

**X-Innovation:
Re-Inventing Innovation Again and Again**

Gerald Gaglio, Université Nice Sophia Antipolis
Benoît Godin, INRS, Montreal
Sebastian Pfotenhauer, Technische Universität München

**Project on the Intellectual History of Innovation
2017**

Project on the Intellectual History of Innovation
385 rue Sherbrooke Est, Montreal, Quebec H2X 1E3
Telephone: (514) 499-4074 Facsimile: (514) 499-4065
www.csiic.ca

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.

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, 1971:73).

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: 118, 128-29; Usher, 1929: vii, 10; Hansen, 1932; Stern, 1937; Schumpeter, 1939: 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?

¹ Social theorists made themselves “innovative ideologists” here, to use Quentin Skinner’s term. They introduced a new meaning for innovation, different from that of the previous decades or even centuries. Until then, the concept of innovation was either a verb or a substantive, an action (introducing new things into the world) or the outcome of that action (novelties). In contrast, to the theorists, innovation is a *process*, a process in time, from the generation of an idea to its application in a practical context, from theory to practice. This representation takes many forms, depending on the discipline. To the sociologists, the process (and its sequence) is one from (individual) adoption to (social) diffusion; to the economists, from invention to commercialization; to management schools from (product) development to manufacturing.

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: 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 and 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 and Moulart, 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 and Harisson, 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: 211).

Rarely if ever did the socialists of the 1830-40s themselves make 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: 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: 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.

² Historians too made use of the term. Historiography of politics as well as that of the working class used social innovation to refer to examples or models (Owen and Fourier) or to make analogies with innovation in politics, religion or literature.

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 and 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)
Educational Innovation (Miles, Carlson)	Open innovation (Chesbrough)
Political innovation (Walker)	Hidden innovation
Social innovation *	Disruptive innovation (Christensen)
	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,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”. Can 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 The Brooks report talks of “a control mechanism ... to forecast the range of possible effects of technology on society and the natural environment, so as to illuminate society’s choices before options are foreclosed by default” (OECD, 1971: 78), “an assessment process embracing the *whole* economy and relating the *whole* of technology to the *whole* social and natural environment ... The management of progress implies an effort to take into account the future” (p. 79)

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 and 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.

References

- Callon, M. (2007), L'innovation sociale: quand l'économie redevient politique, in J.-L. Klein and D. Harrisson (eds.), *L'innovation sociale: Émergence et effets sur la transformation des sociétés*, Québec : Presses de l'université du Québec : 15-42.
- Cloutier, J. (2003), *Qu'est-ce que l'innovation sociale?*, Montreal, UQAM: Crises.
- Comte, Auguste (1841), *Cours de philosophie positive*, Volume 5, Second Edition, Paris: Ballière et Fils [1864].
- Dedijer, S. (1984), Science and Technology-Related Social Innovations in UNCSTD National Papers, in C.G. Heden and A. King (eds.), *Social Innovations for Development*, Oxford: Pergamon Press: 57-92.
- Drucker, Peter F. (1957), *Landmarks of Tomorrow*, NY: Harper and Row.
- Encyclopedia Britannica (1888), *Communism*, T. S. Baynes (ed.), volume 6, Third edition, New York: Henry G. Allen: 211-19.
- Godin, Benoît (Forthcoming-A), Innovation and the Marginalization of Research, in *Handbook of Science and Public Policy*, Stefan Kuhlmann, Dagmar Simon and Weert Canzler (eds.), Edward Elgar.
- Godin, Benoît (Forthcoming-B), *Intellectual and Conceptual Histories of Technological Innovation*, MIT Press.
- Godin, Benoît (2017), *Models of Innovation: The History of an Idea*, Boston: MIT Press.
- Godin, Benoît (2016), Technological Innovation: On the Emergence and Development of an Inclusive Concept, *Technology and Culture*, 57 (3): 527-56
- Godin, Benoît (2015), *Innovation Contested: The Idea of Innovation Over the Centuries*, London: Routledge.
- Godin, Benoît (2008), In the Shadow of Schumpeter: W. Rupert Maclaurin and the Study of Technological Innovation, *Minerva*, 46 (3): 343-60.
- Godin, Benoît and Gerald Gaglio (Forthcoming), Why Innovation Sustains 'Sustainable Innovation', in *Handbook on Sustainable Innovation*, Frank Boons and Andrew McMeekin (eds.), Edward Elgar.
- Godin, Benoît and Joseph P. Lane (2013), 'Pushes and Pulls': The Hi(story) of the Demand Pull Model of Innovation, *Science, Technology and Human Values*, 38 (5): 621-54.
- Hansen, Alvin H. (1932), The Theory of Technological Progress and the Dislocation of Employment, *American Economic Review*, 22 (1): 25-31.
- Havelock, Ronald G. and Mary C. Havelock (1973), *Educational Innovation in the United States*, report to the National Institute of Education, US Office of Education, Washington.
- Hillier, J. et al. (2004), Trois essais sur le rôle de l'innovation sociale dans le développement territorial, *Géographie, économie, société*, 2 (6): 129-52
- Klein, J.L., and D. Harrisson (eds.) (2007), *L'innovation sociale: Émergence et effets sur la transformation des sociétés*, Québec: Presses de l'université du Québec.
- Ionescu, Cornel (2015), About the Conceptualization of Social innovation, *Theoretical and Applied Economics*, 22 (3): 53-62.
- Lechevalier, Jules (1834), Des paroles d'un croyant, *Revue du progrès social*, 1 (5): 518-38.

- Mesthene, E.G. (1969), Foreword, in R.S. Rosenbloom, R. S., and R. Marris (eds.), *Social innovation in the City: New Enterprises for Community Development*, Cambridge (Mass.): Harvard University Press.
- Morse, Dean and Aaron W. Warner (eds.) (1966), *Technological Innovation and Society*, New York: Columbia Press University.
- Morton, Jack Andrew (1971), *Organizing for Innovation: A Systems Approach to Technical Management*, New York: McGraw Hill.
- Mulgan, G. (2007), *Social Innovation: What It Is, Why It Matters and How It Can Be Accelerated*, SKOLL Centre for Social Entrepreneurship, Oxford, Said School of Business.
- Mumford, M.D. (2002), Social Innovation, *Creativity Research Journal*, 14 (2): 253-66.
- Murray, R., G. Mulgan and J. Caulier-Grice (2009), *Generating Social Innovation: Setting an Agenda, Shaping Methods and Growing the Field*, available at www.socialinnovationexchange.org.
- Nussbaumer, J., and F. Moulaert (2002), L'innovation sociale au coeur des débats publics et scientifiques, in J.-L. Klein and D. Harisson (eds.), *L'innovation sociale: Émergence et effets sur la transformation des sociétés*, Québec : Presses de l'université du Québec : 71-88.
- OECD (1971), *Science, Growth and Society: a New Perspective*, Paris: OECD.
- Sargant, William L. (1858), *Social innovators and Their Schemes*, London: Smith, Elder and Co.
- Schatzberg, Eric (2006), *Technik Comes to America: Changing Meanings of Technology Before 1930*, *Technology and Culture* 47: 486-512.
- Schumpeter, Joseph A. (1939), *Business Cycles: A Theoretical, Historical, and Statistical Analysis of the Capitalist Process*, Two Volumes, New York: McGraw Hill.
- Stern, Bernhard J. (1937), Resistance to the Adoption of Technological Innovations, in US National Resources Committee, *Technological Trends and National Policy*, Subcommittee on Technology, Washington: USGPO: 33-69.
- Usher, Abott Payson (1929), *A History of Mechanical Inventions*, New York: McGraw-Hill.
- Veblen, Thorstein (1899), *The Theory of the Leisure Class*, New York: Dover [1994].