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The Media and ICT industries meet the New Normal: Resilience lessons for high uncertainty

P. H. Longstaff¹

Abstract

This paper puts together some of the author's previous work on the concept of resilience. It is appropriate for general readers with no background in the topic. It provides abbreviated theoretical foundations for business resilience, including a brief discussion of business organizations as complex adaptive systems and lists their important attributes. This is followed by a short discussion of resilience characteristics that are seen in multiple systems and are an important for systems that must operate under high uncertainty. Resilience strategies are distinguished from resistance strategies, the costs and benefits of both are discussed. Two different types of resilience are identified: static resilience and adaptive resilience. The paper concludes with strategic and tactical recommendations for communication businesses.

Author's note: This paper combines two styles of reference/citation that the author believes will be helpful to several types of readers: academic readers (who are familiar with APA style) and regulators/ business executives (who are familiar with endnotes).

I. Introduction

The early 21st Century is a time of high uncertainty for many businesses and governments, with fast and strong disruptions in many of the systems that they depend on, including economic, banking, political, technology, and even the weather.² Since we cannot predict where and when disruptions will happen and we may be asked to deal with things we have never seen before, detailed planning in advance may be counterproductive. It may be better to have organizations that are prepared to respond to a wide variety of challenges *and* opportunities.

Where we had come to expect certainty, we are now (sometimes reluctantly) accepting the fact that no amount of data about what happened in the past and no fancy new theories are going to enable us to predict the future of this sector. We are coming to accept the necessity of dealing with uncertainty. This is not a new idea. One of the best known articulations was by military theorist Carl von Clausewitz, who described uncertainty in complex evolving environments as the "fog of war."³

The search for greater understanding of ways for organizations to cope with turbulence and uncertainty has led some to the concept of resilience (Longstaff, 2005, Weick and Sutcliffe, 2007).

Resilience has been studied and described by various academic disciplines as a potential answer to move beyond survival and even prosper in the face of challenging conditions (Carpenter, et al, 2012).⁴

This new way of looking at the goals of managing and regulating communications companies has been made necessary by the evolution of the converging communication sector into “rugged competitive landscapes” (Porter and Siggelkow 2008). The new opportunities and challenges presented by these new landscapes may limit the applicability of established management and regulatory approaches that have previously been successfully employed. The structure of the communications sector (the types of players and their size) has become more vulnerable to “regime shifts” due to asymmetric, interdependent relationships of market players in a dynamic, fast developing environment that has expanded to beyond their former product markets and geographic boundaries. This raises questions about the ability of current regulation to achieve a communications marketplace that provides communication and information services in a sustainable and reliable manner. (e.g. Noam 2010).

And even as the industries in the communication sector are undergoing these significant changes they are imbedded in larger social, political and economic systems that are also undergoing a period of high uncertainty. It has come to be called the New Normal.

II. The New Normal: Complexity and Unpredictability

The Law of Unintended Consequences is familiar to everyone who has tried to manage any kind of organization. For example, sometimes when we are trying to help one thing we inadvertently harm something else. That has probably always been the case, but today organizations are all being asked to work with new people, in new environments, with new technology. The interactions among these people, places and things (and outside forces that are brought into the picture by global transportation and communication networks) cause new surprises that may never have been seen before. Have our world views kept up with this change or are we still assuming a “clockwork” system where everything can be predicted and planned for?

Researchers from many fields, including business and public administration, have discovered that complex systems often behave in similar ways (See, e.g., L. Dennard, K. Richardson, and G. Morcol 2008) These might be biological systems, chemical systems, computer systems, or human social systems. Although the people who have begun to identify and study these systems have worked out some shared names for the processes they observe, it will be some time before a unified theory of complex systems is evolved and adopted. While there is no universally accepted and comprehensive definition of complex systems, there are some things that they seem to have in common. Complex systems:

- Are made up of many components
- Contain intricate webs of causal links and feedbacks that are tightly or loosely coupled
- Have interdependencies among components (or modules)
- Are open to influences from the outside environment
- Are more than a sum of their parts; there is synergy
- Exhibit nonlinear behavior; small changes can bring big and/or many effects
- Have so many dimensions or variables that they are mathematically intractable⁵

Several disciplines have also noted that the level of complexity in a system is closely tied to the amount of embedded communication networking. There also appears to be a relationship between the level of complexity and the control architecture available to the system: a system becomes more complex if it involves more networking but becomes only as complex as its control architecture can handle (Bauer 2004). But adding more control architecture makes the system more tightly coupled and brittle – and less able to handle surprises that it has never seen before. So, trying to control these systems can actually make the potential problems worse. This is an important message for both regulators and business organizations. The more rules you add to the system the more you constrain its ability to adjust to new conditions. The rules must be adjustable when there is high uncertainty or there is a risk that the system will fail when it meets a new challenge. Both the telecommunications and the television sectors (and their regulators) should study the implications of this idea.

Some complex systems are *adaptive* because they *evolve* when individual things (such as organisms or people) called “agents” operate independently in response to forces in their environments. In some systems these agents can “learn” from one another when some agents obtain more resources and their actions are then copied by others. In some systems an important change may not be learnable in the current generation by other agents (for example, the change is a mutation in an organism’s genetic structure). But if that change makes an individual more successful in reproducing itself, the change will eventually become part of the system because these individuals leave more offspring. This is evolution by *natural selection*.⁶ Human organizations and whole industrial sectors sometimes adapt in the same way. In the short term, firms and government organizations adapt when they look at what is working for others and change what they are doing in order to be more successful or to survive at all. Over a longer period of time, the organizations that have evolved their strategies or capabilities for the new environment are more likely to survive and the makeup of the sector will change.

Management theorists have been using these ideas about complexity, adaptability, and unpredictability for at least 50 years.⁷ In what would become one of the more influential business books

of the late twentieth century, Peter Senge suggested that businesses must learn to adapt to change by creating “learning organizations”⁸ and he developed our understanding of *dynamic complexity* where cause and effect “are not close in time and space and obvious interventions do not produce the expected outcome.”⁹ Robert Louis Flood expanded the evidence against predictability in complex business situations, and warned of the consequences for assuming that these processes are capable of being controlled.¹⁰ These ideas about the management (or regulate) of organizations or entire sectors of the economy that are undergoing high uncertainty have been augmented by new research on resilient systems.

III. Resilience as a strategy for communication companies and their regulators

The increasing popularity of the term ‘resilience’ has caused some (e.g., Lorentz 2010; Strunz 2012) to believe that resilience is in danger of becoming another linguistic fashion or buzzword with little or no meaning or validity. While there may be some transient fashion involved, the increased popularity of resilience also signals an alternative focus to the challenges of uncertainty and variability in the New Normal. This has led to new worldwide efforts to recognize and deal with systems that cross traditional academic boundaries and corporate and governmental regulatory divisions.¹¹

Is resilience a metaphor, a capacity, a capability, a strategy, a goal, a guiding principle, a philosophy, a measure or a behavior? Although an elastic notion of resilience may facilitate communication across disciplines (or even divergent lines of research within a discipline (Brand and Jax, 2007, Strunz, 2012), a lack of clarity confusion may hinder operationalization in specific contexts and lead to unclear or even contradicting evaluations of results. But we cannot wait for the world to decide on a definition. The need to find ways to manage and regulate businesses that must cope with high uncertainty is urgent and critical. They must find ways to survive (and even thrive) when they can’t predict the changes coming for their technologies and their various stakeholders.

A resilience strategy is often employed where a *resistance* strategy is not possible. Resistance is a strategy that attempts to keep the danger away from the individual or group in the first place. Building a wall around a city is a resistance strategy if you are likely to be attacked by large groups of people armed with swords. Screening people for weapons when they enter an airport is a resistance strategy. Resistance strategies are often appropriate for dangers that can be predicted and that are likely to happen with some frequency, or are such that, when they do happen, are more costly than the individual or group can endure. The goal is to keep the danger away so that it does not disrupt the current system. Some companies have implemented a classic “Detect and Respond” resistance strategy by watching potential rivals and then buying them in order to kill them before they can become a real threat. This tactic sometimes flies under the radar of competition regulators.

But resistance strategies are less likely to be appropriate where they restrict other survival options. A walled city can keep the local defenders from sending word for reinforcements or reaching water supplies. Resisting change in the firm's strategy (perhaps with a "Walled Garden" strategy) may make it difficult to implement that change when it becomes necessary because there are no connections to alternatives. Resistance strategies can be counterproductive when they give a false sense of security. If you believe you can protect yourself by killing competitors who look like you can be fatal when a competitor comes from another sector. The television industry did not see the competition coming from the internet until it was too late and they can no longer resist that competition. They must find another way.

In situations where resistance is futile or it will reduce access to other critical resources, a policy or strategy to encourage resilience is the next best thing. There are at least two types of resilience. These are sometimes called static resilience (sometimes called engineering resilience or robustness) and adaptive resilience (sometimes called ecological resilience).¹² Either may be an appropriate strategy, depending on the risk that will be dealt with.

Static Resilience is the capacity of a system to return to one pre-designed state or function when it is disturbed. You want your computer to bounce back and do what it was designed to do. Resilience in these systems is measured in the time it takes to come back to system specifications or the number of different conditions under which it will continue to operate at these specifications. The design of the system attempts to limit variables that will have an impact on the system.¹³ This strategy is often appropriate where we know *how* the system will be surprised but not *when*. This is the goal of a firm's tactics for surviving a natural or man-made disaster. You want to be able to get back to full capacity as soon as possible and you can plan for the resources that will be necessary.

This type of resilience is often very efficient in its use of resources, but it would not be an appropriate goal if the system is supposed to adapt to changes in the environment or to generate innovation and new opportunities because it is geared to bouncing back to exactly where you were before.

Adaptive Resilience is often found in systems that have very high uncertainty and must focus on persistence and adaptation. The objective of returning it to the previous state may be impossible or even dangerous if the variables acting on the systems have now changed. The strategies for this adaptive resilience capacity will depend on whether the disruption faced by the organization develops over time, (such as rise of the Internet or the emergence of mobile telephony as the primary phone service for many

customers) or develops very quickly (such as the unexpected emergence of a new technology such as the iPod that very quickly killed the market for the Walkman).

For long-term problems, adaptive resilience is often built by a gradual “discovery” process that tries many things to see what works. Thus companies buy or build small companies that will allow them to try new ideas without investing large amounts of capital. If they do not work out they are valued as “lessons” and disbanded.

For short-term problems adaptive resilience often involves alternative resources. This may mean entering into contracts with alternative suppliers who can step in if current suppliers are no longer able to meet demand or if demand changes. Or it may mean buying a company with access to those suppliers or that has different human resources.

In both cases, adaptive resilience strategies are tolerant of failure and dead ends. Failed experiments do not result in the failed careers of their leaders. Both types of adaptive resilience will assume that there are several (or many) possible acceptable ways for the system to operate and survive. Uncertainty does not allow for prediction of which way is best so trial and error is necessary. The media business is generally operated this way. Nobody can predict which movies, music, books, etc. will be big hits so they try many things and the big hits help pay for the many failures.¹⁴ (Longstaff 2004 and 2011)

IV. Attributes of resilience that may be appropriate considerations for communications companies

There is increasing evidence that resilience is most likely to be found in systems that:

- Build the right amount of diversity and robustness for increasing options and spreading risk
- Increase their range of knowledge for learning and problem solving
- Organize with the right balance of tight and loose coupling
- Increase resilience at the right scale.¹⁵

Each of these attributes can be seen in resilient communications companies.

- *Building the right amount of diversity and robustness for increasing options and spreading risk*

Researchers in more than one discipline have observed that diversity can be an asset when developing resilience.¹⁶ When a group (species, business organization) must operate in an environment where resources are unpredictable and competitors (or predators) are common, one strategy that often gives the

individual or group resilience is to try many things (lay many eggs, develop many new products, invest in many companies) and hope that some of them will be able to survive whatever challenges they encounter. This type of risk *spreading resilience* is a strategy that acknowledges the likelihood of some losses, but it improves the chances that the group or individual won't lose everything. As discussed above, this requires that the system be tolerant of failure and have access to a variety of resources. This might be achieved by using a portfolio approach to spread risk but set up small groups, given them some resources and infrastructure and then leaves them alone to explore new territory.

This separation in order to “explore” may be needed because when a larger firm gets more diverse it tends to get more complex as interaction networks spread unevenly and the forces working on the firm do not have the same effect on the diverse components. For example, forces affects the media divisions of a company may have different effects on the internet divisions. Thus, diversity might increase stability at one scale might decrease it at another scale.

On the positive side, as the interactions between the things and/or the forces increases, the opportunity to develop new types or forces increases. Brian Arthur of the Santa Fe Institute calls this *coevolutionary diversity*. “By this means, complexity, in the form of greater diversity and a more intricate web of interactions, tends to bootstrap itself upward over time.”¹⁷ As noted above, a gradual increase in this kind of complexity can result in the system becoming more brittle and more likely to collapse or flip into a new regime. So, diversity does not always increase resilience at all scales of a system and must be handled with care.

- *Increase their range of knowledge for learning and problem solving*

Human systems will bounce back from a disruption more quickly if they can 1) store and *remember* past experiences; 2) use that memory and experience to learn, *innovate*, and reorganize resources in order to adapt to changing environmental demands; and 3) *connect* with others inside and outside the organization to communicate experiences and lessons learned, self-organize or reorganize in the absence of direction, or to obtain resources from outside sources. There is some evidence that the most resilient organizations are those that have some experience with disruption and have successfully adapted in order to survive.¹⁸ And the most resilient individuals may be those that have experience with dealing with uncertainty and adversity.¹⁹

Individuals and groups must be able to use their information and experience to create novel adaptations to environmental changes to avoid repeating old mistakes. The creation of new ideas, resources, processes, and forms of organization are all results of innovative learning.²⁰ Innovation is a

form of dynamic learning that places emphasis on the capacity to identify and “create new responses or arrangements.”²¹ Innovative institutions sometimes encourage trial-and error type learning by allowing “errors and risk-taking behavior.”²² So the organization must not only remember what happened in the past but it must be flexible enough to incorporate that learning into its present strategy or tactics. Often, innovations occur in a more deliberate way by putting new ideas or resources together with old ones when current strategies are not working. It is true that necessity is often the mother of invention.

Innovative learning can be reduced by a failure to admit that something is not working and continuing to provide it with resources. Examples of this are not difficult to find in both the media and the telecom worlds.

Innovative learning can be especially difficult when it has to happen as an unanticipated disruption is unfolding. During a disruption (such as a technological one), finding information about the innovative learning going on within a firm and among firms (both what is working and what is *not* working) requires a trusted source of information. That may or may not be sources like other divisions within the firm, government, consultants, or industry publications. Identification of these trusted communication channels and maintaining that trust becomes critical.²³ If that trust is squandered on short-term gains (e.g., stock fluctuations) the ability of the firm (or its regulator) to develop innovative learning and approaches will be severely crippled.

- *Organize with the right balance of tight and loose coupling*

Most organizations (or coalitions of organizations) will have internal and external connections that vary in strength. This variety is often difficult to manage but it may increase the resilience of the organization. Robert Glassman, who originally wrote about loosely and tightly coupled systems in biological systems,²⁴ saw that the concepts he developed could be applied to many organizations. His ideas have been applied to military organization,²⁵ organizational development,²⁶ cooperation among business firms,²⁷ cooperation within firms with units that must work together²⁸ and many other fields.²⁹ He noted that the strength of a relationship (whether it is loose or tight) is important to understanding how the system reacts to stimuli, even if this distinction cannot always predict a system’s behavior precisely.

In *tightly coupled systems* any change in one component (individual or subsystem) of the system engenders an immediate response from the other component(s). Any organization that requires an organization-wide rapid adjustment to new conditions is likely to be tightly coupled. For example, engineered systems with automatic controls are said to be tightly coupled (if A happens, then B is the automatic and immediate response). These systems often have very tight feedback and feed-forward loops

in an attempt to regulate many variables. Since anything that affects one part of a tightly coupled system affects all parts, these systems can become unstable when the individual parts cannot adjust to maintain their local stability. This can be seen in multinational media companies with tight connections to the financial systems. Media companies that depend on advertising are tightly linked to the business cycle and suffer more in recessions than telecom companies who often have a looser link to these systems.

In *loosely coupled systems* the components have weak enough links that they can ignore small perturbations in the system. The components have more independence from the full system than tightly coupled components, since they can maintain their equilibrium or stability even when other parts of the system are affected by a change in the environment. They are also better at responding to local changes in the environment, since any change they make does not require the whole system to respond. Examples include divisions of multinational companies who are free to respond locally to changes in consumer preferences or regulatory actions. Thus, if innovation or localized response to particular problems is a goal, then loosely coupled systems would seem most appropriate.

If the goal is standardization and efficiency across the entire system, then a tight coupling of the entire system (including all subsystems) is more likely to yield the desired outcome. However, the very connectedness that makes the firm efficient can amplify internal weaknesses or external shocks because it is unable to respond to individual or unique circumstances.

Managers of functions that have reached this tightly coupled, highly interconnected stage should thus be looking for small, local changes or small errors that can cascade through the system. If this is a real danger, the best strategy may *not* be to get even more tightly coupled but to start a decoupling process that allows the errors to die out locally before they spread in undesirable ways.

- *Increase resilience at the right scale*

There is almost universal agreement that the best starting point for trying to manage an unpredictable system is to identify the various temporal and organizational scales involved. Disruptions that manifest themselves over a long period of time require different strategies than dangers that can pop up at any time. And it is often the boundaries between scales where careful attention must be paid.

As noted above, in systems that operate at more than one scale, resilience strategies may operate at each scale and across the scales. For example, in the human body, the immune system acts first at a local scale to confront an infection by sending a variety of forms of immune cells (within-scale resilience through diversity). But if this strategy fails, the system responds by “scaling up” its response and inducing fever. When similar functions (not necessarily similar mechanisms) operate across scales, they make the

system more resilient because they are redundant: if one fails the other goes into action. Each level of these systems operates separately, and often each level has its own emergent properties and/or operates over different time scales and responds to different cycles. The majority of interactions usually take place within a scale, but scales often interact.

Two types of cross-scale interactions have been identified: *revolt*, when events at a smaller (or faster) scale trigger change at a larger (or longer) scale, and *remembrance*, when events or conditions at a larger (or longer) scale limit the options at smaller (or shorter) scales.³⁰ We see revolt when technological disruptions happen more quickly than large organizations (or their regulators) can respond. Remembrance interactions can be fatal if they limit the options of various components to adapt to changes that are taking place only at their scale because they are tightly coupled to the larger or longer scale.

But when two scales have good communication at the boundaries the system can have higher resilience. The slower parts of systems often act as resilience mechanisms for the faster parts because they can “remember” how to handle certain surprises. In return, the faster parts of the system give the slower parts information about changes taking place and allow the system to adapt at its own time scale.

V. Conclusion

There is not a one-size-fits-all resilience strategy for any firms in the rapidly evolving communications sector. And it would involve some assumptions that are new to industries that have very little experience unpredictable environments and adaptation. This research is just beginning and it only now entering into the stage where we can test it. But even before we can prove the theories we need to bring the ideas to the people who have such a critical need for new ways to approach the uncertainties that face them. The author would greatly appreciate any and all feedback.³¹

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² See, e.g., Bryan Lowell and Diana Farrell, “Leading Through Uncertainty,” McKinsey Quarterly, December 2008 https://www.mckinseyquarterly.com/The_new_normal_2326 ; Rich Miller, “The New Normal vs. The New Mix,” *Business Week*, March 11, 2010, http://www.businessweek.com/magazine/content/10_12/b4171019565076.htm

³ Carl von Clausewitz, *On War*, trans. and ed. M. Howard and P. Paret, Princeton NJ: Princeton University Press, 1984.

⁴ These disciplines include: ecology (Holling, 1996, Walker and Salt, 2012), psychology (Masten, 2001), socio-technical studies related inter alia to safety management (Hollnagel et al., 2006), disaster research (Norris et al., 2008) and a broad range of organizational studies (Lengnick-Hall and Beck, 2005, McCann and Selsky, 2012, Sheffi, 2007, Weick and Sutcliffe, 2007). Publications concerning the concept have increased dramatically.

⁵ For an explanation of this list that is readable by a nonspecialist, see, Melanie Mitchell, *Complexity: A guided Tour*, Oxford and New York: Oxford University Press, 2009; and, Thomas Homer-Dixon, *The Ingenuity Gap: Facing the Economic, Environmental, and Other Challenges of an Increasingly Complex and Unpredictable World*, New York: First Vintage Books, 2002, pp. 110-115.

⁶ For example, a mouse with better hearing is more likely to survive the presence of foxes in her environment and will leave more offspring than other mice. Over many generations these better-hearing offspring will also leave more offspring and gradually the number of mice without the acute hearing will decline.

⁷ For recent ideas, see, e.g. Peter Schwartz, *Inevitable Surprises: Thinking Ahead in a Time of Turbulence*, New York: Gotham Books (2003).

⁸ Peter Senge, *The Fifth Discipline: The Art and Practice of Learning Organizations*. Doubleday: New York (1990), p. 7. For earlier work in the same vein, see, Chris Argyris, *Integrating the Individual and the Organization*. Wiley: New York (1964).

⁹ Ibid. p. 364.

¹⁰ Robert Louis Flood, *Rethinking The Fifth Discipline: Learning Within the Unknowable*, Routledge: London and New York (1999).

¹¹ For example, the Resilience Alliance has developed an interdisciplinary “Resilience Thinking” as a framework for understanding change in social-ecological systems (Walker and Salt, 2012) (<http://www.resalliance.org>). An emerging community of engineers from a variety of subspecialties is developing ‘Resilience Engineering’ as “a new way of thinking about safety” (<http://www.resilience-engineering.org/>). . Resilience capacity is often an emergent property of the system (it becomes apparent over time), making it difficult to predict.

¹² C.S. Holling “Engineering Resilience Versus Ecological Resilience,” in P. C. Schultz (ed.) *Engineering Within Ecological Constraints*, National Academy Press, Washington D. C. (1996).

¹³ See, e.g., G. Taguchi, *Introduction to Quality Engineering*, Tokyo: Asain Productivity Organization 1986; T. Foster, *Managing Quality: An Integrative Approach*, 2nd Ed. New Jersey; Pearson Prentice Hall, 2004.

¹⁴ Longstaff, P.H. and Joseph Steinhardt , 2011. *Listening to Uncertainty in the Music Business: Fat Tails and Resilience*, Harvard Program on Information Resources. http://www.pirp.harvard.edu/pubs_pdf/longsta/longsta-i11-1.pdf

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¹⁵ See, F. Berkes, “Understanding Uncertainty and Reducing Vulnerability: Lessons From Resilience Thinking,” *Natural Hazards Review* **41**: 283-295 (2007); see also <http://www.resalliance.org/576.php> (accessed March 15, 2008). And, J. Douglas Orton and Karl E. Weick, “Loosely Coupled Systems: A Reconceptualization,” *Academy of Management Review* **15**, 2 (1990), 203–223., and D. Dörner, *The Logic of Failure: Recognizing and Avoiding Error in Complex Situations*, New York: Metropolitan Books (1996).

¹⁶ See, e.g., B Turner et al, “A Framework for Vulnerability Analysis In Sustainability Science,” *Proceedings of the National Academy of Science*, **100**:8074-8079 (2003).

¹⁷ W. Brian Arthur, “On the Evolution of Complexity,” in *Complexity: Metaphors, Models and Reality*, G Cowan, D. Pines, D. Meltzer (eds.), Santa Fe Institute Studies in the Sciences of Complexity, Proceedings, **19**, 65-78, 67 (1994).

¹⁸ See Dennis S. Mileti and John H. Sorenson, “Determinants of Organizational Effectiveness in Responding to Low Probability Catastrophic Events,” *Columbia Journal of World Business* (Spring 1987): 14. We would thus expect a culture that has not changed or adapted to be less resilient. In addition, the ability of an individual or group to adapt may be tied to the state of their development. Humans, organizations, social systems, and ecosystems all *develop*; that is, they change over time in form and function such that they grow, mature, die, and change in interesting ways characteristic of the species or type of organization or ecosystem, as shaped by cultural and biological evolution; see L. Gunderson and C.S. Holling, eds., *Panarchy: Understanding Transformations in Human and Natural Systems* (Washington, DC: Island Press, 2002).

¹⁹ C. Siver, E. Holman, and M. Seery, *Journal of Personality and Social Psychology*, 2010.

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- ²⁰ See, e.g., K.G. Tidball and M.E. Krasny, "From Risk to Resilience: What Role for Community Greening and Civic Ecology in Cities?" in A. Wals, ed., *Social Learning Towards a more Sustainable World* (Wageningen Academic Press, 2007), 149-164.
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- ²² Ibid.
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