only partially captured by the OM category of design innovation).

Defining a successful value proposition is not just about marketing but also about the effectiveness of the overall firm strategy and, most importantly, of its business model. If innovators will no longer be concerned with bringing on the market "products" but rather "value propositions", the focus of innovation will have to be redefined through a two-steps perspective:

a) a technical, or technological, effort to improve the product itself (either a good or a service), which is similar to the traditional Oslo Manual's view of "product innovation" (before introducing it on a market) and
b) a strategy of product delivery, based on a clear business model focusing on the interaction with customers in order to generate a successful value proposition that could make the innovation successful in a life-cycle perspective.

[19] "The phrase "value proposition" (VP) is credited to Michael Lanning and Edward Michaels, who first used the term in a 1988 staff paper for the consulting firm McKinsey and Co. In the paper, which was entitled "A business is a value delivery system", the authors define value proposition as "a clear, simple statement of the benefits, both tangible and intangible, that the company will provide, along with the approximate price it will charge each customer segment for those benefits". [...] According to Hassan [2012], however, there is no specific definition for Value Proposition." (Available at: https://en.wikipedia.org/wiki/Value_proposition#cite_ref-1 Accessed in 6 July 2019) .

[20] Available at: https://www.dictionary.com/ (Accessed in 6 July 2019)

By stressing this approach, it could be said that business innovation can be described only with reference to a specific business model. Moreover, it is often related to a *business model innovation* (Massa & Tucci, 2014; Johnson *et al.,* 2008; Chesbrough, 2007; Chesbrough *et al*., 2013) of which an effective value proposition is a key component (Lindgardt *et al*., 2009). Different business models could require the undertaking of various combinations of innovation activities and, as a result, different outputs in terms of product and process innovations. By considering the on-going process of digital transformation, changes in business models have become more frequent, at least as a defensive move, even in small and medium enterprises (Rachinger *et al.,* 2018; Bouwman *et al.,* 2018). This is going to influence frequency and composition of innovation activities that can be hardly evaluated outside the context – i.e. the business model - where they have been generated.

While the OM 2018 was expected to introduce such a dynamic perspective in official innovation statistics, the OECD made a different choice by keeping the dualism between product and process innovations at the center of the scene. In the OM 2018, business model innovation is seen only as the combined change – to be assessed ex-post, rather than ex-ante – of a number "*of business processes such as the production, logistical, marketing and co-operative arrangements in use as well as the main products that a firm sells, currently or in the future, to achieve its strategic goals and objectives*" (OECD/Eurostat, 2018, p. 66). The OM 2018 approach relies on two assumptions:

a) "*there is no single, recognised definition of a business model innovation*" (OECD/Eurostat, 2018, p. 66), which is true as shown by Foss and Saebi (2017), nevertheless a rich literature on this subject offers a lot of alternative definitions;
b) it is difficult to make a distinction between comprehensive and partial, or even multiple, business models (and innovation thereof).

As a consequence, according to the OM 2018: "*It is not recommended to directly collect data on business model innovation as a distinct, stand-alone category through innovation surveys because of the difficulty in differentiating partial business model innovations from*

other types. However, the occurrence of comprehensive business model innovations could be estimated through analysis […] that combines information on the types of innovations introduced by a firm with other questions on innovation objectives, including a question on the objective of establishing a new business model […]." (OECD/Eurostat 2018, p.67). Such choice will negatively affect the comparability among innovators who, though operating in the same industry or market, when introducing new products and processes adopt different strategies and business models.

AND IF SERVICES WERE REALLY DOMINANT?

Beyond the issue of discriminating between goods and service innovation, assuming it is possible and useful to do it, another long-standing issue in the measurement of service innovation – that of separating service and process innovations – is still largely unaddressed. Such issue is widely discussed in the literature (Gallouj & Savona, 2010) which points out that delivered services are often virtually indistinguishable from the processes used to deliver them. In the OM 2018[21] the issue is addressed by simply acknowledging that respondents to innovation surveys can potentially report about multiple innovations that belong to various innovation types[22] in an aggregated way even though – as it is implicitly accepted by mentioning previous OECD works in this area (e.g.

[21] OECD/Eurostat, 2018, p. 66: "A business process innovation can significantly improve the quality of a product, resulting in a joint business process and product innovation.

- A product innovation can require a supporting business process innovation. This is particularly common for service innovations. For example, a new online function for selling information products is both a business process innovation (requiring information and communication technology [ICT] and web development) and a service innovation for potential users. If it creates a new sales channel for the first time, it can also be a marketing innovation.
- Product and business process innovation can be closely intertwined, especially when the process is not distinguishable from the product. This applies particularly to services for which production, delivery and consumption occur simultaneously.".

[22] OECD/Eurostat, 2018, p. 59: "Product innovations are divided into two main types, while business process innovations are divided into six broad types […]. A single innovation can involve combinations of different types of product and business process innovations. Consequently, the typology of innovation types by object is not a classification of mutually exclusive categories. Furthermore, a firm can introduce more than one type of innovation over the observation period for data collection. It is therefore recommended to collect information on multiple types of innovations on the assumption that the responses can refer either to different innovations or to innovations that combine two or more innovation types.".

Frenz & Lambert, 2012) – the data collected will be more useful for analytical than for statistical purposes.

This highlights the issue of the *complementarity between innovation types*. Ballot *et al.* (2015) have found evidence of a high level of complementarity between product and process[23] innovations in small innovating firms in France and UK, which raises a fundamental question about the ability of respondents to make a clear distinction between such broad innovation categories. In order to overcome this issue, at least the concept of service innovation should be better defined. A review by Snyder *et al.* (2016) found four main, commonly used categorization criteria that could be potentially adopted fin order to qualify service innovations:

- by change (radical vs. incremental),
- by newness (new to the market vs. new to the firm),
- by means of provision (technology vs. organization) and, finally,
- by type of change (product vs. process).

The latter, which is ranked as the second most common, highlights the polymorphic nature of service innovation that, by providing the conditions to develop additional innovations, often plays a strategic role in the innovation process itself. In this perspective, Salunke *et al.* (2013) have proposed a further distinction between *interactive* (or external) and *supportive* (or internal) service innovations: "*This conceptualization focuses on value co-creation and customer experience. Interactive service innovations potentially create sustainable competitive advantages, whereas supportive service innovations offer no such direct effect. Innovative changes that the customer discerns and experiences (interactive service innovations) provide avenues for implementing a superior value-creating strategy difficult for competitors to duplicate*". This interpretation is based on the pervasive role of service innovation which, mostly when coupled with digitalization

[23] In the restricted meaning adopted in the OM 2005, i.e. "technological" process innovation that is "… the implementation of a new or significantly improved production or delivery method" (OECD/EUROSTAT, 2005, p. 49).

processes, it is essential to improve the internal efficiency of firms and, in terms of new services offered on the market, contributes to enrich their value proposition.

This approach has also been conceptualized, once again at the crossroad between economics and management studies, as a Service-Dominant logic (SDL) (Vargo & Lusch, 2004; Vargo *et al.*, 2008). The SDL view is, shortly, that all exchanges are based on services, and that:

> *…when goods are involved, they are tools for the delivery and application of resources. That is, goods are service-delivery vehicles. In S-D logic, knowledge and skills are key resources for competitive advantage…* (Vargo & Lusch 2004 cited in Vargo *et al.*, 2008, p. 147).

The same article clearly describes the implications in terms of value creation:

> *For S-D logic, value results from the beneficial application of operant resources, which are sometimes transmitted through operand resources or goods (Vargo & Lusch, 2004). Thus, from this view, value is co-created through the combined efforts of firms, employees, customers, stockholders, government agencies, and other entities related to any given exchange, but is always determined by the beneficiary (e.g., customer).* (Vargo *et al.*, 2008, p. 148).

Without going into further detail, the impact of such an approach on the conceptualization of service innovation is self-evident and calls for a re-consideration, from the SDL perspective, of several elements already described: the servitization processes, the co-creation of value as a result of a successful value proposition and the key role of customers in making new business models successful.

Additional studies have been focusing, more specifically, on the contribution SDL could give to the conceptualization and measurement of service innovation (Ordanini & Parasuraman, 2011; Edvardsson & Tronvoll, 2013; Kohronen, 2014; Lusch & Nambisan, 2015). This allows for comparing the OM 2018 to alternative approaches and to draw lessons for improvement of the official statistics' measurement exercises. Huarng (2018) effectively describes the key features of the current business innovation conceptualization according to the SDL view:

> *First, innovations are not developed solely within the boundaries of organizations. As well as arising from internal sources, innovations occur in collaboration with an extensive network of external agents, including suppliers, partners, and customers*

> *(Chesbrough, 2003; Sawhney and Nambisan 2007). Second, the core elements of innovations are not only tangible, but also intangible, taking the form of information that is transferred to customers. The emphasis has thus shifted from the physical attributes of goods to the values or experiences that are perceived by customers (Prahalad & Ramaswamy 2004; Vargo & Lusch, 2004, 2008; Lee, 2015). Third, innovations can shape the strategy of organizations (Lee & Olson, 2010). Innovations are now considered part of the broader context of supplier–customer relationships (Cantista & Tylecote, 2008). Organizations aim to develop a continuous flow of innovative solutions to specific customer problems. The notion of innovations no longer refers to something new in absolute terms but rather something that is new for a particular customer. (Huarng et al., 2018, p. 454.).*

Several views find a convergence in this approach.

- First of all, that of *open innovation* (Chesbrough, 2003; West & Bogers, 2014; West (Joel) *et al.,* 2014; West & Bogers, 2017) as a widely accepted paradigm that assumes that "*firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology*" (Chesbrough, 2003). This short definition also includes the notion that innovation has to be implemented in a business model open to both knowledge inflows and outflows, and to systematic cooperation with external partners through market and non-market relationships.[24]
- Second, the inclusion in a consistent conceptual framework of both the *tangible* and *intangible* contents of innovations whose combination contributes to value creation and co-creation as the ultimate objectives of business innovation.
- Third, a re-interpretation of the feature of *novelty*, no longer dependent on the technical attributes of the innovation output but generated as a result of the relationship between innovators and customers.

In this context, the issue of value co-creation, i.e. the existence of a "*value- and/or experience-centric focus*" (Lusch & Nambisan, 2015, p. 156), is of paramount importance. Thus, the OM 2018 emphasis on the dualism both between tangible-intangible innovation outcomes (goods vs. services) and between producers and customers becomes irrelevant. The process can be essentially described as starting with a *Producer* issuing a *Value-proposition* that triggers a *Value Co-creation* interaction where the *Customer* plays an essential role in evaluating the attractiveness of the production output, thus enabling such co-creation of value. Shortly, in the *goods-dominant logic* service offerings are

[24] The "open innovation" approach has been introduced in the Oslo Manual for the first time in its fourth edition (OM 2018) by amending a confused reference in the OM 2005 to open ("open information sources") as a synonym of free ("This notion of "openness" does not necessarily imply that knowledge is free of charge [i.e. "gratis"] or exempt from use restrictions [i.e. "libre"]." OECD/Eurostat, 2018, Box 6.1 p. 125). On the other hand, the OM 2018 adopts only partially the canonical concepts and terminology of the open innovation theory (as developed by Chesbrough and others) in order to keep a consistency with the OM 2005 approach of measuring, in innovation surveys, inter-institutional "linkages" rather that genuine knowledge flows.

"designed with value" while in the SDL the value is always co-created with the customer through the activation of sets of resources (Edvardsson & Tronvoll, 2015). The consequence of this change of paradigm in the definition of the business innovation process is that of a substantial redefinition of the key stage when an innovation can be identified as such (also defined as the *innovation implementation* stage, see Gault, 2018).

THE IMPLEMENTATION DILEMMA

Throughout its four editions, the Oslo Manual has been consistent in its view that the innovation implementation is achieved when a producer deems the output of an innovation project as sufficiently developed to be (potentially) marketed. With respect to this approach, the SDL suggests that the implementation stage should be logically extended to include the role of the customer as co-innovator as well as the influence of the *service system*, i.e. the context where implementation takes place.

Yet, when one compares how *product innovation,*[25] has been defined in the second, third and fourth edition of the Oslo Manual some substantial differences in the conceptualization of innovation implementation can be pointed out (Table 1).

Table 1. How OM definitions of innovation have been dealing with "implementation" over time.

OM 1997	• A technological product *innovation is the implementation/commercialisation* of a product with improved performance characteristics such as to deliver objectively new or improved services to the consumer.
OM 2005	• An *innovation is the implementation* of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. • A product *innovation is the introduction* of a good or service that is new or significantly improved with respect to its characteristics or intended uses.
OM 2018	• A business innovation is a new or improved product or business process (or combination thereof) that differs significantly from the firm's previous products or business processes and that has been introduced on the market or brought into use by the firm.

[25] It is worth to remember that the three definitions all include both goods and service innovations.

	• A *product innovation is a new or improved good or service* that differs significantly from the firm's previous goods or services and that has been introduced on the market.

Source: prepared by the author (Perani, 2019).

The most striking difference is that in OM 1997 and in OM 2005 *innovation is the implementation* while, in OM 2018, *innovation is the output* (product or process). This changes dramatically the understanding of innovation, which was previously based on the innovator's activities (subject approach) and now is going back to the pre-Oslo Manual emphasis on innovation outputs[26] (object approach). This change of definition is not without risks: it works well with reference to goods but if we accept the view that goods are increasingly merged with services and that services are often clustering by generating comprehensive value propositions, how can single innovations be identified and properly compared with each other?

On the other hand, this change of perspective does not affect the relevance of the implementation as the stage where the output of an innovation project (an idea, a prototype, a blueprint, etc.) becomes an "innovation". At the beginning of the OM 2018, a key principle of innovation measurement is recalled: "*Innovation is more than a new idea or an invention. An innovation requires implementation*." (OECD/Eurostat, 2018, p. 31). Immediately after this statement, the new OM 2018 approach is delivered by describing how implementation (i.e. turning a product into an innovation) takes place: "*either by being put into active use or by being made available for use by other parties, firms, individuals or organisations*". Two criteria are mentioned here, "use" and "availability", where it is clear that the more generic one (availability), if used for classification purposes, prevails on

[26] Here the terminology suggested by the Oslo Manual 2018 is adopted. OECD/Eurostat, 2018, p. 230: "The innovation literature commonly distinguishes between different stages of an innovation process, beginning with inputs (resources for an activity), activities, outputs (what is generated by activities), and outcomes (the effects of outputs).".

the other (use) even if only because a product, before being used, has to be made available to potential users.[27]

Not surprisingly, these two criteria have generated *two different definitions of innovation* given, respectively, in chapter two and three of the OM 2018. The rationale for this dualism is that of emphasizing the difference between a *broad definition* that could serve the need of identifying generic innovation evidences across all SNA sectors (businesses, public institutions, non-profit institutions, households, etc.) and a *more specific (and traditional) definition* to be used for data collection in business innovation surveys[28].

From a technical point of view, to deal with two definitions of innovation, although consistent each other, will raise the need, in order to prevent any misunderstanding, to thoroughly inform both data providers and users of statistics which one is adopted in data production.

From a logical point of view, it can be pointed out that the broader definition is based on a generic availability concept (*making something new available to potential users*), while the *business innovation definition* is based on a qualification of such availability concept: that of "introduction on the market" that should be interpreted as equivalent to "availability to potential customers" (thus a specific sub-case of the broader definition mentioning only potential *users*). The broad and strict definitions are compared in detail in Table 2.

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[27] In the OM 2018, the implementation issue is discussed in paragraph 2.2.4 at page 34 but without suggesting any original criterion but novelty to make a clear distinction between inventions and innovations. A logical remark is that an invention does not become an innovation only because is made available to potential users.

> "82. In order for a new idea, model, method or prototype to be considered an innovation, it needs to be implemented. Implementation requires organisations to make systematic efforts to ensure that the innovation is accessible to potential users, either for the organisation's own processes and procedures, or to external users for its products. The requirement for implementation is a defining characteristic of innovation that distinguishes it from inventions, prototypes, new ideas, etc.
>
> 83. At a minimum, innovations must contain characteristics that were not previously made available by the relevant organisation to its users. These features may or may not be new to the economy, society, or a particular market. An innovation can be based on products and processes that were already in use in other contexts, for instance in other geographical or product markets. In this case, the innovation represents an example of diffusion. Innovation diffusion can generate substantial economic and social value and is consequently of policy importance. This manual defines innovation to include diffusion processes […], while providing guidelines for identifying different levels of novelty, including new-to-world innovations." (OECD/Eurostat, 2018, p. 34).

[28] The need of introducing in the OM 2018 a broad definition of innovation was argued by Gault 2015 and 2018.

Table 2. A multi-stages innovation implementation approach.

Innovation implementation stages	STAGE A. Generic availability	STAGE B. Availability to customers / Valorization	STAGE C. Value co-creation
Source	Oslo Manual 2018, ch.2.	Oslo Manual 2018, ch.3. European CIS survey (various years)	Service dominant logic. US Survey on the Division of Innovative Labor (Arora *et al.*, 2016, 2018).
General definition	An innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process).	A product innovation is a new or improved good or service that differs significantly from the firm's previous goods or services and that has been introduced on the market. A business process innovation is a new or improved business process for one or more business functions that differs significantly from the firm's previous business processes and that has been brought into use in the firm.	
Business innovation definition (used in business surveys).		*A product innovation is the market introduction of a new or significantly improved good or service with respect to its capabilities, user friendliness, components or sub-systems.* *• Product innovations (new or improved) must be new to your enterprise, but they do not need to be new to your market.* *• Product innovations could have been originally developed by your enterprise or by other enterprises or organizations.*	*In 2009, have you earned revenue from* *any new or significantly improved* *products or services in this industry* *introduced since 2007, where "New"* *means new to your firm. Also, please* *exclude simple resale of goods* *purchased from others or purely* *aesthetic changes.*

Source: prepared by the author (Perani, 2019).

The OM 2018 approach indirectly confirms the understanding of innovation implementation not as a single punctual stage in the innovation process but rather as a

sequence of events/actions; an *implementation continuum.*[29] Which single point, along such *continuum*, sets the conversion of an output into an innovation is just a matter of convention.

In Table 2 a simplified example of how such *implementation continuum* could be described is given. Without excluding that further implementation steps could be identified (economic and social impacts, technological feedbacks, systemic spillovers, etc.), three main stages are described in Table 2: let's start with comparing stages A and B.

The first reflects the definition proposed in chapter two of the OM 2018. It has been purposely developed for use in surveys addressing potential non-market "innovators" and, as the innovation "monomania" is spreading throughout society (Kaiserfeld, 2015), it is to be expected that it will be extensively used in future surveys although no actual use of it is reported so far.

The second is based on the definition given in chapter three of the OM 2018 that, in order to keep the consistency with the definition used in innovation surveys so far, does not deviate too much from the OM 2005 terminology and concepts. It still focuses on the criterion of *introducing a product on a generic market* as a condition to identify an innovation, thus highlighting both the availability of a new product to potential customers (not just generic users, as in the previous case) and the valorization of the product itself (by assuming that every product offered for sale in a market should have a price).[30]

[29] Such implementation continuum could be also seen as a segment of an innovation value chain as described in Roper et al. (2008).

[30] This is an interesting issue because the OM 2018 has to acknowledge that many products (mostly services, including a number of digitally delivered services) are currently distributed free of charge for users even it cannot be excluded that the producers could be able to generate revenues/profits indirectly, for instance by selling advertising services associated to the original services. These cases do not fit in the OM 2018 chapter three approach unless a new definition of market would be given (t was, of course, beyond the scope of the OM 2018). To address the issue, the OM 2018 implicitly allows for making the chapter 2 definition (generic availability to users) prescriptive also when dealing with business outputs.

The OM 2018 (OECD/Eurostat 2018, p.60) states: "A product innovation must be made available to potential users, but this does not require the innovation to generate sales. Limiting product innovations to those with sales would exclude product innovations that fail to meet established or expected demand or where sales require a longer observation period to materialise. In addition, this would exclude digital products that are offered at no cost to users, with revenue obtained from advertising, monetising user information, or through other methods.".

If the first definition should also be adopted in business surveys, thus lowering the threshold for the identification of innovations, many false positives could be found among both innovations and innovators. This would worsen the concerns by users about including in statistics some innovations that, according to the practices used in innovation management, should be classified as *unsuccessful innovations.*[31]

It is worth mentioning that a selection of users/stakeholders of the Oslo Manual, surveyed by Eurostat at the beginning of the OM revision process,[32] did ask for a stricter, rather than a looser, OM definition of innovation. They highlighted the needs of: a) reducing subjectivity in innovation surveys, i.e. providing respondents with an understandable and clear-cut definition of innovation implementation; b) capturing more information about the innovation value of a new product and, potentially, its economic and social impact. Similar views were expressed also by reputed scholars, like Professor Bronwyn Hall (University of California) and Professor Ben Martin (University of Sussex), during a 2016 workshop on the measurement of innovation (National Academies, 2016, p. 7). The former, by stressing the need for integrating innovation measurement at micro and macro level, observed that "*for many questions, it is the value of the output of innovation activity that is the most ideal to measure*", and the latter, argued that: "*whether in the market or non-market context, there could be a danger of bringing in incremental product changes that do not have an impact on economic or social outcomes and well-being*".[33]

[31] There are many different estimations about the rate of failure of new products. Even though it is obviously highly differentiated across industries, a 40% of failures is usually seen as a reliable estimation of the average failure rate of new manufacturing products. (Castellion & Markham, 2013).

[32] In September 2015, Eurostat launched a survey among academicians and analysts who were contributors to the literature on economics of innovation and/or had experiences in processing innovation surveys' data. One-hundred-eighty experts from a large number of countries answered the survey. Survey results can be made available by Eurostat Unit G4 upon request.

[33] National Academies (2016), p. 55. In May 2016, the US Committee on National Statistics of the National Academies of Sciences, Engineering and Medicine organized an expert workshop, rather than a survey, to discuss concepts and models for measuring innovation with participants from many countries and with a mixed professional background. The on-going revision of the Oslo Manual was a subject of discussion, too. Professor Martin made his intervention by commenting a statement by Professor Eric Von Hippel urging that "Oslo Manual [will] include non-market diffusion [of innovation]" and expressing the opinion that: "Its exclusion from the definition is a barrier to recognizing that activities taking place beyond the market can be innovations".

HOW TO CAPTURE VALUE CO-CREATION

It does not seem that the OM 2018 has been able to accommodate the needs of those advocating for a definition of business (product) innovation that fully considers the potential for value creation or, better, co-creation. Nevertheless, the OM 2018 devotes a whole paragraph (OECD/Eurostat, 2018, p. 34) to value creation:

- "*Value is […] an implicit goal of innovation, but cannot be guaranteed on an ex ante basis because innovation outcomes are uncertain and heterogeneous*".
- "*Value-related measures are […] important for understanding the impacts of innovation, although there is no single measure of economic or social value in established statistical frameworks such as the SNA*" but "*… markets for products and finance fulfil a selection function for innovations by guiding the processes of resource allocation in the Business enterprise sector*.".
- "*The realization of the value of an innovation is uncertain and can only be fully assessed sometime after its implementation. The value of an innovation can also evolve over time and provide different types of benefits to different stakeholders*.".

In order to sum up the OM 2018 argument, it could be said that:

- value (co)-creation is an innovation goal but since it is uncertain, it is not essential for the identification of the innovation itself;
- markets can select, under some conditions, the potential innovations according to their value but it takes time and, more than a *criterion for the identification* of an innovation, value has to be seen as a *feature of innov*ations to be assessed ex-post.

This is another example of adoption of a goods-dominant logic. In the SDL paradigm, the process of value co-creation takes place alongside with the exchange between the producer and the customer and it makes no sense to account for it "sometime after […] implementation". Only by rejecting the idea that the output of a project (either an invention, a prototype or a model) could become an innovation simply by making it available to potential users will it be possible to develop an alternative approach that could be based on the identification of innovations by assessing their potential for value co-creation.

The stage C described in Table 2 suggests that the interpretation of the OM 2005 definition of innovation given in the successful US survey on the Division of Innovative Labor (DoIL) might allow for a viable alternative.

Unlike the traditional approach of the European CIS, which fully adopts the OM 2005 terminology in its key question to respondents ("Do you have introduced on the market any new or significantly improved good or service during the reference period?"), the DoIL survey (Arora *et al.,* 2016, 2018) goes straight to the point, combining the introduction on the market of a new product and its actual purchase by customers by asking: "In 2009, have you earned revenue from any new or significantly improved products or services in this industry introduced since 2007?". Here a small change in the survey filtering question marks a substantial evolution from collecting information on outputs with reference to the implementation stage B in Table 2 "Availability to customers / Valorization", to the operationalization of the implementation stage C "(potential) Value co-creation".

Two clarifications are needed. First, assessing a potential for value co-creation is useful to qualify as innovations only those inventions, prototypes, etc. that, once introduced on the market, have passed the test of acceptability by customers. Outputs, which though offered on the market do not generate revenues should simply not be seen as "innovations" (not even as failed or unsuccessful innovations). On the other hand, the marketization of a new product is not the final stage of the *implementation continuum.*[34] Further stages can be identified where the interaction between producers and customers keeps generating additional exchange and use value for both with potential spillovers on economy and society. It is true, as suggested by the OM 2018, that these phenomena can be analyzed ex-post in order to take into account the additional time they need to be fully developed. On the other hand, there is no reason why innovation surveys – which

[34] This point is supported also by the OM 2018 (OECD/Eurostat, 2018, p. 34): "Lastly, implementation is not the final step for an innovative organisation. Follow-on activities to review innovations after their implementation can result in minor improvements or new innovations, e.g. through a fundamental redesign or major improvements. Some of these follow-on efforts could potentially result in innovations in their own right. Post-implementation reviews can also lead to the abandonment of innovations.".

are by definition backward-looking exercises – could not ask about the current effects, in terms of market value creation, of innovations whose implementation started during the surveys' reference periods.

Second, the OM 2018 concerns about how to deal with potential product innovations that are not going to be implemented through the traditional commercial channels need also to be taken into consideration. Providing that the co-creation of value resulting from the interaction/co-operation between producers and customers will be kept as a reference, at least three different cases of innovation implementation can be identified:

- New commercial products (goods or services) that are marketed thanks to a successful value proposition and whose level of implementation (adoption by customers) can be, at least as a proxy, measured in terms of revenues/sales (as in the DoIL survey).
- New goods and mostly services that are implemented by means of a co-creation process where producers are not remunerated in terms of direct sales but receive compensations from other sources (e.g. advertising). In this case, an additional indicator of the indirect revenues generated by the use of these "innovations" should be developed, as well as an indicator of their actual use by customers. For instance, with reference to software or cloud services, an indicator of their intensity of use could be developed.
- New services, and partially goods, made available to customers free of charge. This is the case for many online services already available to customers whose number could increase in the future as collaborative or "sharing" business models will further evolve. It includes, for instance, smartphones' applications (apps) that can be freely downloaded from selected digital stores. These are potential innovations that are made available to users/customers in the digital marketplace. In principle, they cannot be considered actual innovations until a significant group of customers has downloaded them and extracted some value (i.e. any kind of value or advantage) because of their use. In this respect, related indicators of use (number and frequency of downloads, rate of appreciation by customers, etc.) would be needed.

Testing new data collection approaches is possible and recommendable in order to extend our knowledge of the *implementation continuum* and to avoid that innovations could be identified at a too early stage of development with the result of inflating the total estimated number of innovations (and innovators).

INNOVATION IN A DIGITALIZED ECONOMY

The key driving force that should have suggested the introduction in the Oslo Manual of an SDL oriented view – so to focus on the value co-creation potential of business innovations, rather than on their qualitative level subjectively assessed by survey respondents – is the digital transformation of the business sector.[35] To understand the effects of the pervasive influence of digitalization on business in general, and on business innovation in particular, is a key topic currently under consideration by economists (Teece, 2018[36]). On the measurement side, it is probably the main challenge official economic statistics have to face since after World War II.

The SNA is on the forefront (Ahmad & Schreyer, 2016) in dealing with this challenge and several national and international initiatives have been already launched in order to reconsider some fundamental SNA definitions and estimation procedures by taking into account the emerging economic phenomena generated by digital transformation, as it is the case of Nakamura *et al.* (2017) who try to incorporate the *digital free economy* into the SNA framework.

Innovation statistics should be equally concerned about redesigning their conceptual basis in order to properly account for new emerging phenomena that influence the measurement context, thus avoiding that the diffusion of digital technologies could lead to an over-estimation of the innovation efforts even when such technologies are adopted only as a standard replacement of outdated infrastructures or practices.

The OM 2018 describes in a detailed way (OECD/Eurostat, 2018, paragraph 5.5.3, page 112) the potential impact of the digitalization processes on firms activities and, indirectly, on their innovation projects. The focus of the OM 2018 is indeed on assessing

[35] This is, of course, a megatrend whose boundaries can be hardly set. A generic introduction can be found in Brynjolfsson and McAfee (2014) and a definition in Unruh and Kiron (2017).

[36] "The value-capture problem for innovators in the digital economy involves some different challenges from those in the industrial economy. It inevitably requires understanding the dynamics of platforms and ecosystems." (Teece 2018).

the digital capabilities of firms rather than on evaluating the actual impact of digitalization on business processes, so for data infrastructures connecting various business functions, as well as for the remote storage and processing of business data. As a consequence, the OM 2018 draws the conclusion that, as

> *…digital-based innovations are widespread, with respondents noting their use in a very high share of innovations in all industries […] there is little value in identifying innovations that contain or were developed through the use of digital technologies. Instead, data collection should obtain information on the digital competences of firms as a key component of their innovation capabilities.*

Unfortunately, even questions on digital capabilities should not be asked, according to the OM 2018, in innovation surveys but, if possible, in dedicated business surveys on information technologies' capabilities.[37]

This OM 2018 recommendation is not surprising in a conceptual framework based on a static and firm-centric idea of product innovation. Unfortunately, this *goods-dominant logic* is no longer able to effectively describe what happens in the real world where even goods – like, for instance, gaming consoles, smartphones or sport wristbands – are not competing in the market only on their intrinsic technical quality (also because most of them are based on the same technological platform or incorporate the same components of their competitors) but mostly on the attractiveness of the value proposition they offer to customers. This includes: the reputation of the brand and its allurement, the number of people to be potentially connected through these devices (with special attention at the customers' own environment), the ability to connect to other devices from the same brand or from other brands, the availability in terms of number and quality of software applications or digital games to be run on the device, the support

[37] "Dedicated ICT surveys (OECD, 2015b) are the main instrument for collecting data on ICT use by firms. The most cost-effective option that also reduces response burden is to link data on digital capabilities and usage from ICT surveys with data from innovation surveys. If no dedicated ICT surveys are conducted in a country, or if data linkage is not possible, innovation surveys can opt to directly collect data on the use of digital technologies." (OECD/Eurostat 2018, p.113); "digital competences (may be collected through dedicated ICT surveys)." (OECD/Eurostat, 2018, p. 114).

given by the producer and the potential access to the community of customers, etc.[38] To develop such a composite value proposition a strategy and a business model based on an SDL view are needed. In addition, an open innovation approach can help to share knowledge and data with other firms to allow for interoperability and unconditional access to common resources (e.g. software), as well as for an effective communication with customers, which could make further value co-creation possible.[39]

In order to understand whether the potential of digital technologies has been effectively used by firms for innovation purposes, evidence of the adoption of a value co-creation strategy should be looked for. To ask survey respondents about the development of internal digital capabilities is not enough. The statistics community will have to develop in the near future a new logic consistent with the structural changes taking place in the economy as a result of the diffusion of digital technologies. Infrastructures, platforms and services are constantly evolving and are affecting the behavior of innovators who are increasingly interacting with external networks and clusters of capabilities.

Nambisan *et al.* (2017) offer an example of how research on innovation management is affected by the overwhelming digitalization processes by arguing that three pillars of innovation research could be shaken by the new paradigm: a) innovation processes are being shaped by the interaction of a number of products, platforms and services that affect the nature, direction, timing and objectives of the processes themselves; b) innovation agencies cannot be predefined because they evolve as a result of the interaction among various actors; c) the traditional boundaries between processes, goods and services can no longer be taken for granted as they change their nature in a fluid and dynamic way.

[38] In a sense, this is a concise definition of an innovation ecosystem as described in the open innovation literature like Chesbrough (2003, 2007). A critical review of the concept can be found in Oh *et al.* (2016).

[39] How value co-creation processes are affected by the introduction of new digital technologies is also a relevant issue to be addressed. See Kagermann, 2015.

A rich literature (Barrett *et al.,* 2015), including a range of country- and sector-specific case studies, is already available as a basis for the development of a new, digitally-conscious, innovation measurement framework. Overall, awareness should be raised among statisticians that these new research questions[40] will necessarily entail a further development work to complement the current OM framework.

CONCLUSIONS

By looking at the changes introduced over time in the OM's key concepts and definitions, an evolution process can be barely identified. The OM 2018 has critically revised some advancements achieved in the previous editions, like that of interpreting innovation as the process of delivering something new and also valuable, by going back to the straightforward view that, as far as products are concerned, any new product is an innovation by definition. Another example is the reference definition of innovation becoming broader – i.e. "to make something new available to users" – while leaving the question of qualifying the real value of the innovation introduced unanswered.

It should also be noted that some recent developments in the economic and management literature are totally – SDL, servitization – or partially – open innovation, business model innovation – neglected in the OM 2018.

Of course, as to its inner nature of statistical manual, the OM 2018 will have to be evaluated according to its effectiveness and ability to provide a set of tools for improving innovation statistics at international level and, most importantly, to make them relevant to researchers and policy makers.

In this respect, three points need to be highlighted. First, the choice of ensuring an almost total continuity with the statistical practices prescribed by the OM 2005 should be mitigated by adopting a more flexible approach in the design of innovation surveys.

[40] A demand for specific indicators already exists also about definite digital phenomena like digital platforms; see de Reuver 2018.

There is a growing demand for new indicators and for exploring new innovation behaviors; statisticians should keep testing new questions and new indicators. Second, as innovation is more than ever a multi-faceted phenomenon, new surveys should be developed to explore firms' strategies (with reference, for instance, to their intangible assets), new business models (e.g. digital platforms) and the innovation impact at economic and social level (starting from evidences of value co-creation). Third, the request for more information on the effects of the digital transformation should convince statisticians to review some basic classifications (like that on economic activities, ISIC) or statistical definitions (chiefly, that of *enterprise*) to adapt them to the changes taking place in the real world.

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