ON THE SOURCES OF DISCONTINUOUS CHANGE

This theoretical paper seeks to outline a framework for understanding the relationship between innovation and discontinuous change. It begins by defining innovation and the concept of the magnitude of innovation impact. It defines discontinuous change as the internal result of an innovation. It explains how the scope of the impact of an innovation is determined by its origin, its interaction with other innovations, and its novelty. Based on these three characteristics, propositions are made about the relationship between the source of discontinuities and their effects. These propositions are illustrated using a case study of Canadian specialty television broadcasters. The paper concludes by discussing how the nature of discontinuities requires a narrative understanding of the origins and processes of change.

Introduction: Gales of Creative Destruction

The means of understanding discontinuous change by studying their effects on single firms, industries or products can be compared to studying weather patterns by taking measurements at only one location. Prior to the second half of the seventeenth century, meteorologists made forecasts exclusively with local data. To understand weather patterns, and to extrapolate likely future forecasts from local data, historical measures from several sites were aggregated. With some accuracy, this use of historical analysis and live, local data was used to predict, based on past behavior, whether local conditions would change (Corona 2006). On November 14 1854, at the height of the Crimean war, a large storm sank 21 British and 16 French ships. An inquiry into whether theses losses could have been prevented accelerated the development of the “synoptic” weather reporting network, which, with the then-recent invention of the telegraph, was able to use live remote data to predict weather patterns (Lindgrén and Neumann 1980).

The way in which discontinuous change is studied is comparable to the prediction of weather from data gathered at a single location. To understand the process of discontinuous change, the system in which it takes place must be viewed synoptically, or as a whole. Understanding the “perennial gale of creative destruction” (Schumpeter 1943) requires process research across products, firms and industries, just as understanding the weather requires a synoptic perspective on patterns.

Because discontinuous change takes place in a complex system, and cannot be understood from a single dimension, research on its sources and causes cannot focus exclusively on the effect of a single technology and a single firm or industry.
Technological Innovation and Discontinuous Change

Economic theory on discontinuities does provide a synoptic perspective on its effects, exploring the relationship between economic change and technology. Economic theorists focus primarily on the way in which clustered innovations interact with, disrupt and change economies.

Schumpeter, whose writing is foundational to subsequent research on innovation, explains that “the fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers’ goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates” (1943). In so doing, he provides a definition of the types of innovation that propel discontinuous change that is limited to innovations. He further defines innovations as:

1. New goods;
2. New methods of production;
3. Opening of new markets;
4. New sources of supply; and
5. New organizational forms (Schumpeter 1934).

Schumpeter describes a “process of qualitative change” that “incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one.” The causal direction therefore flows primarily from technological, process and managerial innovations to discontinuous change. Schumpeter explains that the pace of technological change itself is discontinuous; innovations are temporally clustered (1934).

Mensch (1979) both clarifies and broadens Schumpeter’s definition by conceptualizing the tension between stability and ‘basic innovations’ as driving creative destruction. Mensch offers a taxonomy of innovation:

The evolutionary tree of human life-styles has numerous offshooting branches. Every fork in a branch stands for the opening of a new path – a new method of operation or a new technology, that is, a novel area of activity that can potentially offer employment to a large group of people. These forks, deviating from former practices, result in what I call basic innovations. (1979)

Mensch defines ‘improvement innovations’ as “the linear extension of the branches on the evolutionary tree (1979). He describes the frequency of emergence of basic innovations as discontinuous and seeks to explain the clustering of innovations into long waves of economic development (Keklik 2003). Similarly, Nelson and Winter (1977; 1982) argue that “general natural trajectories” comprising “technological regimes” define periods of technological development. Schumpeter, Mensch, and Nelson and Winter describe innovations as emerging through an evolutionary process, and Mensch’s use of an evolutionary tree to illustrate the pattern of their emergence connects the development of subsequent innovations to their predecessors.

By separating innovation and invention and explaining how basic innovations are distinct from, and predecessors to, improvement innovations, Mensch suggests a conceptual basis for understanding the discontinuous change triggered by innovation. Freeman and Perez (1988) further divide technological innovations into a taxonomy of four categories:

1. Incremental innovations: improvements in existing production processes; the result of suggestions from users or operations; not the result of deliberate R&D.
2. Radical innovations: The product of R&D; generate the growth of new markets; no aggregate economic effect unless clustered.

3. Changes of ‘technology system’: Combinations of radical and incremental innovations, and managerial innovations; clustering of innovations to simultaneously change unrelated parts of the economy.

4. Changes in ‘techno-economic paradigm’: Multiple clusters of incremental and radical innovations leading to new products, services, systems and industries, and affecting almost the whole economy.

In defining their taxonomy, Freeman and Perez begin to define not only innovations, but their consequences and the process with which they produce creative destruction. Incremental or improvement innovations are extensions of radical or basic innovations. The final two categories of innovations are as much consequences of innovations as innovations themselves; they are the product of innovation with an economic system. Just as innovations are the product of inventions (Schumpeter 1943; Mensch 1979), and the development of innovations is primarily intraorganizational (Nelson and Winter 1982), changes of technology systems and changes in techno-economic paradigms are enacted in an economy. The explicit broadening of the definition of innovations describes an effect of innovation – change – more than the innovation itself.

These overlapping definitions build a scale of innovations illustrated in Figure 1. While the figure conflates distinct concepts, it illustrates the logical progression of taxonomies of innovation and identifies the qualitative shift that occurs when innovations interact with each other.

![Figure 1: Typologies](image-url)
Defining Discontinuous Change

The analysis of discontinuous change requires keeping the two concepts of innovation generally and single innovations separate and including two others. The first concept – innovation – is, as described by Schumpeter, the kinetic energy of change. Single, discrete innovations form the molecules of Mensch’s study, and his cataloguing of basic innovations argues for their ex-post objective identifiability. The second concept is the way in which an innovation clusters with, causes and is caused by other innovations as it moves through a society, and includes the last two of Freeman and Perez’ categories of technological innovations. The distinction can be further explained as the difference between an innovation specifically and the general process of innovation.

The third concept is the way in which the innovation and its pattern of economic progress is perceived by a focal unit of analysis. This concept allows for the distinction of change as an event, as in the introduction of Quartz technology and its effect on the Swiss watchmaking industry (Glasmeier 1991), from dynamism as a property of the environment in which a firm operates (Dess and Beard 1984). The fourth is the effect of an innovation or series of innovations on a focal unit of analysis.

To systematically parse definitions of discontinuous change, each of these four elements must be understood separately. Any definition of discontinuous change requires specificity. Mensch (1979) describes discontinuous change in the pace of basic innovation emergence. Astley (1985) theorizes that discontinuities occur in communities of organizations. Other research (eg. Glasmeier 1991; Henderson 1993; Powell, Koput et al. 1996; Christensen 1997; Fox-Wolfgramm, Boal et al. 1998; Dean, Carlisle et al. 1999; Sainio and Puumalainen 2007) analyzes the effect of discontinuities on firms. Organizational fields (Meyer, Gaba et al. 2005) and teams (Gersick 1988) have also been found to change in discontinuous patterns.

Change is experienced, and therefore its meaning is subject to the intent of the researcher, and the perception of, and effect on, the unit of analysis. For example, the Xerox machine redefined the typing pool across all industries but its effects on the individual firms which used it were less radical; the change was limited to a set of routines at a single department. At the other end of the scale, an industry can go through consolidation and divestiture without affecting the core routines of the organizations of which it is composed. For this reason, the term discontinuous change requires specificity.

Definitions of discontinuous change therefore specify a scope. Anderson and Tushman (1990) define “technological discontinuities” as “innovations that radically advance an industry’s price vs performance frontier.” Garcia and Calantone (2002) argue that a discontinuity is a major change in firm or industry marketing or technology behaviour, and that the nature of the innovation is a function of the degree of change at the focal unit of analysis. Rosenbloom and Christensen (2003), Ehrnberg (1995), and Garcia and Calantone (2002) suggest that this confusion of definitions prevents the effective research of discontinuous change.

Yet the framework for understanding the process for discontinuous change is consistent. Schumpeter (1943), Mensch (1979), Astley (1985), Freeman and Perez (1998) agree that individual, discrete innovations have, as one of their properties, a degree of novelty. For Mensch and Astley, this property is binary; an innovation is either basic or improving, or radical or incremental. Any change produced by innovations, whether alone or clustered, must specify a unit of analysis. Thus Nelson and Winter’s (1977; 1982) “technological regimes”, Dosi’s (1982) “techno-economic paradigm” and Rappa’s (2000) “technological paradigm” describe changes to institutional and industry elements. Meyer and Brooks (1990) define discontinuous change in organizations as a change in organizational configurations. Gatignon and Tushman describe
change at the level of the product sub-system (Gatignon, Tushman et al. 2002). Each of these definitions provides both a criterion for a qualitative shift and a unit of analysis at which the shift occurs. They separate the external innovation from the internal effect of the innovation, allowing for the innovation to be analyzed as the independent variable and the change as the dependent variable.

The internal effect of the innovation can be either positive or negative. Tushman and Anderson (1990) explain that an innovation is competence-enhancing when it improves a firm’s existing activities, and competence-destroying when existing know-how or capital is made obsolete.

The final component of a definition of discontinuous change is the explanation of discontinuities not driven by innovation. Natural and man-made disasters, government legislation and social changes interact with firms both directly and indirectly. These exogenous events are similar to innovations in that they are inherently unpredictable. However, beginning with Schumpeter, innovation is the most frequently discussed source of change.

Figure 2 illustrates the way in which the components of this definition fit together. Over time, innovations of varying novelty and other events emerge, combine and spawn new events. During this process, the innovation either disrupts or complements an existing unit of analysis. Discontinuous change occurs in the interaction.

The illustration can be used at different units of analysis on different theories. For example, population ecology predicts high mortality in industries during discontinuous change (Hannan and Freeman 1977). To represent this theory, the diagram would cluster innovations below the y-axis. Mensch (1979) argues that innovations are either basic or improving; thus the circles would be of only two sizes.
Studying Discontinuous Change

Networks. To describe the process by which innovations precipitate change, Astley (1985) explains how innovations are disruptive to communities of firms. Astley argues that because firms are coupled in interdependent systems, the impact of technological innovations will not be limited to a single company. As a result, and propelled by the cycles of change described by Mensch, basic innovations interact with whole communities of firms. Innovations are likely to be adopted by inter-related firms (DiMaggio and Powell 1983). Over time, similar requirements for knowledge will lead to polythetic groups, or clusters of organizations sharing similar properties (McKelvey and Aldrich 1983).

The community becomes tightly coupled not only to each other, but to a specific niche in the environment. Furthermore, firm-level inertia prevents change (Rumelt 1995). Gomes-Casseres (1994), provides an example of the result, describing how the emergence of multiple incompatible UNIX standards led to competition between networks of firms. When a dominant standard gained a critical market share, the alliance supporting the less popular standard suffered a discontinuous loss of market share.

Networks are inherently more flexible than hierarchies (Powell 1990) yet the requirement to agree to technical standards, and the need for cooperation between multiple firms deviating from standards locks participants in alliances into technological paradigms (Gulati, Nohria et al. 2000). Faced with customers in both the Apple and Microsoft standards, Adobe made the more costly choice of developing its content production software for two operating systems. Apple itself, historically committed to using chips manufactured and developed by IBM and Motorola, recently made the (ex-ante) risky transition to using chips from Intel. In making this change, Apple forced its community of software developers, including Microsoft and Adobe, to redevelop their software for the Intel Mac platform.

A third example illustrates what determines whether a discontinuous innovation is competence-enhancing or competence-destroying. In a study of hard drive manufacturers, Rosenbloom and Christensen (1995; 2003) found that when demand for an innovation exists in a firm’s value network, its effect is competence-enhancing. Christensen (1997) explains that resource dependence of producers on customers prevents producers from working with new customers to develop new products. He illustrates this effect by relating how Bucyrus Erie, a cable-actuated excavator manufacturer, responded to the potential discontinuity represented by hydraulic actuation. Bucyrus purchased a hydraulic backhoe company and used its know-how to produce a hybrid hydraulic/cable product marketed to its existing customers. However, the acquisition and the new product failed because Bucyrus’ existing customers had requirements that could only be met by the reliability of cable actuated backhoes. Both Bucyrus and hard drive manufacturers, who, in Christensen’s study, sold their products to computer OEM’s, were resource dependent on their customers because of a paucity of both customer and product heterogeneity (Pfeffer and Salancik 2003).

The networked configuration of firms has two expected firm-level effects relevant to discontinuous change. First, because of the participation of multiple firms in a single standard, the number of firms affected by an innovation will increase. Second, because networks of firms are tightly coupled systems, their interactions within a network and with innovations are difficult to predict (Perrow 1999), and therefore more harmful to firms. As a result, to understand firm- and industry-level effects of innovations, research must look at the way in which innovations affect the value network (Astley 1985; Christensen 1997).
The Origins and Paths of Innovations. Figure 2 illustrates the way in which innovations combine, evolve and generate new innovations over time. Nelson and Winter (1982) illustrate this process by describing the innovation represented by “the original Douglas DC-3, the result of the confluence of a number of R&D strands,” which represented “a radically new civil aircraft package.” The DC-3 was possible because of the convergence of a set of innovations: “all-metal skin, low wing, streamlining of body and engine configuration, more powerful engines.” The aircraft itself made possible the development of the DC-4, a four-engine incremental improvement over the DC-3. The introduction of the jet engine represented a more radical innovation, and allowed for a leap forward in the evolution of aviation.

The emergence of packet switching, a foundational technology of the Internet, provides a second example of interacting innovations. Roberts (1978) explains that “packet switching was not really an invention, but a reapplication of the basic dynamic-allocation techniques used for over a century by the mail, telegraph and torn paper switching systems.” He argues that the value of packet switching is based on a tradeoff: “if lines are cheap, use circuit switching; if computing is cheap, use packet switching.” Packet switching therefore only gained its property of being radical or basic when coupled with the inexpensive computing power predicted by Moore’s law. Roberts also illustrates the role that governments play in determining the paths of innovations. Packet switching was developed with the support of the United States Air Force to provide robust, survival communication.

During its development, packet switching was incrementally refined, and the technologies on which it operated became both less expensive and more pervasive. As institutions found new applications for the innovation, independent private networks were developed. Roberts explains why:

All these networks were the result of a basic economic transition, which occurred in 1969 when the cost of dynamic-allocation switching fell below that of transmission-lines. This change made it economically advantageous to build a network of some kind rather than to continue to use direct lines or the circuit switched telephone network for interactive data communications. Universal regulatory conditions in all countries restricted "common carriage" to the government or government-approved carriers, and thereby led to the development of many private networks instead of a competitive market of public networks.

The interaction of innovations, the decisions of networks on standards and the influence of government thus set the pace and determined the shape of the emergence of packet switching.

What followed was more radical innovation. Together with fiber-optic transmission, the increased ubiquity and decreased cost of computing power, the emergence of TCP/IP as a universal protocol for packet-switched networks, and a munificent socio-economic context, packet switching enabled the Internet. This innovation in turn spawned others, and generated discontinuous change. Whether packet switching is competence-enhancing or competence-destroying also shifts over time. Initially, phone companies adopted packet switching networks because of cost savings. However, packet switching enabled Voice Over IP, which could increase competition in voice telephony.

Because innovations combine with each other and with the environment in which they emerge, their effects on the firm cannot be understood by focusing exclusively on a single technology. The convergence of multiple technologies and other factors determine whether a discontinuous change will occur. Therefore examining the relationship between properties of
discontinuities and their effects on firms is intermediate to understanding how underlying innovations and the environment in which they evolve determine the scope, degree and nature of a discontinuity.

Coincidences of Innovations and Turbulence. Despite being a combination of technologies, packet switching is still a single, discrete innovation. Its effect on the firm can still be expressed as the effect of a technology on a unit of analysis. Figure 2 illustrates multiple innovations evolving independently. These innovations have the potential to simultaneously affect units of analysis.

In their study of the US bicycle industry, Dowell and Swaminathan (2000) found that persistence of routines between product generations increases organization survival. Put another way, whether an innovation represents a discontinuity is a function of how severe the organizational requirement to adapt will be. For example, a number of events have converged to force auto parts suppliers in Toronto’s Golden Horseshoe area to close. The rise in the Canadian dollar, the decline of the US auto industry, and competition with China have forced some firms out of business and others to close down (Keenan 2007). The decline of Digital Equipment Corporation began when the simultaneous emergence of a UNIX standard and TCP/IP eroded two separate sub-systems of the company’s proprietary products. Pfeffer and Salancik provide a third example of the decline in canning businesses caused by the simultaneous post-WWII increase in tin supply, increase in vegetable imports, innovation in freezing and development of supermarkets.

On a long enough timeline, the simultaneous innovations faced by a unit of analysis and the potential effect of unknown discontinuities blurs into a property of the landscape. Environmental dynamism, or the rate and unpredictability of environmental change (Dess and Beard 1984) aggregates the effects of innovations and makes them internal to the unit of analysis. At the firm level, the strategic response shifts from a response to a discontinuity to an adaptive organizational configuration (Bourgeois and Eisenhardt 1988). The topic of interest to the researcher changes from innovations and discontinuities to properties of the environment and strategic configurations of firms.

Synthesis: Three Dimensions to Discontinuous Change Analysis. The innovation novelty scales illustrated in Figure 1 can be used together with the concepts of innovation source and time described above to frame the extant literature on discontinuous change and provide three propositions for further research on the relationship between innovation source and discontinuity effect.

Proposition 1: Innovation Origin and Innovation Effect. Pfeffer and Salancik (2003) conceptualize the firm’s environment as having three levels. The first is “the entire system of interconnected individuals and organizations who are related to one another and to a focal organization through the organization’s transactions.” The second is “the set of individuals and organizations with whom this organization directly interacts.” The third is “the level of the organization’s perception and representation of the environment.” The authors explain how participation in institutions and social activities determine the knowledge a firm’s executives have about its environment.

One of the basic constraints bounding rationality is the amount of attention managers can allocate to parsing their environment (Simon 1997). Because of this constraint, management attention is scarce (Ocasio 1997). The orientation of the top management team will be more focused on events in the second level of Pfeffer and Salancik’s environment than in the first. A manager’s restricted field of vision will further focus responses to more immediate environmental
features (Hambrick and Mason 1984). If an innovation originates within or close to a firm’s value network, a firm is more likely to understand its implications.

As a result, as the origin of an innovation becomes more distant in a firm’s environment, it is more likely to be discontinuous.

Proposition 2: Innovation Novelty and Innovation Effect. As innovation novelty increases, or as innovations become radical, or disruptive of existing paradigms, the magnitude of their effect increases. Mensch (1979), Freeman and Perez (1983) and Nelson and Winter (1982) describe how the disruptiveness of technology is a function of the degree to which they are novel. Furthermore, as innovations become paradigm shifts, the likelihood that they will trigger other innovations increases. Whether the innovation is described as improving versus basic, or incremental versus radical, or minor versus major, its effect will increase.

The increase in likelihood of discontinuity is related to the knowledge the firm possesses. Weick (1995) explains that firms understand discontinuities by applying existing knowledge to a process of sensemaking. New knowledge – the cognitive understanding of innovations – is therefore a function of the completeness of existing knowledge. A firm is less likely to understand the implications of innovations when they are developed in environments about which a firm has less knowledge.

Thus as an innovation’s novelty increases, it is more likely to be discontinuous.

Proposition 3: Innovation Interactions and Innovation Effect. Nelson and Winter’s explanation of the evolution of the aeronautics industry provides an example of the way in which innovations converge and splinter as they diffuse through a socio-economic system. Stacey (1992) describes this process:

It means that the future of an innovative system is absolutely unknowable. An innovative system, therefore, cannot be driven to some planned or envisioned future state… it can only emerge from the chaotic interaction between it and the systems constituting its environment.

The firm’s ability to anticipate and react to innovations will decrease as those innovations trigger unknowable changes in a firm’s environment.

Therefore as an innovation’s interactions with its environment increase, it is more likely to be discontinuous.

The three propositions are illustrated in Figure 3. The volume of the cube represents the likelihood that an innovation will be discontinuous to a focal firm. A small discontinuity will be caused by an innovation whose origin is proximate to a focal firm, whose novelty is low and whose interactions with other innovations are limited. A large discontinuity, illustrated on the right, will result from innovations that originate far from the focal firm in unrelated industries, disrupt existing technological paradigms and interact with other innovations to compound their effect on the focal firm.
Existing Research

The framework illustrated in Figure 3 can be applied to existing studies. In examining the effect of Quartz technology, Glasmeier (1993) chose a revolutionary innovation whose origin—First World War sonar—was unrelated to the environment in which watchmakers operated (Bottom 1981). Quartz technology was quickly applied to developing timekeeping devices, and thereafter changed only in its size and cost; it did not interact with other significant innovations before disrupting the Swiss watchmaking industry.

Kaplan, Murray et al. (2003) studied the response of pharmaceutical firms to advances in biotechnology. The innovation being studied is close to the industry, but represents a paradigm shift in technology. The study explains that Watson and Crick’s discovery of DNA led to innovations in DNA splicing. This core innovation combined with others to disrupt pharmaceutical research.

Case Study: Effect of Internet on Canadian TV

The effect of the Internet on Canadian specialty television demonstrates the way in which innovations, other events and the propositions made above explain discontinuous change. The Internet itself is the product of converging innovations, and represents a technological paradigm or basic innovation. It has triggered a number of improvement innovations, which have in turn triggered other innovations. These innovations are threatening television both directly and indirectly by challenging the way in which content, audience and advertising are acquired and sold.
Canadian specialty television broadcasters function in a tightly coupled value network. Cable and satellite providers sell their programming to audiences, paying federally-mandated licensing fees to broadcasters. Broadcasters also get revenue from advertisers, who buy audiences in the form of advertising spots. Specialty television broadcasters purchase programming from producers or develop their programming themselves. They are therefore resource dependent on the Federal Government, cable and satellite providers, audiences and advertisers.

The convergence of hypertext, packet switching and standard data transmission protocols encouraged the initial spread of the Internet. The decreasing cost of home computers increased their popularity and provided the Internet with the critical mass required for both audiences and content creators to spend a significant amount of time online. More recently, advances in cloud computing and the development of social media have begun pulling audiences away from television towards the Internet. This has eroded the audiences broadcasters sell.

At the same time, Google is using knowledge about its users to more effectively provide advertising services to its clients. Google has recently developed the capability to automatically sell radio advertising spots to its clients (Mills 2006). If this technology is successfully applied to television advertising, advertisers will lose clients to the Internet, decreasing advertising spending on television.

In the past, the CRTC has protected Canadian culture from foreign competition. However, the CRTC has clearly stated that it will not regulate the Internet (CRTC 1999). The licenses on which broadcasters relied will no longer guarantee an audience for their content.

The case demonstrates how multiple technological and value network interactions, distant origin of innovations and the paradigm-breaking nature of a change can interact. For broadcasters, the result is a potentially discontinuous change (Figure 4). Understanding that the technology is disruptive does not provide useful information; the rapid ascent of YouTube
demonstrates that the direction in which innovations evolve cannot be anticipated (Stacey 1992; Christensen 1997). Some media companies have responded through acquisitions. For example, Fox has purchased MySpace and used the social media platform to interactively and effectively promote its films. However, this option is less available to broadcasters whose operations are exclusively based in Canada.

The dilemma faced by broadcasters is an example of resource dependence. It can also be seen as a demonstration of how dynamic capabilities – or the absence of a dynamic capability to develop new audience experiences in a global marketplace – determine the outcome of strategic change (Teece 2007).

Conclusion

The Type of Research Discontinuous Change Requires

The above case study briefly illustrates a set of interacting factors. In repeated, iterative studies of discontinuous change, Meyer, Gaba et al. found that thorough analysis can require heuristic or nonformal methods to properly capture the full complexity of the phenomenon (2005). By repeatedly questioning their research methods, the authors were able to develop a process for studying change that was historical, not dogmatically tied to a research design or unit of analysis, and aware of nonlinear concepts.

Their approach is similar to Christensen’s (1997). In exploring hard drive manufacturers, backhoe manufacturers, retailers and automobile companies, Christensen uses historical analysis at multiple levels to illustrate patterns in discontinuous change.

Discontinuous change is internal and temporal. Whether or not a change is discontinuous is contingent on its effect on the firm. The way in which it develops from innovations or other changes in the environment and affects a firm or other level of analysis requires longitudinal research. The length of time and narrative approach required to study discontinuities is a product of the inability to understand them in isolation. Like weather, change must be understood synoptically.

Summary

The framework suggested above attempts to organize work on discontinuous change and to suggest an area to be studied. Discontinuous change begins primarily with innovations, which interact with other innovations and events in the environment. Innovations can be incremental, revolutionary, or, especially when clustered with other innovations, can have a more profound effect on the economy.

Whether innovations produce discontinuous change is contingent on the unit of analysis being considered. When firms and networks are studied, the degree and nature of coupling within the network can determine the severity of a discontinuity. The origin of innovations is also likely to increase their effect. Finally, the way in which innovations trigger other events in the environment determines their disruptiveness.

All of these elements can be seen in the reaction of Canadian specialty television broadcasters to the Internet. Discontinuous change will affect them in a way they cannot currently understand, and therefore cannot react to. Creative Destruction is the inevitable and relentless propellant of capitalist change.
References


