# The Vocabulary of Innovation:
# A Lexicon

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## Abstract

Innovation is certainly one of the most popular words of the modern imaginary. Yet innovation is only one of many words used to talk about novelty or newness. This paper looks at the vocabulary used to talk of innovation over the centuries. The paper compares the vocabulary of two *epistemes*. The first *episteme* spans from the Reformation to the nineteenth century, a period when innovation was most unwelcome. The second *episteme* is that of the twentieth century, precisely when innovation changed meaning and acquired its *lettres de noblesse*.

The paper documents a far more comprehensive view of innovation than that offered by some modern theorists, whose self-referencing "history" of innovation is repeated again and again, like a myth. This canonical paradigm of the late twentieth century has eclipsed the diversity of meanings and representations of the previous decades, even centuries.

No one Language ever required the Use of a Dictionary more than the English [which] is founded in such a variety of other Languages [and where] daily Innovations are introduced (A Society of Gentlemen, 1768).

Innovation has come to mean all things to all men, and the careful student should perhaps avoid it wherever possible, using instead some other term (Ames, 1961).

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Innovation is certainly one of the most popular words of the modern imaginary. Yet innovation is only one of many words used to talk about novelty or newness. For example, in the nineteenth century, invention was the catchword. Today, artists talk of creation, and in the previous centuries of imagination. Early theorists in anthropology and sociology talk of innovation, but without using the word. It is only in the second half of the twentieth century that innovation has become a slogan, grouping a diversity of other words or concepts. Innovation is part of a semantic field concerned with change and novelty/newness in a large sense.

If innovation is one word among many, the intellectual history of innovation has to take into consideration a whole semantic field, as Reinhart Koselleck suggests, not identifying a concept with any single word. There exist a range of "synonyms, antonyms, associated terms, forming a more or less unified part of a vocabulary at a given time". The historian seeks "to identify the variety of meanings [a concept] may bear" (semasiology) but also seeks "out all the terms and expressions that could be used to designate" the concept (onomasiology) (Hampsher-Monk et al., 1998: 2).

There is a debate as to whether words are different from concepts. To Reinhart Koselleck, concepts are words with a special historical meaning. Concepts condense a multiplicity of meanings for which a word is used. A concept abridges certain forms of stabilized word use. It is an abstraction from patterns of words usage, a "concentrate of several substantial meanings" (Koselleck, 1972: 85). In this sense, concepts are always ambiguous and have a multiplicity of interpretations. The study of concepts continually demands contextualization, according to the writers, the types of document, fields of endeavour, countries and epochs. To Conal Condren, a concept does not belong to a different order of phenomena from words. It is words that have a conceptual space or semantic fluidity. This conceptual space may be larger or smaller. A concept has a wide capacity or area of operation, a capacity to subsume different doctrines due to extension by definition and redefinition (e.g.: to avoid odious terms), conflation (synonymy at the expense of one of the terms) and distinction, borrowings (from neighbouring concepts), associations, substitutes and opposites (Condren, 1994: 16-17, 61).

I do not enter into this debate here. I totally agree with Condren: concepts do not exist independently of words. I also agree with Koselleck: a concept is more than a word. The enlargement of a concept's semantics marks its passage from word to concept. Like many words that Koselleck studied, after c.1789 the word innovation enlarges its meaning and becomes a concept used to talk of experienced and expected changes, including those that were denied before. Yet in practice, a concept cannot be talked about and defined without using other words, or even contrasting it to other concepts. There is a whole vocabulary of interrelated words to talk about a concept.

Nevertheless, the historian has to start somewhere. In the past few years, I have delimited my research area to the concept of innovation. The aim is, as Niklas Olsen puts it in his study of Koselleck's work, to trace the fate of a concept which has turned into "a particularly intense level of linguistic condensation", in the present case a concept which has become a rallying cry and which carries romance and commendatory overtones. "All conflicting social layers and political parties are using [the same basic concept] to communicate their different experiences, interests, and party-political programs" (Olsen, 2012: 182). Yet innovation never stands alone in my work. I have to take into consideration the whole vocabulary with which innovation is discussed. For example, from the sixteenth to the nineteenth century, continuous references are made to "change" (Godin, 2010c; Godin, 2012-13).

This paper studies the vocabulary used to talk of innovation over the centuries, in order to understand what innovation is or what representation people have of the concept. The paper makes use of dictionaries, diverse discourses (royal declarations, sermons and pamphlets) and theories. The paper compares the vocabulary of two *episteme*. The first *episteme* spans from the Reformation to the nineteenth century, a period when innovation was most unwelcome. I delimit this *episteme* with two moments, from the widespread use of innovation as a concept (seventeenth century) to the critique of the then-current representation (nineteenth century). The vocabulary of this *episteme* consists of four words: change, reformation, revolution and innovation. The second *episteme* is that of the

twentieth century, precisely when innovation changes meaning and acquires its *lettres de noblesse*. The vocabulary of the modern *episteme* also consists of four words – imitation, invention, action and creativity – that I study through the theorists' definitions of innovation.

Some of these words act as counter-concepts to innovation (e.g.: reformation, imitation) and others as basic concepts (e.g.: action). Still others are contested (e.g.: invention) or at the periphery or un-theorized (e.g.: creativity). Before the twentieth century, what innovation is is what the opponents to innovation say of it, particularly the Church and its disciples, dramatizing the consequences of innovation. In the twentieth century, innovation is what the apologists of innovation, including the theorists, say. In both cases, innovation is an evaluative concept.

The paper is divided into three parts, the first two devoted to the vocabulary of the two *episteme* respectively. The third part asks whether and to what extent theoretical definitions of the twentieth century have resolved the controversies of the previous centuries on what innovation is. The paper documents a far more comprehensive view of innovation than that offered by some modern theorists, whose self-referencing "history" of the idea of innovation – which contains little study of primary sources – gets repeated again and again, like a myth. This canonical paradigm of the late twentieth century has eclipsed the diversity of meanings of the previous decades, even centuries. The few historical thoughts on theories of innovation – mostly banal references to history – neglect many writers and their contributions to the development of the idea of innovation. In fact, theorists do not invent from scratch. They draw upon and are influenced by numerous analyses conducted before them. They repeat these views, work upon them and draw them together into a single model

**Innovation: "Anything That [the Nation] Has Not Been Used To"** [1]

Every language has its own word for innovation, or novelty of a certain kind: *kainotomia* to the Ancient Greeks, *novitas* to the Romans, *novatio* to Latin writers and those in pre-revolutionary France and Scotland, innovation in England. From the Reformation onward, innovation is strictly pejorative. Whether one looks at religion, politics, philosophy, science or social reform, innovation is negative. As "introducing change into the established order", innovation is a polemical weapon used against those who attempt to change things (Godin, 2012).

What innovation means may be defined explicitly, for example in dictionaries. One also expects definitions in theoretical works. However, theories of innovation do not exist before the twentieth century – although some, like Niccolo Machiavelli and Francis Bacon, offered some conceptual thoughts or vision (Godin, 2014a). There is no writer, no theory and no philosophy of innovation. One has to look at official documents (e.g.: royal proclamations) and everyday discourses (e.g.: sermons, pamphlets, etc.) to study what innovation means. In such documents, innovation is more often than not talked of in terms of contrasts to something else or in terms of synonyms. When, in the late sixteenth and early seventeenth century people started using innovation in everyday discourse, they talked of it in terms of associations (e.g.: "heresy") and epithets (e.g.: "dangerous") (Godin, 2014d).

Innovation belongs to a semantic field and a hierarchy of words used to talk about novelty, from the most neutral to the most subversive. There is a hierarchical semantic construction or "ordering of significance" of words, to use Michael Freeden's phrase (Freeden, 2011):

[1] Clarendon, E. E. (1702), *The History of the Rebellion and Civil Wars in England, Begun in the Year 1641*: 71.

Change
Reformation
Innovation
Revolution

Before the nineteenth century, *change* and *reform(ation)* were accepted to a certain extent, provided they did not disturb the established order and were gradual. Yet the two words, particularly reformation, are often used to talk of innovation without using or to avoid using the word innovation. [2] In this sense, reformation is innovation in disguise. In contrast, *innovation* and *revolution* are rejected by many as being subversive of the established order.

*Change*

The issue that concerns everyone who talks of innovation is change. "Were there not that DESIRE OF NOVELTY and SPIRIT OF CHANGING in the world", states Hester Lynch Piozzi in his *British Synonymy*, "fewer INNOVATIONS would perplex mankind, and fewer misfortunes distress them" (Piozzi, 1794: 313). The basic question is whether change is natural or human. One expects change to be continuous and gradual. As Robert Nisbet puts it, continuity is the "most deeply seated axioms of Western thought" (Nisbet, 1969: 174). Change is, or should be, natural and continuous. Development, evolution and progress refer "to a slow, gradual and cumulative type of change". No leaps are admitted; things changed by degree, little by little. In this context, unexpected or undesired change brought into the world by humans is an innovation.

"Innovation" comes from the third-fourth century, as *in* + *novo* (Godin and Lucier, 2014). It is one of those words that admits of both a concrete (substantive: novelty) and an abstract (verb: introducing something new) meaning, both end and means. However dictionaries usually stress the verb form. As Samuel Johnson put it, innovation is "introducing novelty" (Johnson, 1755). The verb form points to the one who innovates –

[2] The same is true for many other words, like "republicanism" in America before 1776 (Hanson, 1988).

the innovator – as the factor requiring control. One had to wait the nineteenth century for a definition of innovation as substantive in dictionaires, as in the *Dictionnaire de la langue française* from Émile Littré (1872-77): innovation is defined as both "action d'innover" and "résultat de cette action".

> Substantive: novelties (new ideas, behaviors, objects)
> Action: introducing (or bringing in) something new
> Process: from invention to diffusion (commercialization)

Seventeenth and eighteenth century English dictionaries define innovation as changing the old *and*/*or* introducing something new in its place. To a certain extent, changing stresses the past: innovation is change of "old customs" or "old fashions" (Phillips, 1658; Blount, 1661; Coles, 1677; Kersey, 1702, 1708; Manson, 1762), while making new points to the future: innovation is "bringing in of new opinions" or "new customs" (Phillips, 1658; Coles, 1677; Miege, 1677; Manson, 1762), something "not known before", "unknown to former times" (Johnson, 1755; Fenning, 1763; Sheridan, 1780), "not practiced before" (Rider, 1759; Fenning, 1763).

> Innovation
>
> A making new, also a bringing in of new customs or opinions (Phillips, 1658)
>
> A bringing up of new customs, opinions, etc. (Coles, 1677)
>
> Change or alteration (Miege, 1677)
>
> A binging in of new customs or opinions (Kersey, 1708)
>
> Change by the introduction of novelty (Johnson, 1755)
>
> Change arising from the introduction of something unknown, or not practised before (Manson, 1762; Fenning, 1763)
>
> Change by the introduction of novelties (Sheridan, 1780)

Innovate

To make new or become new, to renew or change his old fashions (Blount, 1661)

To make new or become new (Coles, 1677)

To bring up new customs, to cause a change (Miege, 1677)

To bring up new customs instead of old ones (Kersey, 1702)

Laying aside old customs and bringing up new ones [one's own] (Kersey, 1708)

To bring in something not known before (Johnson, 1755; Fenning, 1763; Sheridan, 1780)

However, from the mid-eighteenth century onward, novelty is stressed rather than custom, and the key definition is "introduction of novelty", a definition suggested by Samuel Johnson, among others, and used in every later definitions of innovation – up to today. French dictionaries carry the same definition, but with more qualifications. Very often, change to the religious order (Furetière, 1690; Dictionnaire de l'Académie française, 1694; Féraud, 1787) and to the political order (Richelet, 1680; Furetière, 1690) are stressed, because they are considered "important" matters (Puget, 1773) or "existing for a long time" (Furetière, 1690). Often these qualifications are made with regard to the verb innovate or the innovator and "novator" [3] – as the "cause" or "author" of innovation, as some English dictionaries put it (Miege, 1677; Coles, 1677):

Inovation [one 'n' only]: chose nouvelle qu'on veut introduire dans un état (Richelet, 1680).

Innovation: changement d'une coutume, d'une chose établie depuis longtemps. En bonne politique, toutes les innovations sont dangereuses. Les innovations en matière de religion aboutissent à des schismes, à des guerres civiles … Pour vivre en paix, il ne faut rien innover, ni dans l'état ni dans la Religion (Furetière, 1690).

Novateur : celuy qui introduit quelque nouveauté, quelque dogme contraire aux sentiments & à la pratique de l'Église (Dictionnaire de l'Académie française, 1694). Les novateurs sont dangereux. Il se dit quelquefois De ceux qui veulent innover dans quelque matière que ce soit (Dictionnaire de l'Académie française, 1762).

[3] "Ce mot d'inovateur n'est pas approuvé, on dit novateur" (Richelet, 1680); "on ne dit pas innovateur: le mot usité est Novateur. Innovateur manque à la langue … Novateur ne le supplée pas. Celui-ci ne se dit que des opinions, et pour d'autres objets, il ne peut exprimer le sens de celui qui innove" (Féraud, 1787)

> Novateur: celui qui entreprend des choses nouvelles dans des matières importantes telles que la religion, la politique, la jurisprudence … Toute innovation qui attaque les principes est destructive (Dictionnaire des notions primitives, 1773).
>
> Novateur: celui qui innove. Longtemps on en l'a dit qu'en matière de religion (Féraud, 1787).

That evaluative connotations appear in encyclopedias [4] and critical dictionaries [5] is expected, being similar to England where political and law dictionaries refer, for example, to non-neutral or contextualized senses. [6] Yet, that such connotations should define innovation in standard dictionaries is unexpected to a modern. To Richelet and some others, innovation is "dangerous" (Richelet, 1680; Furetière, 1690; Dictionnaire de l'Académie française, 1762). French dictionaries of the nineteenth century also stress the founding of novelty or character of the innovator: "Changer par esprit de nouveauté" (Littré, 1872), "qui cherche à innover" (Larousse, 1867) (Larousse, 1867).

How do we explain these connotations? When people started using the word innovation widely in the seventeenth century, it was in the context of discussing religious and political changes. Innovation served the argument of the opponents to change. The Puritans never refrained from using the word to accuse their opponents of changing the doctrine and discipline of the Church. In turn, monarchists and Church authorities accuse the Puritans of being the innovators themselves by refusing to submit to the bishops (Godin, 2010c). Similarly, in politics, the word was used by its critics, namely the monarchists, to whom change (republicanism) is innovation. In contrast, the English Republicans – and later French revolutionaries – made no use of the word innovation. Certainly, there is a "disease" in the state (corruption in the sense of degeneration), and therefore a need to change the political order. Yet the republicans had to make a positive case for their cause, and therefore avoided using a word with moral connotations (Godin, 2012-13). The same holds for "men of science" who always refrain from using

[4] Innovations are "deformities in the political order" (Diderot, 1780).
[5] Innovations are "une peste dans les académies et dans les états; il faudrait se contenter de s'opposer aux fondamentales; il y en a qui sont de courte durée, et il y en a qui ne durent pas, Bayle, 1820
[6] "Restoring the British Constitution to its original purity" (Pearson, 1792); "a term applied to every species of improvement, and particularly dreaded by corrupt rulers, as well as by all placemen and pensioners" (Pigott, 1795).

innovation to talk about the new science (Godin, 2014a). One author of the above dictionaries denies innovating too. “To many words”, states Thomas Blount, “I have added the Authors names, that I might not be thought to be the Innovator of them” (Blount, 1661).

Innovation is a word used to talk of and/or name change in a pejorative way; change which is man-made rather than natural or from God, a radical or revolutionary change rather than gradual, a subversive change to the established order, a religious and political change. To be sure, change is generic – and neutral, as Bentham suggests (Bentham, 1824), and change is everywhere. [7] However, it is another matter when change comes from Man. For this purpose, *alteration* is a synonym used frequently to blame the one who changes things or who innovates. “Innovation and/or alteration” frequently appear together in the same expression or sentence.

*Reformation*

Dictionaries do not tell the whole story. A basic word in the semantic field of innovation is reformation. Since the Greek fathers, reformation has had a positive and definite religious connotation (Ladner, 1959). It shares the place with a whole vocabulary concerned with “renewing the soul” of man by divine redemption or conversion toward God: renewal, regeneration, rebirth, restoration, redemption, resurrection, amelioration, transformation, conversion, purification, perfection. According to Gerhart Ladner, with Gregory VII, the word came to be used not only for individuals but for organizations too (the Church). In both cases, reformation is a call back to origins, a return to purity. As Ladner puts it, *reformatio* is newness in the sense of betterment, a new condition (a return to original perfection; a renewal) not in the sense of novelty (Ladner, 1959: 41-48).

[7] The ancient Greek philosopher Protagoras’ famous sentence is “All matter is in a state of flux”. “All human affairs are ever in a state of flux and cannot stand still”, claims Machiavelli in *The Discourses* (I, 6). Francis Bacon wrote similarly in his essay *Of Vicissitude of Things*: “matter is in a perpetual flux”.

Reformation acts as a counter-concept to innovation in the sense that it is change of a moderate nature. Reformation (and the like) is change for the better, a perfecting. "To innovate is not to reform", as Edmund Burke puts it (Burke, 1796: 290):

> There is a manifest marked distinction, which ill men, with ill designs, or weak men incapable of any design, will constantly be confounding, that is, a marked distinction between Change and Reformation. The former alters the substance of the objects themselves … Reform is, not a change in the substance, or in the primary modification of the object, but the direct application of a remedy … *To innovate is not to reform*.

A reform does not alter the substance or the principles of a thing (as innovation does) but remedies its deficiencies. A reform is gradual and conservative. [8] Such is King Charles's keyword in his posthumous *Eikon Basilike*. (Charles, 1649). This whole discourse is one of moderation and reformation. As "prudent reformer", King Charles talks of "moderate desires of due reformation … as might still preserve the foundations and essentials of government … not shake and quite overthrow either of them". To Charles, his opponents' demands are "innovations masked under the name of reformation". Charles is not alone. The contrast continues in the following centuries. "In order to procure for France all of the luster it should have", suggests Louis Henri Duchesne de Voiron, Assemblée des notables, "il n'est question que de corriger les abus qui existent … [C]e n'est pas par des innovations qu'on rétablira l'ordre, mais en mettant de l'ordre dans l'Administration"; (it is simply a question of correcting the abuses that exist … It is not by innovations that we shall re-establish order, but by putting order into the Administration) (Duchesne, 1788: 1). And as August, bishop and prince of Spire (Alsace), put it in a declaration against innovations at the French Assemblée "prétendument" nationale: Alsatians have always "demandé la réforme de quelques abus, mais non le renversement de l'ordre hiérarchique; ils ont respecté la forme du gouvernement, que Jesus-Christ a lui-même instituée, & que les Apôtres ont transmis jusqu'à Nous" (demanded the reform of whatever abuse, but not a reversal of the hierarchical order; they have respected the form of government, which was instituted by Jesus Christ himself, & which the Apostles have transmitted to Us) (Auguste, 1791: 11).

[8] For an analysis of reform as conservative change, see Lienesch (1983) on the American anti-federalists in the 1780s.

Auguste Comte thought similarly. The sociologist uses innovation in a positive sense in several of his writings (*Cours de philosophie positive*, 1841; *Système de politique positive ou Traité de sociologie*, 1851). Yet Comte is aware of the pejorative connotation of innovation. One needs, suggests Comte, to minimize his innovation and erect or establish one's own innovation as a "necessary return toward the primitive order" because of resistances to innovation (Comte, 1851, volume 2: 428). In fact, Comte's own system on the organization of the sciences is explicitly presented as a "necessary reform" rather than a "true innovation" (Comte, 1851, volume 1: 473).

One recurrent strategy, as in Burke, is contrasting innovation to reform. Many titles of the time express a distinction between reform and innovation: John Symmons' *Reform without Innovation* on a proposal for a "simple measure [on Members of Parliament having immunity in credit matters], without any innovation on, or substantial alteration of, the existing laws" (Symmons, 1810: 17); Robert Lee's defense of his changes to public worship in *Reform not Innovation*: "Innovation in this present instance is Reform" (Lee, 1867: 6). Such is also the case with "social innovation" (socialism) [9] as well as progress: *Progress – Not Innovation* is the tile of an editorial in an American magazine of the mid-eighteenth century (The Golden Rule, 1848).

To many English reformers (political, social), (church) Reformation is a model to which innovation is regularly contrasted. Yet reformation also has many detractors – above all the Catholics, who use it as a synonym for innovation, both words occurring together in the same phrase. In fact, one may read in a work on the "secret" history of the University of Oxford, "There is not a word in the *English* language, which has more envy and ill-will attending it, than *reformation* … I never heard of any *reformation* … but what was strenuously opposed … The best men, and the best things in the world have, most of

[9] "It is our object in the present paper", states an anonymous writer, "to indicate briefly, first, the most important of those radical errors into which the socialist theorists fall, and those scientific certainties against which they blindly and vainly struggle; and next, the principle of some of those experiments made by sober social *reformers*, which may compass, to a certain moderate extent, the same ends as those which stimulate the socialist theorists to their fruitless efforts, but which would attain them by the modest and gradual means alone" (Anonymous, 1859).

them, nicknames fix'd upon them, to render them odious or ridiculous", (Newton, 1726: 23).

*Revolution*

Like reformation, revolution constitutes a basic concept of the semantic field of innovation from the seventeenth to the nineteenth century – and even later. While reformation is moderate change, revolution is radical change.

Revolution is a concept that has been much studied, particularly its origins in science (Cohen, 1985) and its transfer to the political arena (Koselleck, 1969; Baker, 1988; Ozouf, 1989; Reichardt, 1997). Here I want to stress that revolution entered the vocabulary of innovation – and *vice-versa*. This occurred after the French Revolution of 1789. Revolution gave to innovation a political connotation – or rather gave innovation back its political connotation, because innovation (*kainotomia*) already had such a connotation to the ancient Greek philosophers. For centuries, innovation was talked of in terms of revolution. From the very early thoughts on innovation by Plato and Aristotle to the twentieth century, innovation has been seen as subversive (Godin and Lucier, 2012). In fact, the vocabulary of innovation is contaminated by that of revolution (and the reverse), with similar synonyms (change and others), epithets (sudden and others) and imputation of (bad) motives to the innovator (design and others).

The association between revolution and innovation has made of innovation a sudden and violent affair. Revolution is an overall or total change, often with a violent overtone. Such a pejorative association is again essentially that of critics of innovation: "the revolution was the work of innovation", claims an anonymous writer on the danger of innovation to a government (Anonymous, 1817: 29). On the eve of the French Revolution, many critics started associating revolution and innovation. The analogy with or association between innovation and revolution abounds in the literature of the time. "La réforme conduit à l'innovation, l'innovation à la révolution, la révolution à l'anarchie et au désordre" (Reform leads to innovation, innovation to revolution, revolution to

anarchy and to disorder), such was the common opinion as reported by Abbé Arthur Dillon in his *Progrès de la révolution française en Angleterre* (Dillon, 1792: 13). The Scottish philosopher Thomas Reid wrote a pamphlet titled *On the Danger of Political Innovation*, making explicit references to revolution: "every change of government is either sudden and violent, or it is gradual, peaceable and legal" (Reid, 1796: 9). Even gradual changes "ought not to be rashly made; but with good advice and for weighty causes … The change made at the Revolution in 1688 was violent indeed, but necessary … Since that time, we have had no Revolution but such gradual and peaceable changes, by new laws" (Reid, 1796: 14-15).

The association continues during the nineteenth century. Revolution is innovation and innovation is revolution. "In every state where [innovation] begins, no one can tell where it will end … The French revolution was neither organized in a moment, nor accomplished at once. No, it was brought about by degrees" (Anonymous, 1817: 27). In the same spirit, Jermyn Cooper, Reverend at Christ Church College, Oxford and Rector of West Chiltington, writes against the "new school of Innovation and Revolution", namely those "who renounce all honest Church and State principles" (Cooper, 1866: 32).

In many respects, the semantics of revolution is similar to that of innovation, [10] and the connotation of revolution changed to positive at the same time as did that of innovation, from political rupture and *coup d'état* to social progress and liberation (Koselleck, 1969; Baker, 1988; Lusebrink and Reichardt, 1988; Ozouf, 1989; Reichardt, 1997). In fact, "The discrepancy between the traditional and the modern conception of "revolution", and the change from the one to the other resemble the alterations in the usage of numerous other terms which, taken together, form the semantic transformation to the modern world" (Dippel, 1976: 116): originality (Mortier, 1982), curiosity (Daston, 1995; Kenny, 1998; Harrison, 2001), imagination (Engell, 1981) and … innovation. [11] Like innovation,

[10] In one of the very few pages that "historians" have devoted to the concept of innovation, Melvin Lasky suggests that innovation is a precursor term to revolution (Lasky, 1976: 311). I rather believe that innovation (as sudden and violent) simply has connotations of revolution.

[11] For a sample of the vocabulary or terminology used in the literature on progress, see Spadafora (1990); on reform, see Ladner (1959); on revolution, see Goulemot (1996); on technological invention, see Long, (2001).

these words got rehabilitated gradually over the nineteenth century, some because of aesthetics (originality) and others because of utility (curiosity).

What distinguishes revolution and innovation is that revolution is collective, so it is believed or expected, and innovation is individual. A revolution is experienced as a result (historical) (Goulemot, 1967: 433f; Baker, 1988; 43; Ozouf, 1989: 811). Like reformation, revolution is the affair of groups, generations and whole nations. In contrast, innovation comes from an individual. It is a private liberty.

*Innovation*

Innovation, I have mentioned already, started being used widely (and pejoratively) after the Reformation in the context of religious debates, and then in political controversies on republicanism. Before that date, innovation had a political connotation too (to the Greeks) but also a positive connotation, as renewal in spiritual and in legal matters. From the Middle Ages to the Reformation, innovation had the meaning of "renewing" (Godin and Lucier, 2014) – this meaning is also present in seventeenth century dictionaries (Cotgrave, 1611; Phillips, 1658; Blount, 1661; Miege, 1679). Christianity innovated here with a representation of *innovo* as (spiritual) "renewing". This positive connotation or usage continued for centuries, then changed to negative with the Reformation.

Innovation entered the late sixteenth-early seventeenth century everyday vocabulary through two routes. First, as a prohibition. In 1548 Edward VI issued a proclamation *Against Those That Doeth Innouate* (Godin, 2010c). This was the first such royal decree in Western countries. Such an admonition not to innovate is regularly recalled by writers in the following century to support their own case (ecclesiastics, royalists, pamphleteers). Edward's proclamation was followed by conferences of bishops, sermons, visitations and discourses of clerics. The second route is criticism of the papacy. In the 1640s, Puritans, but also the English Parliament, accused the then-Archbishop of Canterbury and King Charles of introducing elements of Romish doctrine and discipline into Protestantism. Citizens were invited to send petitions to the Parliament, which they did by the dozen.

As contrasted to reformation (and/or reform) which is 'conservative' or moderate change, innovation is radical change. [12] "Reformation certainly is nearly connected with innovation", states Edmund Burke, but "where the latter comes in for too large a share, those who undertake to improve their country may risque their own safety" (Burke, 1791b: 225-26). Innovation "requires some radical spirit" (Anonymous, 1844). [13] It is here that *novelty* acquires its full sense. Innovation brings about something entirely new (or considered entirely new), regardless of the consequences, while reformation only changes some aspects of things, or brings about novelty in a gradual way. "As in most questions of state, there is a middle. There is something else than the mere alternative of absolute destruction, or unreformed existence" (Burke, 1790: 158). [14]

What does innovation mean? A study of usages reveals that innovation is "a change in the long-established order of things by the introduction of novelty, however trifling or inconsequential that innovation may at first appear" (Anonymous, 1817: 15-16). Innovation is introducing change in religion and in political power or the monarchy. In religious matters particularly, the controversy on innovation continued well into the late

[12] Writers of the time rarely (study and) define what innovation is. Some exceptions are: 1) Abbé Guillaume-André-René Baston, vice-president of the Academy of Sciences of Rouen. In a discourse before the Academy in 1809, Baston attempts to "establish the meaning of the word innovation" and distinguish innovation from other words like novelty, renewing, change and variation. "There is not one that resembles it exactly. Newness is not always innovation; renewal comes closer, but does not reach it; change is only the half of it; variation is more mobile than it" (Baston, 1810: 130). Baston concludes, "for there to be innovation, it is necessary that the thing replaced by a new thing, have been, from the beginning, what it was at the end, or that it have had such a long existence, that what had been before it, be almost entirely forgotten" (Baston, 1810: 131). Using examples from science, Baston suggests, "Innovation is not used only to destroy what is bad or false; it also serves to perfect what is good and true (...). It is only by force of innovation that the first productions of genius acquired constancy, a fair hearing, regular proportions" (Baston, 1810: 133). 2) Robert Lee: Innovation is "the introduction of a Ritual" ("One of the elements of a Ritual is its being imposed by authority; another is its fixity and sameness") (Lee, 1867: 44). 3) Richard Frederik Littledale: Innovation "is the introduction of a new thing, unknown before. If something which is old, and has been worn out by use, or has been stolen, is replaced ["new to us", p. 15], we do not call that replacement Innovation, but Restoration" (Littledale, 1868: 4-5).

[13] Radicalism is a frequent accusation at the time: "Moderate Reformers … who are realty radical reformers" (Anonymous, 1817: 4); "the present age … [is] prone to a reckless radicalism" (Winslow, 1835: 5).

[14] "Reform suggests that the existing system is not inherently bad, that it has a potential goodness if acquired or institutional deficiencies are remedied. Radicalism, in its insistence upon root and branch change, must show the whole to be unsoundly based upon false principles" (Davis, 1982: 204). The duality moderate-radical is a commonplace throughout history and a much studied phenomenon. For example, see Israel (2010) on the radical *versus* moderate Enlightenment.

nineteenth century. Many church ministers exhort their disciples not to fall into innovation (Ackland, 1798; Fly, 1798; Symmons, 1810). Others deny that they innovate (Lee, 1867) or that the church innovates (Littledale, 1868).

There are many similarities between the vocabulary of heresy and that of innovation. When Tertullian (c.a.160-225) replies to the heretics who "claim that it is the Church herself who has altered the teaching of the Lord and of the Apostles" (Ladner, 1959: 136-37), he makes an accusation used later by innovators against the church authorities: the innovators are the bishops. Innovation is, to a certain extent, a modern successor to heresy, a secularized form of the idea of heresy. "Innovation and heresy are practically synonymous … We frequently find them accusing each other of innovation" (Preus, 1972: 2). The innovator is against the established order – religious, political and social –, as much as the heretic is against orthodoxy and the church. Both heresy and innovation are talked of, among others, in terms of evil, sickness and disease, and innovators as flatterers and seducers and eager for novelty (Godin, 2014d). The innovator himself is regularly compared to and called a heretic.

The rhetoric of innovation up to the nineteenth century is a language-game using the above four words. One recurrent strategy, as in Burke, is making contrasts to reform. Another strategy is making analogies to or associations with revolution, in a negative sense. A third strategy is denying innovating, using words like *restoration* and *renewal* instead. Innovation as restoration or return is a much repeated defense fom those accused of innovation. As Pierre Bayle put it in his *Critical Dictionary* (1820): the innovators "se vantent toujours d'être les imitateurs des anciens" (always assert that they do nothing but in imitation of the ancients).

Erwin Panofsky suggests that "from the fourteenth through the sixteenth century, and from one end of Europe to the other, the men of the Renaissance were convinced that the period in which they lived was a "new age" as sharply different from the medieval past as the medieval past had been from classical antiquity and marked by a concerted effort to

revive the culture of the latter ... [But] they experienced a sense of regeneration too radical and intense to be expressed in any other language than that of Scripture" (Panofsky, 1960: 38). This is a much repeated claim in the literature. Writers drew on theology, precedents and existing institutions and norms to justify radical changes. [15]

Using traditional language is precisely what Francis Bacon does concerning his much innovative enterprise: a new scientific method. Bacon uses traditional and biblical language – *instauratio* (in Latin means both restoration and new beginning) [16] – to advance his cause. Innovation is too radical. *Instauratio* (and *regeneratio*) means rebuild, not in the sense of innovate, but in the sense of replace, build a new building, new *fundamenta* (foundations) (Whitney, 1986: 23-54; 91; 95-98). *Instauratio* fuses the idea of revolution (discontinuity) with the ideology of reform (change). Bacon's new learning (and method of discovery) is re-edification: a continuation of ancient learning towards something new (a new basis for hope and progress). Bacon offers a "moderate approach to innovation" (Whitney, 1986: 56). On innovation he argues for gradual innovation (Godin, 2014a).

Yet, there are other words used as synonyms of innovation whose function is to stress precisely the revolutionary character of the enterprise or the change to come in a positive way, such as *renovation*. "The principle of government", states Joel Barlow, American politician, friend of Thomas Paine and advocate of the Revolution, "must be completely changed; and the consequence of this will be … a total renovation in society" (Barlow, 1792: 90). Similarly, at the very beginning of *The Spirit of the Age* (1831) John Stuart Mill suggests that "our own country … shall be renovated … Society demands, and anticipates, not merely a new machine, but a machine constructed in another manner"

[15] On the Middle Ages, see Preus (1972) and Smalley (1975); on the Renaissance, see Palonen (2003: 76-77); on Modernity, see Israel (2010: 29). "The situation of the humanists was that of innovating ideologists. They had to face the novelty of their situation but made use of it by appealing to the ancient world as something that was more easily acceptable in their context than openly declaring that they were entering into a new world, for which there were as yet no conceptual tools" (Palonen, 2003: 76-77). "If one wished to attract the support of governments, churchmen, and magistrates in the eighteenth century one had to couch proposals for reform in terms of support for monarchy, for the existing social hierarchy based on privilege, and for the existing moral norms - in other words, propose only slight repairs to the existing edifice" (Israel, 2010: 29).

[16] A term used by Augustine and Calvin (and many other writers too). See Whitney (1986: 26, 50, 222).

(Mill, 1831). Although renovation has an etymological root similar to reformation (the syllable *re*: return, going back to the past or the true or the original) and had a religious connotation for centuries (renewal of the soul), it is used in the sense of (revolutionary) innovation. *Renovation* is a radical innovation.

Frequent uses are made of other terms too. *Invention* and *imagination* (fancy) are legion among the critics of innovation. While discussing the state of government and the Commonwealth and the schisms and divisions which have ensued in the church, King Charles claims his intention to "tie and restrain all Opinions that nothing might be left for private Fancies and Innovations" (Charles, 1628). Before the eighteenth century, invention and imagination were essentially contested and has nothing to do with creativity. To be sure, invention and imagination are everywhere, in science for example where titles emphasize the 'new' (Thorndike, 1957), but not innovation: innovativeness yes, innovation no! During the Quarrel between the ancients and the moderns, no modern made use of the term innovation. When "men of science" from the seventeenth to the nineteenth century use innovation, it is in the political sense not in the sense of originality or creativity (Godin, 2014a).

From the above vocabulary, every country has its preferred word: reformation in England; revolution in France. The twentieth century elected innovation. What distinguishes innovation above all from other words is a focus on the source or origin of innovation. Writers focus on the innovator. The stress placed on the verb form and the one who innovates is witness to this fact. The innovator is a non-conformist, or rather a deviant. Similarly, the stress placed on "project", "design", "scheme", "plot", "plan" and "experiment" is a recurrent accusation against the individual as innovator. [17] A similar use is made of 'novation'. In the literature of the time, novation has similar connotations to innovation.

[17] Edmund Burke's vocabulary is full of such expressions: "schemes of innovation" (Burke, 1791b: 217); "Innovations and experiments" (Burke, 1791b: 223); "desperate enterprises of innovation" (Burke, 1791a: 199).

**Innovation: "A Socially Valued Departure from Past Practice or Thought"** [18]

The above image of innovation lasted until the nineteenth century. If one turns to the twentieth century, one gets a totally different representation. "Innovation is the development of new ideas into marketable products and processes", states Paul Stoneman in the *Handbook of the Economics of Innovation and Technological Change* (Stoneman, 1995: 2). Another handbook carries the same representation: "Innovation is the first attempt to carry [invention] into practice … It occurs mostly in firms" (Fagerberg et al., 2005: 4-5). These definitions sum up to 'technological innovation', a phrase that appears after 1950. They stress the market, the firm and new goods. They also highlight originality ("first") and make a contrast to invention: innovation is a new idea or invention made *practical*.

The transition period from one vocabulary of innovation to another occurred gradually from about 1750 to 1850. This transition is studied elsewhere (Godin, 2014b; 2014d). Suffice it to say here that, "Economic, social, and environmental alterations over the short and the medium term were sufficiently commonplace [for a couple of centuries], and occurred with such increasing frequency, that it was very difficult to escape an awareness of mutability" (Woolf, 2003: 43). What needs to be stressed here is the consciousness or *perception* of change (Koselleck, 1969; 1977). Whatever the extent of the changes, "it is the image rather than reality that allows us more clearly to understand the changes" (Rabb, 1975: 90). "Everything … [i]s conceived in terms of change and upheaval" (Koselleck, 1969: 48) and "change itself becomes the great theme of history" (Koselleck, 2002b: 80). In such a context, innovation is positive because it is instrumental to political, social and material progress. The revolution is innovation in a positive sense and innovation is revolution: "Humanity is in permanent revolution; innovation is a condition of its existence; on the day it becomes immutable, it shall perish" (Laurent, 1879: 13-14). "L'époque actuelle", claim the editors of a monthly French magazine of the nineteenth century, "ne ressemble à aucune de celles qui l'ont précédée … Les sciences, la

[18] Merton, R. K. (1965), The Environment of Innovation Organization: Some Conjectures and Proposals, in G. A. Steiner, *The Creative Organization*, Graduate School of Business, University of Chicago: 50.

littérature, les beaux-arts et surtout l'art dramatique, ne marchent que par systèmes et par innovations; jamais l'esprit humain ne montra peut-être une pareille agitation en tous sens … [Ce] mouvement incessant [a été] autorisé et excité [par la Révolution]" (Aumond and Gouriet, 1829) [The current era does not resemble any of those that preceded it … The sciences, literature, the fine arts and especially the theatre, work only by systems and by innovations; never perhaps has the human spirit shown such an agitation in every sense … This incessant movement has been authorized and excited by the Revolution]. [19] Others start to critique the then-pejorative representation of innovation, above all Jeremy Bentham, pointing to the forgotten etymology of the word (Godin, 2014d). From the twentieth century onward, a totally new representation of innovation develops:

- Innovation is no longer seen as subversive to the social order, but simply opposed to traditional ways of doing things. While sociologists of the early twentieth century still define innovation as negative, [20] the representation changes completely in a few decades. [21] The deviant is now the conservative. [22]
- The innovator is no longer a heretic. He is simply different from the masses or from his fellows. He may be a deviant, but in a sociological sense: an original, a marginal, a nonconformist, unorthodox. [23]
- The innovator is ingenious and creative. He is an experimenter, an entrepreneur, a leader; he is the agent of change.

To many writers, stress is still placed on the individual, but non-conformity is "difference" or "originality". [24] To the sociologist, the innovator is the *first* adopter of a new idea, behaviour or thing (*versus* laggards). To the economist, innovation is the *first*

[19] Single or particular innovations are also called revolutionary and the like. On an innovation in chemical process: "une innovation qui était appelée à produire une révolution" (Quesneville, 1842 : 1); Other words use are "remarquable" (Delepierre, 1836 : 13), "majeure" (Werdet,1841), "first" (Bertier, 1879) and "original" (Didacus, 1884).
[20] Innovators as "obstructionists, non-conformists and social offenders" (Chapin, 1928); innovation as "a departure from institutional norms", "the use of institutionally proscribed norms" (Merton, 1938: 144).
[21] Robert Merton's negative connotation of 1938 shifts to positive in 1965: "a socially valued departure from past practice or thought" (Merton, 1965: 50).
[22] "Conservatives are given to predicting that dire results will flow from innovation" (Wolfe, 1923: 212).
[23] Innovation is "iconoclast, divergent, revolutionary thinking" (Kuhn, 1959).
[24] Over time, originality has had at least three meanings: origin, difference and creativity.

commercialization of an invention (*versus* imitators). However, to many twentieth century writers, innovation is the affair of organizations (firms) rather than individuals, the affair of whole nations too.

Innovation started to be studied theoretically in the late nineteenth-early twentieth century. To be sure, there exist some (very few) conceptual thoughts before that date. Yet theories proper start with Gabriel Tarde (1890), Joseph Schumpeter (1934), Rupert W. Maclaurin (1949), Homer G. Barnett (1953), Everett M. Rogers (1962) and many others in their own specialty: Charles Carter and Bruce Williams (1957; 1958), Tom Burns and George Stalker (1961), Matthew Miles (1964), Victor Thompson (1969), Sumner Myers and Donald Marquis (1969), Gerald Zaltman (1973), Christopher Freeman (1974), George W. Downs and Lawrence Mohr (1976). To this list one should add the many contributions of Elihu Katz, Jerald Hage and James Utterback.

The main concepts emerged in the 1940s-50s, within a diversity of approaches. Then publications exploded in the 1960s. Many new contributors also appeared from governments, supported by private consultants and theorists as consultants. Yet, by the mid-1970s, the diversity had shifted to a dominant representation – with reference to one and only one iconic theorist, Schumpeter: innovation is technological innovation. This section stops at this date. The following decades only added variations to a then-emerging dominant representation. [25]

The above authors make explicit use of the concept innovation. However, many early theorists deal with innovation without using the word. Such is the case with anthropologists in the early twentieth century (Godin, 2014c) and sociologist like William F. Ogburn (Godin, 2010b). Such is still the case with many sociologists in the 1960s, who study the adoption-diffusion of innovation without using the word innovation

[25] To be sure, theories have evolved and the field has enlarged its scope since the 1970s. The diversity of meanings remains too. However, the modern representation of innovation and its basic concepts, including what is qualified today as new concepts (like social innovation), emerged before 1980.

much. [26] Such is the case with economists too. From the 1930s onward, mainstream economists study what they call "technological change", a precursor term to technological innovation (Godin, 2010a). [27] This is not a semantic issue. Some argue that economists did not study innovation until a late date (Freeman, 1974), a statement which in fact depends on how one defines innovation. Equally, bibliometricians have recently started to map the field of what they call "innovation studies" (Martin, 2008; Fagerberg and Verspagen, 2009). [28] They concentrate on the word innovation in counting articles. Not surprisingly, they ignore a whole literature (e.g. sociology). [29]

The semantic field of innovation in the twentieth century is larger than that of the previous centuries, but at the same time more restricted. The reader is invited to refer to the list of definitions accompanying this paper for the bibliographic references to over 400 papers and books discussed in this section and the next one. This list has been constructed from bibliographies from sociology (Rogers, 1962), management (Zaltman et al., 1973), history (Kelly and Kranzberg, 1978) and others (e.g.: Tornazsky et al., 1980), and my own knowledge of authors and theoretical works, including "innovation studies". The list also includes documents from practitioners, like managers and engineers: a representation develops from many sources, not only academics. The list is far from exhaustive, but certainly representative of the work in the field.

To be sure, like new, *change* (and to a certain extent alteration) remains a basic concept in the vocabulary of the twentieth century. In his review article "Innovation" in the *Encyclopedia of the Social Sciences* of 1930, Horace Kallen defines innovation as "changes or novelties of rites, techniques, customs, manners and mores" (Kallen, 1930:

[26] And before adoption, there has been adaptability (and adaptations and adaptors) in studies of change in education.

[27] In general, technological change is a very loose concept. To anthropologists, sociologists and many others, it refers to the *result* or *outcome* of innovation; innovation is the *action* leading to technological change (Marquis, 1969; Gerstenfeld, 1979). However, to economists technological change has a specific meaning related to the production function: change of the input/output combination.

[28] "Innovation studies" is the study of the economics, management and policy of innovation. The first occurrence I found of the phrase "innovation studies" in the literature is the following: "Diffusion studies can be considered as a sub-class of innovation studies" (Holdaway and Seger, 1968: 369).

[29] As stated above, the main concept of sociology is adoption/diffusion. For an excellent and early example of inquiry (on knowledge transfer) based on words, see Havelock (1969: I-6).

48). Every theorist in the following centuries agrees. Introducing innovation is the capacity to "undertake and carry through pioneering changes" (Williamson, 1951: 1). It is "effective change" – as contrasted to new knowledge (Drucker, 1957: 24), "a change which involves reorientation of individual value structure" (Bohlen, 1965: 272). To Richard Nelson and Sydney Winter, change is a "natural" definition of innovation (Nelson and Winter, 1974: 894). [30] Very often, change is used merely as a synonym for innovation, or a co-word. Organizational change is an example. [31] But so is social change, [32] a concept criticized long ago for its fuzziness. [33] To some others, innovation is a stage in social change (Boskoff, 1957: 294) or a type of social change (Zaltman et al., 1972). To still others, the words social change and modernization simply shift to innovation (Hill, 1974; 1975; Himmelstrand, 1982; Zapf, 1991). Every field studies change: culture change in anthropology, social change in sociology, organizational change, entrepreneurial change and educational change in management, attitude change in psychology, scientific change in philosophy, political change. In economics, I mentioned already that technological change has been a precursor or substitute term for (technological) innovation since the 1930s, either used interchangeably with innovation, as anthropologists and sociologists do (Stern, 1927; 1937; Ogburn, 1936, Wilkening (1956), Rogers (1958) or, increasingly, defined as "substitution of machinery for labor" (Bowden et al., 1939) or change in methods of production, generally called change in production functions: "ways in which quantity of product [output] varies if quantity of factors [input] vary" (Schumpeter, 1939: 87). [34]

At the same time, some distinguish change from innovation. To Selwyn Becker and Thomas Whistler, there is a missing distinction in the literature between innovation and

[30] "Change of existing decision rules" (Nelson and Winter, 1974: 894), "change … if there has been no prior experience" (Nelson and Winter, 1977: 48).
[31] Sapolsky (1967), Sieber (1968), Aiken and Hage (1971), Gross (1971), Holt (1971), Corwin (1972), Zaltman et al. (1973), Baldridge and Burnham (1975).
[32] Ogburn (1920), Sims (1939), Mowrer (1942), Hagen (1962), LaPiere (1965).
[33] "A 'pure' theory of social change, independent of substantive identification of the patterns undergoing transformations [is] uninteresting" (Moore, 1960).
[34] Schumpeter (1939), Lange (1943), Goodwin (1946), Brozen (1951), Scoville (1951), Baldwin (1951), Soho (1952), Robinson (1952), Bruton (1956), Feller (1958), Penn (1958), Hamberg (1959). Joseph Schumpeter calls the "setting up of a new production function" a "rigorous definition" of innovation (Schumpeter, 1939: 87).

change: “every change becomes an innovation simply because it has not been done before by that particular organization … Such a definition sterilizes the term innovation” (Becker and Whistler, 1967: 463). To these authors, innovation is first use and change is the consequence or last stage of a process: invention, innovation, followers or late adopters, changes (in organizations). Ten years later, Richard Daft and Selwyn Becker distinguished change and innovation again. They hold that innovation is a subset of (organizational) change. “Innovation is the adoption of something new, change is the adoption of something different”. In other words, if it is new only to the organization, it is change (Daft and Becker, 1978: 4). In his work on social innovation, political scientist Jean-William Lapierre also distinguishes social change and innovation. Social change is adaptation. It is not innovative: it maintains the existing social structures. By contrast, social innovation changes the whole system. It is revolutionary: it transforms social roles and the social structure and gives rise to new political systems (Lapierre, 1977: 185).

Another word of the previous *episteme* remains in the vocabulary of the twentieth century: *revolution*. Innovation is revolutionary change – in a positive sense – or radicalism (Wolfe, 1921; Ogburn, 1936; Ogburn and Nimkoff, 1940). “An innovation is a change which involves reorientation of individual value structure”, as contrasted to “a simple change in materials and equipment” and to “an improved practice” (Bohlen, 1965: 272). Revolution is no longer destructive, but disruptive, even creative (Schumpeter’s “creative destruction”). Even “evolutionists” focus on the revolutionary. To sociologist Colum Gilfillan, the development of inventions is evolutionary (the combination of many small contributions) but it is “revolutionary” inventions (with an “s”) that change civilization (Gilfillan, 1935). Similarly, Joseph Schumpeter contrasts evolutionism (concerned with continuous change and equilibrium) to the “discontinuity” and “revolutionary” character of innovations (Schumpeter, 1934: 62f). Innovation as revolutionary is a typical theorists’ representation of innovation – in contrast, to lay people, innovation is commonplace, daily and everywhere (see Alter, 2000). Most of the time revolutionary innovation is talked of in terms of “major” or “radical” innovation and many theorists explicitly emphasize such innovation because of its effects on society –

and the ease of measurement. [35] Typologies develop that classify change and innovation as to whether they are incremental ("nuts-and-bolts"), radical or systemic (Meierhenry, 1966; Engel, 1968; Marquis, 1969). Sociologists develop typologies of personality like the "innovational" *versus* the authoritarian (Hagen, 1962). [36]

To a certain extent, *innovation* continues to bear meaning similar to *reformation* too (Bennett and Macknight, 1956; Voget, 1957; Fairweather, 1967). A social reform (under different terms: social invention, social experiment, social technology, social innovation) is innovation – conducted using the scientific method (Fairweather, 1967; Fairweather and Tornatzky, 1977; Tornatzky et al, 1980; 1982). [37] Yet to others, innovation is different from reform: "unlike reform [innovation] does not aim at curing a defect; it aims at creating something new" (Drucker, 1957: 45). As sociologist Newell Sims puts it: "The reformist attitude desires the maintenance of traditional structure and belief in modified form. It would remodel or renovate existing institutions but not create new ones" (Sims, 1939: 43).

Change, reform and revolution do not tell the whole story. The twentieth century develops its own vocabulary. Four new concepts make their appearance: imitation, invention, "action" and creativity.

[35] "Major changes" of "economic importance" to a firm's growth (Mueller, 1962: 324); "A unique and to a significant degree unprecedented mental construct" (LaPiere, 1965: 197-98). "An innovation (or more precisely a major innovation since we are not concerned with trivial changes) is a 'fundamental' change in a 'significant' number of [an organization's] tasks" (Wilson, 1966: 196); "major change" (Carroll, 1967: 532); "radically new", "great economic importance" (Myers, 1967: 1); "disrupt complex and valued roles, identities and skills" (Taylor, 1970: 70); "grand and relatively rapid changes or revolution" (Zaltman et al., 1972: 3); "an innovation may be defined as a change in the basic structure of an organization" (Fainstein and Fainstein, 1972: 513); "significant" (Gordon and Fisher, 1975: 3); covering a large number of people, important (real promise for change) and with long-term potential (Baldridge and Burnham, 1975: 167); "significant, unprecedented, and qualitative departures" (Downs, 1976: xv); "major … great importance" (Hayward et al., 1976: 16); changes, transforms the whole system (Lapierre, 1977: 185). "of economic and social importance" (IIT, 1968).

[36] Other classifications concern types of change and attitudes to change: innovation-conservatism (Veblen, 1899; Graham, 1956); conformity-innovation-ritualism-retreatism-rebellion (Merton, 1938); innovator-rebel-revolutionary (Mowrer, 1942); innovator-laggard (Rogers, 1962); innovator-advocate-adopter (Hagen, 1962).

[37] On the early use of "social invention", see Ogburn (1922), Chapin (1928), Weeks (1932). On "social innovation", see Godin (2012).

*Imitation*

For centuries, imitation has been a major category in the fine arts (Abrams, 1953). It remains fundamental to defining innovation in the twentieth century too. While the previous centuries make a contrast between innovation and tradition, a contrast which continues in the twentieth century, [38] imitation becomes THE counter-concept. French sociologist Gabriel Tarde's *The Laws of Imitation* (1890) is certainly an exception in defining imitation positively in the sense of diffusion (of innovation). He would have some successors among economists in the 1950s-60s (Yale Brozen, Edwin Mansfield). But in general, innovation is "opposed to conservatism and imitation" (Ward, 1903: 246). Imitation is contrasted to innovation, which is originality. A whole vocabulary develops defining innovation as "first introduction" or "first adoption" of an invention. As sociologist Everett Rogers puts it: "Innovators are the first [2.5 per cent] members of a social system to adopt new ideas" (Rogers, 1965: 55-56). [39] To economists, innovation is "the first regular commercial" application or sale (Maclaurin, 1949: 262; Enos, 1962a: 308). No one put it better than economist Jacob Schmookler: "The first enterprise to make a given technical change is an innovator. Its action is innovation. Another enterprise making the same technical change later is presumably an *imitator*, and its action, *imitation*" (Schmookler, 1966: 2).

One may find many similar views in the literature. To Theodore Levitt, one of the few authors who devoted himself to early conceptual thoughts on what innovation is, "When other competitors in the same industry subsequently copy the innovator, even though it is something new for them, that is not innovation, it is imitation" (Levitt, 1966: 63).

[38] Thomas Kuhn on tradition and innovation (Kuhn, 1959); Robert K. Merton (1938) and Michael Mulkay (1972) on conformity and innovation; Leff G., Gregory (1963): *Tradition and Innovation in 14th-Century Thought*, New York: Barnes and Nobel; Szyliowicz, J. S. (1965), *The Contemporary Middle-East: Tradition and Innovation*, New York: Random House; Levine, D. N. (1965), *Wax and Gold: Tradition and Innovation in Ethiopian Culture*, Chicago: University of Chicago Press; Segall, B. (**19??**), *Tradition and Innovation in Early Alexandrian Small Art Objects*; Yoshino, M. Y. (1968), *Japan's Managerial System: Tradition and Innovation*, Cambridge (Mass.): MIT Press; Knight, D. M. (1969), *Libraries at Large: Tradition, Innovation, and National Interest*, New York: R. R. Bowker.

[39] The idea first appeared in Beal and Bohlen (1955) and Hildebrand and Partenheimer (1958) then became popular in marketing (Bell, 1964; Robertson, 1967; 1968; Robertson and Myers, 1969; Uhl et al , 1970; Boone, 1970) and economics.

Economist Chris Freeman, a mainstream author on technological innovation, holds the same representation. When discussing firms' strategies, Freeman limits and contrasts "the traditional strategy [use of invention as] essentially non-innovative, or insofar as it is innovative it is *restricted* [my italics] to the adoption of process innovations, generated elsewhere but available equally to all firms in the industry" (Freeman, 1974: 257). To Freeman and his colleagues, innovation "excludes simple imitation or 'adoption' by imitators" (SPRU, 1972: 7).

Definitions of innovation as originality or "first" adoption or "first" commercialization are voluminous. [40] Alongside "first", the vocabulary is composed of "major" [41] and many other qualifications such as "important" and "significant". [42] There is no connotation of creativity (more on creativity below). For example, to economists, originality refers essentially to market issues: being first to introduce a product on the market, in order to appropriate the whole economic benefit (profits) of an innovation. [43] Hence, the several studies on lags and gaps between nations, or the study of the introduction in other countries of an invention produced commercially elsewhere for the first time (Freeman,

[40] "First regular commercial broadcasting" (Maclaurin, 1949: 262); "first commercial production" of an invention (Freeman et al, 1963: 39); an innovator is a person "who brought the drug into his practice soon after it became available" (Coleman et al., 1966: 37); innovation is the step "in which the new concept is first introduced into the economy, the society, or into the 'business' of government (Hollomon, 1967: 32); the "first 10 percent" of purchasers of a new product (Robertson, 1968: 330); an invention "applied for the first time" (Mansfield, 1968: 83); used or applied "for the first time" (Aiken and Hage, 1971: 64; Mansfield, 1971 et al.: 11; also "first to apply"; Utterback, 1974: 621); "first use" (Utterback, 1971: 78; Crane, 1972: 18); "first or early use" of an idea (Becker and Whistler, 1967: 463); "first commercial application or production" (Freeman, 1974: 166); "first use or application" (Goldhar et al., 1976); "earliest or extent of use" (Downs and Mohr, 1979: 385).

[41] "Major changes" of "economic importance" to a firm's growth; a "major changes" in products and processes" (Mueller, 1962: 234); "an innovation (or more precisely a major innovation, since we are not concerned with trivial changes) is a 'fundamental' change in a 'significant' number of [an organization's] tasks" (Wilson, 1966: 196); the criterion for defining innovation is "a major change in the curriculum" (Carroll, 1967: 532); "major … great importance" (Hayward et al., 1976: 16).

[42] "Of economic importance" (Mueller, 1962: 324); "grand and rapid" (Zaltman et al, 1972: 3); "extensive, important and long term" (Baldridge and Burnham, 1975: 67); "significant" (Gordon and Fisher, 1975: 3); "significant, unprecedented and qualitative departure" (Downs, 1976: xv); "non-trivial" (Nelson and Winter, 1977: 48).

[43] Such is the essence of David Teece's much-cited article: "Innovating firms often fail to obtain significant economic returns from an innovation while customers, imitators and other industry participants benefit" (Teece, 1986: 285). As a consequence, theories of innovation are concerned with ways of preventing imitation or "keeping imitators/followers at bay" (Teece, 1986: 290), that is, how can firms get the full benefit of their innovation: how the "innovator is to avoid handing over the lion's share of the profits to imitators" (Teece, 1986: 292). Teece discusses the "strategies the firm must follow to maximize its share of industry profits relative to imitators and other competitors" (Teece, 1986: 300-301).

1963). Sociologists are no exception to such a representation of innovation. They have developed typologies contrasting the innovator (the first to adopt an innovation) to the laggard (the late adopter of an innovation) (Rogers, 1962).

In general, innovation is the object of definitions and classifications with regard to two dimensions. In kind: innovations on things that exist already (improvement) or which are *totally* new. This gave rise to classifications such as tradition *versus* innovation and the like among sociologists, and incremental *versus* revolutionary-radical (or minor *versus* major) among economists. From a class or subcategory, [44] innovation shifted to a category of its own, with subclasses like product/process. The other dimension of innovation is time. Innovation is classified as either original (first introduction/adoption) or imitation.

The imitation-innovation opposition is a theoretical construct. To some others, imitation is innovation: the imitator does something new "instead of doing what he is accustomed to do" (Barnett, 1961: 34). In fact, to most researchers from sociology, politics and business schools, to the exception of economists (neoclassical or evolutionary), innovation need not be new, in the sense of being first or new to the world. To anthropologists of the early twentieth century (invention and) innovation builds on what already exists. But imitation is not mere copying. It involves invention (adaptations), or re-innovation as later theorists say (Rice and Rogers, 1980; Rothwell, 1986). To Joseph Schumpeter innovation "need not necessarily have occurred in the industry under observation, which may only be applying, or benefiting from, an innovation that has occurred in another" (Schumpeter, 1939: 89, footnote 1) – a "lesson" that the students of Schumpeter, like Chris Freeman, rapidly forget. Equally, to Charles Carter and Bruce Williams, a firm "may be highly progressive [innovative] without showing much trace of originality [research]. It may simply copy what is done elsewhere (…). It is nonsense to identify progressiveness with inventiveness" (Carter and Williams, 1958: 108). Some

[44] Type of change or attitude to change; types of adopters: innovators – the first 2.5% –, early adopters, early majority, late majority, laggards (Rogers, 1962).

natural scientists have also recently explored imitation as a successful strategy in human cultural evolution, as much if not more successful than innovation (Rendell et al., 2010).

Yet few social researchers provide a positive view of imitation, [45] and even fewer integrate imitation into their theories. Dennis Mueller and John Tilton are among the very few, over the period studied here, who have considered imitation not as copy but as variant and made it a step in the process of innovation. To Mueller and Tilton imitation is one "stage" of technological growth or development: innovation, imitation, technological competition, standardization (Mueller and Tilton, 1969: 571). Rare are those who, like sociologist Edward Shils, talk in terms of a dialectics between imitation and innovation: tradition is past innovations and innovation depends on tradition (Shils, 1981). Yet many theorists study imitation, but without acknowledging it, using terms like acculturation, contagion, diffusion, transfer, absorptive capacities.

The debate on imitation is witness to the subjective connotation of innovation. To many, what innovation is depends on the innovating individual or organization. Everett Rogers, an influential author on innovation, as influential as Schumpeter, introduced a definition of innovation that has remained widely used in the literature. Innovation is "an idea perceived as new by an individual" (Rogers, 1962: 13) "or other unit of adoption" (Rogers, 1983: 11). Such a view of innovation existed before Rogers: in Theodore Noss, Ernest Mowrer and Margaret Hodgen. [46] Many others have produced similar distinctions, [47] and such distinctions have remained commonplace among theorists, [48] despite Lyman

[45] Exceptions are A. D. Little (1963), NPA/NSF (1966), Schon (1967), Myers (1967), Marquis (1969), Myers and Marquis, (1969: 19-20).

[46] Innovations "are not necessarily new … They may already be in existence in some areas of culture and may spread to other areas, or may have been borrowed … They may be only a slight modification … They are innovations because they are new in some particular situations" (Noss, 1940: 2-3); "may be borrowings from other cultures", recognized "by the group as new" (Mowrer, 1942: 36-37); "technological changes are envisaged as having taken place when a tool, a device, a skill or a technique, however unknown or well-known elsewhere, is adopted by an individual in a particular community and is regarded as new by the members of that community" (Hodgen, 1952: 45).

[47] Fritz Redlich, in an early study of Schumpeter's typologies, distinguishes between primary or genuine innovation *versus* re-innovation, and between imitation and copy (Redlich, 1951). See also: initiative *versus* imitation (Deutsch, 1959); newness from existing products (radical or incremental), newness in time (introduction to the market), newness in terms of sales level, newness to the customer (subjective perception) (Robertson, 1971).

Ostlund's argument to the contrary (Ostlund, 1974). The OECD has lately espoused the idea in its manual on methodological standards for surveying innovation – an idea suggested early on: innovation is production (generation) or use (imitation) (Marquis, 1969). The Oslo manual suggests three levels of novelty: new to the world, new to the market (or country) and new to the firm (OECD, 2005).

*Invention*

The core of the vocabulary of innovation in the twentieth century is composed of two words: invention and action. On one hand, innovation is contrasted to invention, a basic concept of the previous century (Macleod, 1988; 2007). Like imitation, invention is a counter-concept to innovation – but a basic concept at the same time. To be sure, to many researchers like anthropologists, invention is innovation of a specific kind. Yet, to the majority of theorists, innovation is not invention. Invention is mental while innovation is practical. As Schumpeter puts it: "Innovation is possible without anything we should identify as invention and invention does not necessarily induce innovation" (Schumpeter, 1939: 84-85). This is a fundamental contrast included in many theoretical definitions of

[48] "An idea that is perceived as new" (Myers, 1966: 300); "new to the firm under study, whether or not it is technologically new to the civilian economy as a whole" (Myers et al., 1967: II-1); not "the first known use by mankind" (Knight, 1967: 479); "new to the states adopting it, no matter how old the program may be or how many other states may have adopted it" (Walker, 1969: 881); the innovator as the first person to take up a new idea but "may or may not be original in an absolute sense" (Havelock, 1969: 7-13); original (first use) or adopted (imitation) (Myers and Marquis, 1969: 3); "new to an American city"; need not be first appearance" or first use but "successful implementation" (Aiken and Alford, 1970: 843); " Most innovations of great economic impact are not causally related to sophistical scientific discoveries … [but are] based on well-known, not too recent, scientific and engineering knowledge" (Charpie, 1970: 6); "There are few totally innovative ideas … They have been advocated and debated for years … What is new or innovative … is the transformation of existing ideas into concrete policy proposals" (Johannes, 1972: 2); "new for the organization": it does not have to be an invention. "It had only to be new for the particular organization being scored" (Hage et al., 1973: 283); "perceived to be new by the relevant unit of adoption" (Zaltman et al., 1973: 10; Zaltman, 1977: 12; Duncan, 1976: 167); "new to the state adopting it" (Gray, 1973: 1174); "It may be new under the sun, or … new only under this roof" (Kelly and Kranzberg, 1975: ii); "new to the adopting unit" (Downs, 1976a: 701); "new to the political units adopting them" (Downs, 1976b: xv); "new to the political unit" (Downs, 1976: xv); "in a particular innovator-client/use combination" (Goldhar et al., 1976); "perceived to be new by the relevant unit of adoption" (Zaltman and Duncan, 1977: 12); "new in relation to the organization's technological environment" (Daft, 1978: 197); "new to the adopting agent, not necessarily to the world in general" (Downs and Mohr, 1979: 385).

innovation. [49] Yet, the idea goes back earlier than Schumpeter. "Since the writings of Ogburn (1922) and Linton (1936)", writes Rogers, "most scholars have made a distinction between invention and innovation. Invention is the process by which a new idea is created or developed, while innovation is the process of adopting an existing idea" (Rogers 1978: 4). But the distinction is older still: innovation need not necessarily be invention, wrote American sociologist Lester Ward in 1903 (Ward, 1903: 243). And there is a similar distinction which is older yet: that between discovery and (material) invention.[50]

However, to others the distinction invention-innovation is "not as sharp" (Nelson et al., 1967: 95-97). There is a spectrum of activities (Cole, 1949; Goldsmith, 1970), a continuum: "Invention and innovation shade into one another. It is impossible to specify the point at which a new product or process begins to be put in use" (Schon, 1967: 2-3). As a general rule, innovation is equated to invention *applied*. The large-scale funding of (public) research or research and development (R&D) after World War II – in the name of technological innovation – is certainly a major factor in the semantic association between invention and innovation – as the very popular phrase "science, technology and innovation (STI)" suggests. Innovation begins with science or R&D, so claims the "linear model of innovation".

On one hand, R&D is defined as innovation. As the OECD puts it, "The guiding line to distinguish R. and D. activity from non-research activity is the presence or absence of an element of novelty or innovation. Insofar as the activity follows an established routine pattern it is not R. and D." (OECD, 1962: 16). On the other hand, R&D (mainly basic research) is postulated as generation of innovation (Maclaurin, 1949; Kuznets, 1959; Pavitt, 1963) or the first step in the process of innovation. Finally, R&D is used as a measurement proxy for innovation in numerous empirical studies.

[49] To list just a few: Carter and Williams (1957), Eckaus (1966),.Allen (1967b), Simone (1966; 1969), Mohr (1969), Charpie (1970), Kuznets (1972), Fainsteain and Fainstein (1972), Freeman (1974), Utterback (1974), Twiss (1974), Jervis (1975); Locke (1976).

[50] Francis Bacon (speculative *versus* operational); anthropologists' distinction between discovery and invention (Godin, 2014a). That invention is intellectual is true only if defined according to the older sense of (scientific) discovery, or if contrasted to innovation in the sense of application or commercialization. Yet to others, invention is action or innovation too: making something new, like a new machine.

The idea that innovation is necessarily connected to R&D is so entrenched in the minds of theorists that it explains a controversy on innovation in the late 1960s-early 1970s. In 1967, the US Department of Commerce issued one of the first government studies on innovation (US Department of Commerce, 1967). It documented that R&D is only a very small part of technological innovation costs (tewn per cent). Economist Edwin Mansfield, followed by Humphrey Stead, did not believe the numbers, basing their view on a critique of the methodology (Mansfield et al., 1971: 118-19; Stead, 1976). History proves that the two authors were wrong, but this demonstrates how powerful the view of innovation as R&D is among theorists.

One thing is sure: in the twentieth century, the technological connotation of invention gets into innovation, adding a new and hegemonic word to the semantic field – *technology*. Technology brings into innovation its connotation as industrial and material (Morère, 1966). Technology becomes innovation and innovation becomes technology. Even to sociologists like Everett Rogers "the adoption of a new idea almost always entails the sale of a new product" (Rogers, 1962: 261). To Elting Morison, historian and founder of MIT's program on Science-Technology-Society (STS) in 1976, mechanical innovations present for study "a concrete, durable situation" compared to "other innovating reagents - a Manichean heresy, or Marxism, or the views of Sigmund Freud - that can be shoved and hauled out of shape by contending forces or conflicting prejudices. At all times we know exactly what [the innovation] really is" (Morison, 1950: 593). Similarly, every economist concentrates on technology and "exclude[s] social invention" from his study (e.g.: Kuznets, 1962: 19).

The same happened to invention in Bacon's time: invention got "technological". In *The Advancement of Learning*, Bacon distinguishes two kinds of invention: invention in sciences and arts, and invention in rhetoric (Bacon, 1605: 219). Up to then, the latter was the common meaning of what invention is: a step to bringing forth good arguments. As Bacon put it, invention "draw[s] forth or call[s] before us that which may be pertinent to the purpose which we take into our consideration" (Bacon, 1605: 223). However, to

Bacon such invention "is not properly an invention for to invent is to discover what we know not, and not to recover or resummon that which we already know" (Bacon, 1605: 222-23). It may serve to "direct inquiry" and for "wise interrogating"; yet, it is not invention but memory (Bacon, 1605: 224).

To Bacon, real invention is invention relative to science and the useful arts. In fact, Bacon was noticing an increasing use of the term invention in the matter of "technological" or useful arts. [51] However, this kind of invention is actually "deficient" according to Bacon. It relies on chance rather than reason, and on a form of induction which is "vicious and incompetent". Bacon's *Novum Organum* is entirely concerned with this kind of invention and with its division between *experience literara* and *interpretatio naturae*. In this work Bacon offers a systematic method for invention in science and arts.

One may ask to what extent Bacon's view has contributed to the modern representation of invention as technological invention. In the centuries after Bacon, invention meant finding (discovery) as well as making (constructing, fabricating) and was applied, generally with few qualifications, to both activities. Later, a distinction was made between two concepts: discovery refers to facts or things that already exist out there and that one finds out, while invention combines and makes new things (Seely, 1883; Mason, 1895; Wyman, 1929; Harrison, 1930a, 1930b; Linton, 1934; Kneale, 1955). Discovery is reserved for science, and invention for the useful arts. Today, to many people, invention relates to technology.

The twentieth century is witness to a similar change in the meaning of innovation, from the general to the technological. Yet in spite of the technological connotation, innovation in the twentieth century is first of all market innovation (commercialization).

[51] See Long (2001) for many quotations using the word invention in very old books and treaties on "technology". On the concept of invention in the context of technology in the seventeenth and eighteenth centuries, see Macleod (1988b). On the history of the concept of technology, see Schatzberg (2006; 2012).

*Action*

Innovation appropriates a very large vocabulary to talk of the practical (*versus* the speculative, including invention or basic research) and becomes a super-category. Like revolution, innovation is a meta-concept (Koselleck, 1969) that has the "ability to combine conflicting ideas" and resolve all problems at once (Ozouf, 1989: 817), characterized by linguistic inflation, fuzziness and a large semantic field (Goulemot 1967; Mailhos, 1968; Saint-Gérand, 1988). Innovation is like progress too – it ties numerous experiences and encompasses more and more spheres of life (Koselleck, 2002a) – and civilization: a synthetic and unifying concept (Bowden, 2011: 30).

Together with invention, "action" is a concept at the core of the vocabulary of innovation in the twentieth century. [52] Innovation is *doing* – doing something new (as opposed to the mental). [53] It requires "energy", as French sociologist Auguste Comte put it discussing the opposition or "fundamental battle... between the spirit [or instinct] of conservation

[52] For a rare and unique piece in the literature that discusses innovation as action, see Hellestrom (2004).
[53] "Dynamic action" (Ward, 1903: 246, 248); "doing something differently" (Schumpeter, 1926: 89; 1939: 84).

and the spirit of improvement". [54] Sociologists Thorstein Veblen [55] and Lester Ward [56] and economist Schumpeter talk in terms similar (energy). [57]

The vocabulary used to talk of "the act of innovation" (Merton, 1965: 50) is multiple: "putting idea to work" (Levitt, 1963: 73; Morse and Warner, 1966: **XX),** practical, [58] "operational" (Allen, 1967: 1), "bringing into being" or "into use" (Schon, 1967: 29; Mohr, 1969: 112) an "economic reality" (Bright, 1964: 4), "put into useful form" (Bolz, 1975: 43). This culminates with Richard LaPiere's statement: an idea is not "socially significant apart from its actual manifestation" (LaPiere, 1965: 197). The concept makes use of the following words and ideas:

- Introduction: introducing something new to the world. This concept first appeared among anthropologists and sociologists, [59] but is most popular among economists and management. [60]

[54] "The spirit of innovation is primarily the result of essentially personal instincts...Man...is, by his nature, like any other animal, eminently conservative...Social evolution would certainly have been infinitely more rapid than history tells us, if its development had been able to depend mainly on the more energetic instincts; instead of having to fight against the political inertia that it tends to produce spontaneously in most cases" (Comte, 1839: 558-59). Then Comte discusses civilization or social progress as a shift from animalism to humanity, a triumph of reason over instincts. Social development encourages individuals "to attempt new efforts to ensure themselves, by more refined means, of a an existence that otherwise would thus become more difficult, and also by requiring societies to react with a more stubborn and more concerted energy to battle sufficiently against the more powerful growth of specific divergences" (Comte, 1839: 642). Population and cities create "new needs and new difficulties, this gradual agglomeration spontaneously develops new means... The fundamental antagonism between the instinct for conservation and the instinct for innovation... having evidently to acquire from then on a significant increase in energy" (Comte, 1839: 643). "The essential and permanent battle, which establishes itself spontaneously between the instinct for social conservation, the usual characteristic of old age, and the instinct for innovation, the usual attribute of youth" (Comte, 1839: 636).

[55] "Innovation calls for a greater expenditure of nervous energy in making the necessary adjustment than would otherwise be the case"; it requires "some surplus of energy" (Veblen, 1899: 126).

[56] As "dynamic action", innovation is exceptional and limited to a few people: "Surplus social energy is confined to these favored groups, and all social innovation emanates from them" (Ward, 1903: 244).

[57] In *The Theory of Economic Development*, Schumpeter talks of the entrepreneur as innovator in terms of energy. The words used (and contrasted to routine) are energy – "exercising one's energy and ingenuity" – motive power, effort, strength and great surplus force (Schumpeter, 1934: 81-94).

[58] "Practical use" (Carter and Williams, 1957: 15); "practical form" (US Senate, 1965: 1074).

[59] "The inventor, or innovator, is a person who introduces into man's response to his environment new tools, new techniques, or new ideas" (Mowrer, 1942: 36); "the introduction of new features [cultural traits] in culture" (Rose, 1948: 255).

[60] "The introduction of new commercial products" (Maclaurin, 1949: xvi); "the introduction of new machines" or design ideas (Brown, 1957: 406); "the introduction [into a firm] of a new process which reduces costs, or of a new product which diverts demand from an old product" (Carter and Williams, 1958:

- Application, [61] assimilation, transformation, exploitation, translation, implementation: applying (new) knowledge in a practical context. These concepts stress the source of innovation. Innovation is the application of:
    - Ideas
    - Inventions
    - Science – in spite of Gilfillan's (1935: 6) and Schumpeter's lesson (see page 32 above). [62] This is a major idea of the twentieth century: science and innovation form a pair, and many theorists focus on the initiation step of innovation: the generation or R&D.
- Adoption, acceptance, utilization (use), diffusion: adopting a new behaviour or practice. These concepts are mainly used by sociologists. [63]

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55); "capacity of industry to introduce a rapid succession of new products and processes" (Allen, 1958: 9); "the introduction of innovations which increase the efficiency of production of existing goods in addition to replacing older commodities in capital and consumption goods markets" (Dernburg, 1958: 4); "introduction of new products or new processes of production or distribution" and "changes in organization and the addition or expansion of particular administrative units" (Hill and Harbison, 1959: 16); "introduction of a commercial process" (Enos, 1962b: 225); "the introduction of a new product or a cheaper way of producing an existing product" (Rosenberg, 1963: 218); "the introduction of new developments … that are produced and actually used" (Knight, 1965); "the introduction of new and improved processes and products into the economy" (Johnston, 1966: 158); "the introduction to widespread use of new products, processes or ways of doing things (Allen, 1967: 7).

[61] Application often has the connotation of "imitation", as in Schumpeter and others: "applying outside innovation to one's own organization" (Williamson, 1951: 1).

[62] Innovation is "the application of new discoveries on a commercial scale" (Boulding, 1946: 86); the use of new technical knowledge "in order to derive new products" (Burns and Stalker, 1955: 249); "practical applications of fundamental and applied science" (Rostow, 1952); "the application of new knowledge" (Carter and Williams, 1958: vii); "a new application of either old or new knowledge to production processes" (Kuznets, 1959: 29); a definition reproduced in Pavitt, 1963: 206; technological innovation is a translation process "which begins with pure science" (Croome, 1960: 9); innovation "springs from scientific research or invention and proceeds from theory, experiment, or speculation to economic reality" (Bright, 1964: 4); "a new development in fundamental science" is a "requirement for innovation" (Cockcroft, 1965: 89); "Technological innovation means improving the old or developing new industrial products or services from a science base" (Morton, 1968: 57); "technological innovation is the perception, creation, and transformation of relevant science into new and improved products and services" (Morton, 1971: 4).

[63] *Resistances to the Adoption of Technological Innovation* (Stern, 1937); "Social innovation or progressivism" is "laws and practices adopted by various states" (McVoy, 1940: 220). "We call any particular advance in the technology of production an *innovation*, when it is adopted by enterprise" (Keirstead, 1948: 132-33); "technological changes are envisaged as having taken place when a tool, a device, a skill or a technique, however unknown or well-known elsewhere, is adopted by an individual in a particular community" (Hodgen, 1952: 45). "Innovators are the first to adopt new ideas" (Beal and Bohlen, 1955: 9); "innovators are not necessarily the same persons as inventors. Inventors are the individuals who create new ideas. They unite cultural elements into new combinations. Innovators adopt …" (Rogers, 1962: 195-96); "innovators are the first members of a social system to adopt new ideas" (Rogers, 1965: 55). "an idea, practice or object that is perceived as new by an individual or other unit of adoption" (Rogers, 1983:

- Commercialization: bringing a new good to the market. Used concurrently with introduction or application, this concept applies to technological innovation. [64]

In general, the above concepts make reference to two key ideas: input or "push" on the one side – knowledge or science as the source of innovation – and output or "pull" on the other – innovation to meet market demand. These two ideas crystallized into what came to be called "models" (Godin, 2006; Godin and Lane, 2013) and led to the study of innovation as a "process". Herein lies a semantic innovation of the twentieth century, an innovation that has had a major impact on the modern representation of innovation. Until then, innovation was either a substantive (novelty) or a verb (introduction, adoption), an end or a means. Sometimes it was also discussed in terms of a faculty (combination, creativity), an attitude (radicalism) or aptitude (skill) or quality (creativity, originality, departure, difference). In the twentieth century, innovation is a "process", a sequential process in time.

The nuance between innovation as a verb and innovation as a process is not as clear-cut as it might appear at first sight. This is not unlike innovation as substantive or verb. In fact, innovation is a word that admits of two meanings: action (introduction of a novelty) and result/outcome (the novelty itself), a fact first mentioned in Littré's dictionary (1872-77) and noted by some theorists (Parks, 1959; Siegel, 1962, Chakrabarti, 1973; Hildred and Bengston, 1974; Osborne, 1998; Hellstrom, 2004). For example, sociologists use innovation as a substantive but focus on the verb (diffusion). Similarly, economists stress the verb as a process in time. Be that as it may, innovation as a process contributed to

11); "a process-innovation is defined as any adopted improvement in technique which reduces average costs per unit of output" (Blaug, 1963: 13).

[64] "Introduction of a new commercial product" (Maclaurin, 1949: xvi); "When an invention is produced commercially as a new or improved product, or process, it becomes an innovation" (Clemens, 1951: 14); "first commercial production" of an invention (Freeman et al, 1963: 39); "commercial application of the results of previous inventive work and experimental development" (SPRU, 1972: 7); "first *commercial* [Freeman's italics] application or production of a new process or product" (Freeman, 1974: 166); "the technical, industrial and commercial steps which lead to the marketing of new manufactured products and to the commercial use of new technical processes and equipment" (Jervis, 1975: 20); "innovation refers to technology actually brought into first use or application" (Goldhar et al., 1976: 51). The first such view comes from economist Josiah Stamp (1929) and sociologist Gilfillan (Gilfillan, 1930: 96).

giving the concept of innovation a very large function: innovation encompasses *every* dimension of an invention, from generation to diffusion.

Economic historian Abbott P. Usher was one of the firsts, together with political scientist Karl Deutsch (1949) and anthropologist Homer Barnett (1953), to offer a view of innovation as a (mental) process, which "consists in the assimilation of particular data into a [deliberate] pattern previously recognized as incomplete" (Usher, 1929: 13). To Usher this process is composed of the following steps: elaboration of the concept, primary synthesis, critical revision. Over time, innovation as a process composed of sequential steps or stages (like the life-cycle) took many forms, of which three are dominant. Economic historian Rupert Maclaurin and his colleagues from MIT (George Baldwin, Arthur Bright and Yale Brozen) deserve mention here, as the first theorists on (technological) innovation as a process. [65] One form – of which anthropologists in the early twentieth century were precursors (Godin, 2014c) and on which Victor Thomson, together with James Utterback, provides an influential terminology, [66] and whose root goes back to Sumner Myers and Donald Marquis (1969), – starts with the generation of an idea and ends with its realization or transformation into reality – most of the time an economic (market) reality.

[65] A process composed of "four distinct stages": fundamental research, applied research, engineering development and production engineering (Maclaurin, 1947); "Science and technology [the Section is entitled "Stages in the Process of Technological Change and Some Definitions"]: can be broken down into five distinct stages: (1) fundamental research, (2) applied research, (3) engineering development, (4) production engineering, and (5) service engineering" (Maclaurin, 1949: xvii). "the gradual accretion of technical knowledge, from the birth of a new idea to commercial fruition" (Bright, 1949: 449); a process of the "successful introduction of *new products*": science, engineering (invention), innovation (entrepreneurship) (Maclaurin, 1950: 91); the invention of a new product and its introduction to the market ("commercial exploitation"): "invention, development, and manufacture" (Baldwin, 1951: 97, 99); invention, innovation and diffusion, or three "levels" or roles of technological change in economic growth, all interrelated (the "movement" of one is reflected in the others): what is technologically possible (invention), what is possible with techniques currently used (innovation) and what is occurring in the economy as a whole (imitation) (Brozen, 1951). For similar early views, see also: a "process of innovation" or "sequence of events", according to three "steps": development of the idea, introduction, reception (Morison, 1950: 599); the "steps … from the imaginative mind to the customer": research, development, pilot-plant, commercial-plant, production, marketing (Mueller, 1957: 85).

[66] Generation, acceptance, implementation (Thompson, 1969); idea generation, problem solving and implementation/diffusion (Utterback, 1978).

The innovation process is generally defined and studied as a sequence that includes two, three or four phases, depending on the writer: [67]

Invention [68] → innovation [69] → diffusion [70]

The other form of the sequential process puts the emphasis on a series or "chain" of activities, as Maurice Goldsmith calls it (Goldsmith, 1970), from pure research, to applied research then development then production, [71] or, as Keith Pavitt and William Walker call it, "the technical, industrial and commercial steps" (Pavitt and Walker, 1976). Such sequences gave rise to the highly popular "linear model of innovation" (Godin, 2008; 2011).

The above two are the most frequent forms. Another very influential sequence, at least among sociologists, is Rogers' sequence of adoption, composed of five stages – awareness, interest, evaluation, trial, adoption (Rogers, 1962) – a sequence from rural sociology first suggested by George Beal and Joe Bohlen in 1955.

Before leaving this section, we should mention two associations or keywords of the modern vocabulary. To every theorist:

- Innovation is advance or *progress*, in the name of (social) needs to sociologists, organizational performance to business schools and industrial competition to economists. Yet in general, progress does not define innovation explicitly (but see McVoy, 1940; Gray, 1974: 693).
- The *entrepreneur* is an emblematic figure of innovation in many theories of innovation, including policy. He is contrasted to the manager and to routine

[67] Innovation as a process in two phases is generally the exception. For a two-steps sequence (initiation, implementation), see Johannes (1972), Zaltman et al. (1973) and Duncan (1976).
[68] Other terms used are generation, initiation or conception of an idea.
[69] Other terms are proposal or acceptance/rejection or adoption or translation or actualization or transformation or incorporation or realization or introduction or commercialization.
[70] Other terms are adoption or implementation or reception.
[71] Maclaurin and colleagues from MIT in the late 1940s-early 1950s; Furnas (1948), Mueller (1957), Croome (1960), Enos (1962), Goldsmith (1970), Stead (1976).

(Schumpeter, 1934; 1939) – a contested idea (Cole, 1949; Ruttan, 1959; Chandler and Redlich, 1961).

*Combination/Creativity*

The fourth basic concept in the vocabulary of innovation in the twentieth century is creativity. While in the previous centuries innovation was subversion, the connotation now shifts to creativity as combination. In fact, "combination" is a precursor term to innovation, a term that goes back to studies of the imagination in the eighteenth century. Combination continues to be used in *lieu et place* of innovation in early theories of innovation like Gabriel Tarde's (Tarde, 1890). In his study of social classes, sociologist Vilfredo Pareto uses combination rather than innovation, defining combination as "uniting disparate elements together in a new entity" (Pareto, 1916: 889-90). Schumpeter's main concept in *The Economic Theory of Development* (1926) is also combination – not innovation – combination shifting its characteristics to innovation in the 1934 edition. [72] Over the twentieth century, innovation is regularly defined as (creative) combination. [73] The first (or rather unique) theory of innovation as combination ("configuration") comes from anthropologist Homer Barnett (1953).

[72] Schumpeter makes no use of innovation in the German edition of 1911. In 1926, innovation appears regularly, but as a secondary idea to that of combination. Innovation is never defined. It is novelty of any kind and is used interchangeably in the sense of a "new task", "doing something differently" or simply "something new" and, in one place, "the function of entrepreneurs" (Schumpeter, 1934: 89). Overall, combination rather than innovation is the term used to talk about innovation. It is combination which is explicitly defined (as innovation): combination is "directed towards something different and signifies doing something differently from other conduct" or "innovation". It presupposed a specific kind of "aptitudes" (p. 81, footnote). This "carrying out of new combinations" is composed of five cases: new good, new method, opening of new market, conquest of a new source of supply, and new organization (Schumpeter, 1834: 66). My reading of Schumpeter is different from Heertje, who argues that in 1926 Schumpeter "now introduces the concept of innovation" (Heertje, 1988: 75). Yes he introduced the concept, but with no discussion of it.

[73] "New recombination of old parts" (Deutsch, 1949: 28); "aggressive assemblage of information and analysis of results deriving from novel combinations of factors" (Danhof, 1949); "a combination of two or more traits" (Heinrich, 1950); "new combination of elements" (Redlich, 1951: 286); "stepping from one combination to another" (Robinson, 1952: 33-34); "an intimate linkage or fusion of two or more elements" (Barnett, 1953: 181); "a new combination of some pre-existing elements" (Hagerstrand, 1972).

Innovation as creativity finds a place in several theorists on innovation [74] – and defines R&D too. [75] It is interesting to contrast the definition of the 1972 edition of the *International Encyclopedia of the Social Sciences* to that of 1930 (Kallen, 1930). The reference to change shifts to origin(ality): the introduction of a "hitherto unknown element … say, for example, a new technical device, a new way of allocating social roles, or a new cultural manifestation" (Hagerstrand, 1972: 174). Yet, to some other researchers, in fact to most researchers, innovation is not creativity (inventing) but action, as discussed above.

Nevertheless, to most theorists of innovation, creativity remains a sleeping concept. It is not theorized upon, at least not in "innovation studies" (Godin, 2015). It is taken for granted. With few exceptions (Barnett, 1953), creativity has no connotation of the mental act of creating or inventing something new. [76] To be sure, innovation is regularly talked of in terms of originality, in the sense of origin in time (first). But most of the time creativity refers to the outcome/result (something different, original) [77] of a creative act which remains mysterious, or frequently refers to the market: combining factors of (industrial) production or activities. [78] In general, creativity ends up as a synonym of

[74] Pareto (1916: cunningness, ingenuity, creativity); Schumpeter (1939; 1942: creative destruction; 1947), Deutsch (1949: creative steps), Terborgh (1950: creative capitalism), Redlich (1951: creative (primary) versus semi-creative: subjective), Maclaurin (1955: innovation requires "the right combination of creative vision and action"), March and Simon (1958: "closely related to … creative thinking"), Gardner (1963), Argyris (1965) using psychologists' studies; Simone (1968: innovation is engineering teaching [methods] "for stimulating creative thinking"), Gabor (1970: "methodical creations of the human spirit").

[75] "Research and experimental development may be defined as creative work undertaken on a systematic basis to increase the stock of scientific and technical knowledge and to use this stock of knowledge to devise new applications" (OECD, 1970b: 8).

[76] The artist and the literary critic do not use the word innovation either. One exception is B. Bergonzi to whom innovation is "avant-garde" in contemporary art. Because "the 'avant-garde' label has come to seem a little old-fashioned", Bergonzi "settle[s] for 'innovation', an innocuous but precisely descriptive term" (Bergonzi, 1968: 11-12).

[77] Entirely new (Levitt, 1966: 63); new and different (Zaltman, 1965: 2); qualitatively different (Robertson, 1967: 14); "differ substantially" (from existing policies: Johannes, 1972: 1); depart ("from traditional concerns": Mohr, 1969: 111), departure (Merton, 1965: see footnote 21 and 22 above; Rosenblum, 1976: 4).

[78] A new combination in techniques of production (Goodwin, 1946); "by innovation we mean the combining of factors of production in new ways" (Griffin, 1949: 317-18); "the combination of many different activities" (Enos, 1962a: 299); "the carrying out of new combinations" or "reducing an invention to practice and exploiting it commercially" (Scherer, 1965: 165).

change or novelty (Barnett, 1953) or innovation, [79] or a metaphor (Schumpeter's "creative destruction") or a social process. At best, creativity is creation in the sense of making new (LaPiere, 1965: 197-98): generating, originating things judged great by the analyst.

**Innovation: "No Adequate General Definition Which Offers Common Ground"** [80]

In spite of the theories, linguistic and semantic issues remain important in the twentieth century. A new concept or a concept whose meaning is changing faces controversial points of view. Over the twentieth century, many talk of innovation but make no use of or refuse to use the word. This is the case with anthropologists whose main concepts are invention and diffusion, and sociologists on adoption and diffusion. Change remains a central concept too (social change, organizational change, technological change). [81] Innovation is part of a cluster of words used in the same text, and poorly defined (Tarde, 1890; Stern, 1927; 1937; Noss, 1940; Deutsch, 1949; Posner, 1961; Edwin Mansfield in the early 1960s), and many words are used interchangeably with innovation, sometimes explicitly. [82] In fact, the absence of explicit definition in theoretical works is a recurrent pattern, as in the previous centuries.

In contrast, one finds many different definitions in the same document (Schumpeter, 1939; Enos, 1962a) or multiple meanings of the concept by the same author (Posner, 1961; Mansfield, 1961). Theorists merely appropriate a new popular term: innovation is used in titles, but not inside texts (e.g.: Hunter, 1955; Baum et al., 1957); innovation is

[79] As J.H. McPherson, manager, Psychology Department, Dow Chemical Company, puts it in his paper on "creative engineers": "engineers expect to carry their brain children on out to maturity – through pilot plant and production plant on out to the marketplace … to carry an idea out though the verification stages, reduction to practice … to get ideas off the ground" (McPherson, 1965: 33-35). See also Gruetzkow (1965) for a discourse on creativity as synonymous to innovation.

[80] Warner, K. E. (1974), The Need of Some Innovative Concepts of Innovation: An Examination of Research on the Diffusion of Innovation, *Policy Sciences*, 5: 441.

[81] Social theories of innovation in science are few. Certainly, under diverse names scientific innovation has been studied for decades (e.g.: scientific change). Thomas Kuhn is certainly an emblematic representative of such a study (Kuhn, 1962). Kuhn also produced a paper contrasting tradition and innovation in science (Kuhn, 1959). Yet apart from David Mulkay, Joseph Ben-David and a couple of others, social theories on scientific change or scientific innovation do not use the word innovation.

[82] For example: "R&D/innovation, technological innovation, and innovation will be used interchangeably in this paper" (Rubenstein and Ettlie, 1979: 65).

the object of relabeling previous concepts: combination (Schumpeter, 1912 *versus* 1934), induced invention (Brown, 1946; Fellner, 1961), change (Ogburn and Nimkoff, 1940 *versus* Nimkoff, 1964), technological change (Maclaurin: 1947 *versus* 1949s; Robinson, 1938 *versus* 1952). Innovation functions as a "portmanteau" as Richard Nelson and Sydney Winter define the concept (Nelson and Winter, 1977: 36), or a "packaging", as *Nature* put it in 1979: innovation "provides a central theme around which otherwise disparate activities can be arranged" (*Nature*, 1979: 119).

Yet some concepts have become basic concepts to innovation and remain so in the twenty-first century. The two *episteme* studied here share a central characteristic. In fact, recent theories only recapitulate the older views, using a different vocabulary. Innovation is intentional. Such was the case with the Reformation. When people portray innovation as "private opinion", they stress the intentional character of the individual or innovator, in the sense that the innovator voluntarily opposes the social order. Authors of dictionaries think similarly. For example, a law dictionary declares that "precedents [are the] best and safest Rule to Walk by, because they are generally not only the Opinion of the Makers" (Jacob, 1743; 1797). Over the twentieth century, innovation was also studied as an intentional or purposive affair: initiative, [83] deliberate [84] and motivation [85] are key terms, as well as planned change, directed change and managed change. However, the innovator is now a genius, an original, an eccentric, and innovation is said to come mainly from outsiders (Gilfillan, 1935: 89-91): the young and the poor (a statement already found in Plato, Aristotle, Machiavelli, Bacon and Comte), the dissatisfied and maladjusted (Barnett, 1953), the frustrated (a statement already found in William Ogburn, Abbott Usher and Joseph Rossman), the low social status class (Linton, 1934: 344-45) and the deviants (Rogers, 1962: chapter 7; see also his tradition-modernity norms: p. 59). [86] Yet, to modern writers, innovation is organizational, social and national too, because it is

[83] Tarde (1890), Cole (1949), Terborgh (1950), March and Simon (1958), Deutsch (1959), Zaltman et al. (1973), Brewer (1973), Ettlie and Rubenstein (1980).
[84] Drucker (1957), Miles (1964), Corwin (1975).
[85] Mohr (1969).
[86] Sociologist Pitirim Sorokin argues to the contrary: "It is the upper-urban civilized groups who have been "innovators" … contradictory to the current opinion, according to which the upper classes are supposed to be "conservative" while the lower classes are thought of as innovators" (Sorokin, 1937-41: 574).

progressive. [87] Still, innovation is intentional or purposive in the sense that it can be planned.

Despite the theoretical definitions of innovation of the twentieth century, theorists have not settled the old controversies on what innovation is. To a certain extent they have settled one debate: the controversial nature of innovation. Theorists stress the successful and minimize failures. [88] Innovation is praised everywhere: "researchers have implicitly assumed that to adopt innovations is desirable behaviour [rational] and to reject innovations is less desirable [irrational]" (Rogers, 1962: 142), a situation that has not always been thus. For example, the publication explosion of the 1960s-70s produced many conceptual analyses, including critical thoughts on Schumpeter. [89] Today, such discussions are relatively absent in the literature. Few theorists define their concepts, unlike the economist Simon Kuznets in several of his papers on innovation. Writers distinguish types or classes of innovation, but rarely define what innovation is. A theorist brings out his own definition from the start, as handbooks do. [90]

What innovation is differs depending on the author and the discipline. It is both wide and restricted. To anthropologists like Homer Barnett (1953) and Margaret Hodgen (1952) innovation is "any thought, behavior, or thing that is new because it is qualitatively different from existing forms" (Barnett, 1953: 7). Innovation here is more or less a synonym for novelty. To John Gardner, innovation is new ways of thinking and doing: political, social, economic and organizational (Gardner, 1963: 30-31, 68, 75-85). In 1958,

[87] To Rogers, adoption is individual (a mental process) while diffusion is social (among persons) (Rogers, 1962: 76). See also Hornell Hart on invention as individual and innovation as social (Hart, 1931: 511f).

[88] Gilfillan (1935), Noss (1940), Allen (1958), Enos (1962a), Myers and Marquis (1969), Aiken and Alford (1970), Stead (1976), Pavitt and Wald (1971), Battelle (1973). On failures, see: Coe (1967), Evan (1967), SPRU (1972), Utterback et al. (1976).

[89] Cole (1949), Deutsch (1949), Taymans (1950), Redlich (1951), Scoville (1951), Baldwin (1951), Barnett (1953), Drucker (1957), Ruttan (1959), Bowley (1960), Katz et al. (1963), 1963; Schon (1967); *Journal of Business* (1967), Robertson (1967; 1971), Mohr (1969), Fores (1970), Zaltman et al. (1973), Warner (1974), Downs and Mohr (1976), Daft and Becker (1978), Levitt (1963; 1966), Rowe and Bozie (1974).

[90] In addition to the two handbooks discussed on p. 21-22 above, other handbooks take the dominant representation (industrial) for granted, and many editors do not define innovation as such, in their introductory chapter at least: Dogson and Rothwell (1994), Karlsson (2008), Lundvall et al. (2009). One exception is Shane (2008). The absence of definition is also the case in (the introduction to) a handbook which studies a large conception of innovation (Shavinina, 2003). The few handbooks' discussions of what innovation is come mainly from writers on non-technological innovation: Cozijnsen and Vrakking (1993); Poole and Van de Ven (2004); Fallouj and Djellal (2010); Hall and Rosenberg (2010).

the magazine *Scientific American* published a special issue on innovation in science, also defined broadly. Broader definitions are legion in the literature. [91]

To be sure, some definitions are disciplinary: organizational, [92] political, [93] educational, [94] social [95] … and economic. Yet the last one is what some call a "restricted" definition of innovation that has become a spontaneous representation or "common meaning" of innovation: "invention introduced into the market" (Nutter, 1956: 522, footnote 4). However, innovation "is more – much more – than machines" (Enarson, 1960: 496). But few follow anthropologist Homer Barnett, the second theorist of innovation broadly defined (after Gabriel Tarde) – Schumpeter's theory is ten pages long only (Schumpeter, 1939), whose view were regularly cited until the 1970s, using the term innovation as an alternative to the "popular" and "restricted" meaning of invention as technological. [96] John Gardner contrasts his broad conception to a "narrow and immature" conception restricted to technology (Gardner, 1963). Dennis Gabor contrasts his definition to a "restricted sense", namely "the process that turns an invention through development, pilot manufacture, sales propaganda, etc., into a marketable product" (Gabor, 1070: 10), as do students of social innovation. In fact, writers on both organizational and social innovation start by making a contrast with technological innovation. [97] "In general", states Kenneth Warner, "sociologists have studied a far wider range of innovations" than economists (Warner, 1974: 439).

[91] Tarde (1890), Stern (1927), Usher (1929), Kallen (1930), Hart (1931), Schumpeter (1939), Rose (1948), Cline (1948), Jaffe (1948), Redlich (1951), Noss (1940), Hogden 91952), Barnett (1953), Boskoff (1957), Drucker (1957), Ruttan (1959), Rogers (1962), Gardner (1963), Jones (1963), Levitt (1966), Lapiere (1968), Toulmin (1969), Gabor (1970), Kuznets (1972), Zaltman et al. (1973).

[92] Williamson (1951), Maclaurin (1955); March and Simon (1958), Hill and Harbison (1959), Lorsch (1965), Burns and Stalker (1961), Miles (1964), Argyris (1965), Wilson (1966), *Journal of Business* (1967: Becker, Knight, Evan, Carroll), Mohr (1969), Turner and Williamson (1971), Gross et al. (1971), Morton (1971), Zaltman (1973), Aiken and Hage (1971), Rowe and Bosie (1974), Baldridge and Burnham (1975), Downs (1976).

[93] McVoy (1940), Scott (1968), Thomson (1969), Walker (1969), Johannes (1972), Gray (1973; 1974), Savage (1973), Solesbury (1976), Downs (1976), Rosenblum (1976).

[94] Enarson (1960); Miles (1964); Carlson (1965); Gross (1971); Daft and Becker (1978)

[95] Ogburn and Nimkoff (1940) (social invention), McVoy (1940), Noss (1940), Drucker (1957), Garvey and Griffith (1966), Fairweather (1967), Taylor (1970), Holt (1971), Kuznets (1972), Brewer (1973), Lapierre (1977), Tornatzky et al. (1980).

[96] Economist Josiah Stamp talks in similar terms: "invention has too mechanical a connotation … We must include processes and the consequences of discovery" (Stamp, 1933: 383).

[97] Another contrast (to writers on organizational innovation) is to individual innovation.

Innovation is at the same time contested and taken for granted. Over the period 1950-75, innovation was regularly contested for the fuzziness of the concept [98] – and remains so today. [99] As a consequence some authors suggest abandoning the term. [100] At the same time, what innovation is has become taken for granted. Several writers talk of technological innovation without the qualifier 'technological' in the phrase, either mechanically (more often than not) or deliberately (Batelle, 1973; Freeman, 1974: 18). In fact, few students of technological innovation name the innovation studied as "technological innovation". Innovation suffices.

Governments, international organizations and consultants have all espoused the technological and market view of innovation (see attached file on definitions). [101] To a great extent, governments – together with academics as consultants – are at the origin of the current and dominant representation of innovation. Among the many meanings and usages available, governments elected one, the industrial one. Some of the official definitions even became those of the theorists, like that of the first report of the UK Advisory Council on Science and Technology (1968), under Sir Solly Zuckerman,

[98] "Like all analytical concepts, the terms 'invention, innovation, and diffusion' lose some of their preciseness when one attempts to apply them to historical facts" (Scoville, 1951: 347). Innovation "lacks precise definition" (Maclaurin, 1955). "Every change becomes an innovation simply because it has not been done before ... Such a definition sterilizes the term innovation" (Becker and Whisler, 1967: 463); US Senator Philip A. Hart, to the Senate Hearings before the Subcommittee on Antitrust and Monopoly: "It is important to have a clear conception of what we are talking about". The problem involves "a confusion of the concepts of invention, on the one hand, and innovation or development on the other hand" (US Senate, 1965). "The most outstanding feature of innovation is its mysteriousness … Many problems arise in defining innovation … because of the value judgment attached to the term … The difficulty here is that most of us expect an innovation to be something good" (Knight, 1967: 478); "the term innovation has been employed so widely and ambiguously" (Mohr, 1969); "one of the vogue words these days is innovation. For some people it is even more – it is a value word that implies something good and positive. As with most popular words, it is misused and has different meanings for different people" (Holt, 1971: 235); "little consensus about the meaning" of innovation (Aiken and Hage, 1971); "there are no adequate general definition which offers common ground" (Warner, 1974: 441).

[99] See the recent OECD examination of innovation survey questions (OECD, 2012; 2013).

[100] "Innovation has come to mean all things to all men, and the careful student should perhaps avoid it wherever possible, using instead some other term" (Ames, 1961: 371); "we shall do better without the word innovation" (Machlup, 1962: 179); "the use of the term innovation is counterproductive" because each individual has his or her own interpretation. "It may be useful to drop the term 'technological innovation' for purposes of survey design" (Roberts and Romine, 1974: 4).

[101] Other similarities of official definitions and theorists concern the contrast to invention, the subjective nature of innovation, innovation as originality in time (first), innovation as a process and a series of activities and innovation as revolutionary (major).

reproduced by researchers at SPRU (SPRU, 1972; Rothwell and Robertson, 1973; Jervis, 1975; Pavitt and Walker, 1976), and that of the US Department of Commerce (1967) used by researchers in the United States (Goldsmith, 1970; Twiss, 1974).

**Conclusion**

The representation of innovation has changed dramatically over the last four centuries. The man of the seventeenth and eighteenth centuries believed that "The desire of innovation" is that "to which Unquiet and Injudicious Men are commonly enclined" (Madox, 1702: preface). Innovation was subversive. To repair (reform) is not to destroy (innovate). The theorist of the twentieth century thinks otherwise. Innovation is revolutionary, in a positive sense, and is most welcome – for its contribution to (economic) progress.

Innovation defies definition, like many abstract concepts. To some, innovation is simply novelty or change, and includes invention. This view takes innovation as a substantive. To others, innovation is the introduction of something new. It is using or adopting or commercializing; the theorists exclude invention from this definition. Here, the verb form is stressed. To still others, innovation is a meta-concept: a *total* process, from generation to diffusion. Given this large semantic spectrum, a jargon has ample space to develop, which it did. [102] One writer suggested recently that due to the complexity of innovation but also "the academic desire to either create new words or redefine existing words, … the language of innovation suffers from a rich vocabulary" (Linton, 2009: 729). Right. But the performative stance of many theorists (e.g.: national system of innovation; social innovation) explains as much. Where the performative view reigns, there is no place for history, reflectivity or semantic nuances. Innovation is a rallying cry.

The conceptual space of innovation is quite large, but at the same time limited. It is large in the sense that innovation is used for everything new, from change to reformation to

[102] Seventeenth century: novelist, noveller, novellism. Twentieth century: innovative, innovationist, innovatory, innovational, innovativeness, innovatively, innovistic, innovativity.

revolution. What is common to every writer is the idea of change and novelty. Besides this, innovation has no stabilized meaning. Innovation may be originality (an entirely new or different thing, not hitherto existing) or improvement or renewal; it may include imitation (restoration) or not. At the same time, the conceptual space of innovation is limited. It is left to the audience or reader to put a meaning on the term. More often than not, this person has a spontaneous representation of innovation as subversive (as in the past) or technological – the result of an economic ideology to which the theorists have contributed.

This later representation is quite recent. "Technological innovation" is a phrase that appeared after 1950. To take just one example, Schumpeter made no use of the phrase. [103] Certainly, the term 'technology' existed before that date, as well as 'technological change'. However, in a matter of decades, technological innovation eclipsed other terms and became the canonical representation of innovation. One has to turn to Rupert W. Maclaurin, economic historian from MIT and the first theorist on technological innovation in the late 1940s-early 1950s (Godin, 2008), although never mentioned in "histories" of technological innovation, for the source of this representation. Not only is Maclaurin a very early user of the term 'technological innovation' but he develops the idea of technological innovation as 1) a process, 2) a sequential process in time, 3) a process that starts with science (research), and 4) a process whose ultimate stage is commercialization.

The concept innovation and its study are frequently postulated to originate from economics and Joseph Schumpeter. [104] This is a mythic attribution of origin. It is perhaps due to the absence of history on the concept in the literature. The few historical lines that

[103] To Schumpeter, innovation is 1) doing things differently, 2) composed of five types, of which one is "new goods" (neither "technology" nor "technological innovation"), 3) a new combination of factors of production or technological change, as with American mainstream economists (Schumpeter, 1939).

[104] "The term 'innovation' appears to have originated in a tradition of economic analysis" (Staudenmaier, 1985: 56); "the founding framework of innovation" is Schumpeter (Alter, 2000: 8); "innovation is a concept that belongs first to the business world" (Durance, 2011: 7); "the study of innovation began in economics, notably in the works of Schumpeter" (Cajaiba-Santana, 2013: 43). See also Fagerberg and Vespagen (2009) on a bibliometric mapping of the field. For similar mythic attribution on social innovation, see Godin (2012).

exist, including bibliometric analyses of the field of "innovation studies", concentrate on industrial innovation. This leaves out a wide diversity of meanings. In fact, the early representations, theories and definitions of the twentieth century come from anthropologists and sociologists, and the definitions are quite broad in meaning. Subsequently, the managers' and the economists' "restricted" representation developed, concurrently with that of governments, and got into the media and into everyday discourse. Yet today this canonical representation is shifting again. Recent extensions of the concept are the OECD Oslo manual, which now includes organizational and marketing innovation (OECD, 2005), the literature on "social innovation" [105] and the use of the concept as a metaphor in biology (Reader and Laland, 2003).

A concept integrates multiple meanings, suggests Reinhart Koselleck. In the twentieth century, innovation retains the ancients' connotation of revolution, [106] in a positive sense, [107] as well as the instrumental and purposive connotation. Modern theorists forget that they recapitulate older views. Over the centuries, the concept of innovation has enriched its scope as well, from the religious to the political, the social and the economic. Yet this is only part of the story. At the same time, there is "death of historical context", loss of meanings and mystification (Burke, 1950: 112). "The frequent use of words or indeed names tends to wear down their meaning. They contract and at the same time expand their significance" (Nitze, 1948:464). Today, innovation has lost, to take one example, the spiritual meaning of the Middle Ages (renewing of the soul) (Godin and Lucier, 2014). Innovation is a concept for inducing actions oriented toward practicality.

[105] A concept whose history is similar to that of innovation, from negative in the nineteenth century to positive in the last few decades (Godin, 2012).
[106] To the Greek philosophers innovation (*kainotomia*) is subversive of the established order, a meaning that got into the religion with the Reformation. While innovation is revolutionary in the sense of radically different to Xenophon, this meaning changes to the politically subversive in Plato and Aristotle (Godin and Lucier, 2012).
[107] Innovation as revolutionary changed to the positive in the twentieth century, because of its major (revolutionary) impacts on the economy, it is said.

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