Innovation: Integration of Random Variation and Creative Synthesis

Citation	Chen, J., & Adamson, C. (2015). Innovation: Integration of Random Variation and Creative Synthesis. [Article in Press]. Academy of Management Review. doi:10.5465/amr.2014.0438
DOI	10.5465/amr.2014.0438
Publisher	Academy of Management
Version	Accepted Manuscript
Terms of Use	http://cdss.library.oregonstate.edu/sa-termsofuse

Innovation: Integration of Random Variation and Creative Synthesis

Jiyao Chen Ph.D. [*]

Assistant Professor of Innovation Management

College of Business Oregon State University

443 Austin Hall Corvallis, Oregon 97331 USA

541-737-6338

jiyao.chen@oregonstate.edu

Christopher Adamson

College of Business Oregon State University

443 Austin Hall Corvallis, Oregon 97331 USA

adamsonc@onid.orst.edu

Academy of Management Review forthcoming

11.03.2014

[*] Jiyao Chen would like to thank Jeff Barden, Jiexun Li, and Don Neubaum for their highly constructive comments.

Innovation: Integration of Random Variation and Creative Synthesis

ABSTRACT

Sarah Harvey has developed an important model called creative synthesis for the use of dialectical reasoning in creative endeavors. This model is put in direct opposition to the evolutionary model called random variation, which, according to Harvey, promotes incremental innovation, while creative synthesis promotes radical innovation. In emphasizing the affirmative stage of the dialectical process, creative synthesis offers a description of how groups can be consistently successful in creative endeavors through collective attention, enabling ideas, and building on similarities. We propose that creative synthesis is not a rival to but an extension of random variation and that the same dialectical reasoning used by Harvey allows us to integrate the two models into a more versatile hybrid: evolutionary synthesis. We contend that the hybrid model better reflects the complexity of reality and avoids the problem of routinization. It appears that innovation is all about Darwin and Marx.

Key Words: Innovation, creativity, evolutionary synthesis, random variation, creative synthesis, evolution, dialectics

Innovation: Integration of Random Variation and Creative Synthesis

By giving precedence to the shared understanding of the dominant paradigm over the variation of ideas in evolutionary models, Harvey (2014) has developed an important model called creative synthesis for the use of dialectical reasoning in group creativity. This model is presented as an alternative to the evolutionary model called random variation (Campbell, 1960), which, according to Harvey, promotes incremental innovation, while creative synthesis promotes radical innovation. The facilitators of creative synthesis – collective attention, enacting ideas, and building on similarities – are descriptive of how groups can be consistently successful in creative endeavors. Theoretically, creative synthesis emphasizes the dynamics of dialectical reasoning through affirmation rather than negation. Though Harvey's model is compelling, we propose that its contribution can be increased through integrating it with negation reasoning and the same random variation that it was to replace. To this end, we first articulate the assumptions and limitations of creative synthesis, then develop a hybrid model called evolutionary synthesis, and end with further research implications.

Fundamentally, Harvey's argument seems to rely on the assumption that random variation and creative synthesis are incompatible models that must be selected by managers for different purposes. Whereas the former promotes divergent inputs, the latter is built on a careful convergence of "group members' perspectives into a shared understanding that is unique to the collective" (Harvey, 2014: 325). In Harvey's view, while novelty in random variation originates within the individual "stimulated by divergent input," novelty in creative synthesis comes from "connecting" different perspectives between individuals taking the diversity of inputs *as a given*.

Since the outcome (exemplar) of each synthesis can be the input for a new round of synthesis, creative synthesis appears to be a closed, recursive system; however, just as population ecology fails to explain how new organizational forms originate (Astley, 1985), creative synthesis fails to explain how new ideas originate in the first place,

Adopting creative synthesis at the expense of random variation can be problematic for two reasons. First, the reality of the creative process is more complex than any one model can represent (Kezar, 2001). Accordingly, most organizational change theories are actually hybrids of different models (Van de Ven & Poole, 1995). For example, by focusing on the relationship among diverse populations in organizational communities, Astley's (1985) community ecology combines the conflict of dialectics with the competitive selection of evolutionary theory to explain how organizations evolve into heterogeneous forms. In fact, just as random variation is not sufficiently descriptive of what creative teams in Pixar do in practice, so too does creative synthesis find a similar limit. For example, while the synthesis of art and technology is a central feature of Pixar's ingenuity (Harvey, 2014), so is the firm's openness to divergent ideas. According to Pixar's president, Ed Catmull (2014: 216, emphasis added), randomness plays a key role in creativity: "If there are people in your organization who feel they are not free to suggest ideas, you lose. *Do not discount ideas from unexpected sources. Inspiration can, and does, come from anywhere*."

Second and more importantly, in attempting to counteract the routinization of the creative process under the random variation model, Harvey may have unfortunately constrained the creative process into an even more routinized model with a closed system by taking diverse inputs as given and only focusing on synthesis. According to Harvey, practitioners will be able to create a map and develop more radical innovations through developing collective attention and

building on similarities. This is an exciting prospect, yet it could lead to stagnant and incremental practices by inadvertently promoting groupthink in which the group only focuses on similarities and ignores random inputs. In fact, Harvey has acknowledged this limitation as in the example of Pixar's *Cars 2* in which its developers cannot synthesize a novel exemplar due to lack of input diversity. By unnecessarily separating or isolating random variation and creative synthesis, Harvey has imposed the limitations of each.

A similar issue has been reported in artificial intelligence research (Holland, 1975). Based on a search heuristic of natural selection, a genetic algorithm mimics an evolutionary process that requires two important operators: crossover and mutation. Crossover, which produces a child solution by combining portions of two parent solutions, is analogous to reproduction during creative synthesis. By contrast, mutation, which alters one or more bits in an existing solution, is analogous to modification during random variation. While crossover advances and guides evolution in promising directions, mutation maintains diversity in a population of solutions and assures further evolution. Without mutation, a genetic algorithm can lead to a uniform population (Holland, 1975), a similar problem of homogenization in population ecology (Astley, 1985). This suggests the necessity of combining random variation and creative synthesis.

We propose that evolutionary and dialectical modes of creative process are not radically contrary to one another. Dialectical process is more compatible with evolution in its assumptions than teleological change in which a final goal is the guiding force of organizational change (Van de Ven & Poole, 1995), and yet teleological and evolutionary change have been combined in models like goal-oriented brainstorming (Litchfield, 2008). Although Harvey's facilitator, building on similarities, is an affirmative form of dialectics, the discovery of attractive

similarities in ideas is the selection that occurs in the evolutionary process. Thus, synthesis and selection are intertwined parts of the same process, suggesting that in the same creative process stimulation and connection can occur between and within individuals. Consequently, creative synthesis is not a rival to random variation and the same dialectical reasoning used by Harvey allows us to integrate the two models into a more versatile hybrid: evolutionary synthesis.

Evolutionary synthesis would not focus exclusively on convergence, but integrate the variety of idea inputs in random variation with the collaborative construction of a shared space. On one hand, it is important to integrate by building on similarities, but doing so does not discount the need to respect and appreciate divergent views. Further, to integrate inputs, group members can not only connect and empathize differences, but also *negate* existing ideas (Oswick, Fleming, & Hanlon, 2011). On the other hand, diverse inputs originate not only from the synthesis of similarities and of diverse viewpoints, but also from the imaginative capabilities of group members and from random factors within and outside a group in an open system. Consequently evolutionary synthesis includes the strengths of random variation and creative synthesis by integrating both divergence and convergence in the creative process. Of course, how to balance divergence and convergence leads to a new question, which is beyond the scope of this dialogue. Nevertheless, we can learn its answer from Brown & Eisenhardt's (1997) semi-structure, a concept that provides mechanisms to balance order and disorder, and Chen's (2014) ambiculturalism, a mindset that enables people to balance and integrate contrary qualities from both the East and the West.

Random variation and creative synthesis are not only compatible, but their histories are intertwined. Engels, an admirer of evolutionary theory (1978: 681), directly linked Darwin and Marx at the latter's funeral, commenting that "as Darwin discovered the law of evolution of

organic nature, so Marx discovered the law of evolution of human history." Both evolutionary theory and Marx's resuscitation of Hegelian dialectics may have found their synthesis in Schumpeter's insight that the entrepreneurial act of innovation was the driver of economic development (Kelm, 1997). Marx's idea of combinations was extended by Schumpeter's five new combinations (Kezar, 2001), and both Hegel's dialectic and historical understanding could be theoretical underpinnings to Schumpeter's synthesis of circular flow into economic development by means of creative destruction (Prendergast, 2006). Just as evolutionary and dialectical reasoning are linked theoretically and historically, innovation theory could be a result of evolutionary and dialectical thinking. As innovation is carrying out new communications of diverse inputs (Schumpeter, 1934), innovation can be understood as the integration of random variation and creative synthesis. Since the outcome of synthesis can be a new source of further integration, innovation as a whole is a recursive system. Since new inputs are continuously added from our understanding of a new phenomenon, often initiated by random events such as the discovery of penicillin, innovation becomes a growing, open system.

Such a synthesis is implicit in Harvey's model. In fact, creative synthesis is not purely a dialectical model, but a synthesis of the Hegelian-Marxian method with the social-cognitive model (Kezar, 2001) and essential elements of evolutionary theory. While the evolutionary and dialectical modes of organizational change (Van de Ven & Poole, 1995) tend to emphasize the actions and ideas that are combined to realize the change, the social-cognitive model incorporates the emotional and social aspects of group members (Kezar, 2001). Bridging the divide between functional and socially constructed modes of organizational change, Harvey has developed a form of dialectical change that integrates the affective responses of group members. Further, these resources are combined with environmental resources to motivate groups to share

ideas in creative synthesis. While the traditional divide between dialectical reasoning and evolution is the relative importance of the environment, whether biological or economic, creative synthesis incorporates environmental considerations within the framework of dialectical reasoning. As Harvey (2014: 335) notes, “after producing creative output, a group will receive feedback from the environment—from managers and customers, for instance.” This makes the dialectical process of creative synthesis contingent on the surrounding environment, further solidifying its connection to evolution.

By recognizing the compatibility of different models of creative process and their limitations, our evolutionary synthesis model may open up exciting avenues for new research beyond explaining the creative process, such as the generation, evolution, and renew of knowledge, theory, innovation, organization, and entrepreneurial opportunity. Moreover, evolutionary synthesis may facilitate the handling of paradoxes in management, such as negotiation, conflict, contradiction, and ambiculturalism. For example, though Schumpeter’s carrying out new combinations has been an essential concept of the innovation process, it is unclear how an individual, group, and organization exactly accomplish that. Harvey’s three facilitators seem to provide guides to do so. When random variation and creative synthesis are seen as connected processes, evolutionary synthesis is able to describe individual and communal creativity and provide a new framework for understanding the innovation process.

Harvey’s model offers an important contribution through affirmation by its facilitators that further describe the creative process. In this dialogue, we seek to extend Harvey’s creative synthesis in three aspects. First, we refine it by integrating its dialectical roots with the random variation model that it was designed to replace. Second, we articulate the importance of both

affirmation and negation in dialectical reasoning. Third, we argue that our evolutionary synthesis can bring new insight to creativity and innovation studies. We hope evolutionary synthesis will motivate more researchers and practitioners to balance and integrate both evolutionary and dialectical reasoning and both affirmation and negation in further research and practices, particularly on creativity, innovation, and organization change.

REFERENCES

Astley, W. G. 1985. The two ecologies: Population and community perspectives on organizational evolution. ***Administrative Science Quarterly***, 30: 224-241.

Brown, S. L., & Eisenhardt, K. M. 1997. The Art of Continuous Change: Linking Complexity Theory and Time-Paced Evolution in Relentlessly Shifting Organizations. ***Administrative Science Quarterly***, 42: 1-34.

Campbell, D. T. 1960. Blind variation and selective retention in creative thought as in other knowledge processes. ***Psychological Review***, 67: 330-400.

Catmull, E. 2014. ***Creativity, Inc.: Overcoming the Unseen Forces That Stand in the Way of True Inspiration***. New York: Random House.

Chen, M. J. 2014. Becoming ambicultural: A personal quest, and aspiration for organizations. ***Academy of Management Review***, 39: 119-137.

Engels, F. 1978. Speech at the graveside of Karl Marx. In R. C. Tucker (Ed.), ***The Marx-Engels reader***. New York: WW Norton.

Harvey, S. 2014. Creative synthesis: Exploring the process of extraordinary group creativity. ***Academy of Management Review***, 39: 324-343.

Holland, J. H. 1975. ***Adaptation in natural and artificial systems***. Ann Arbor: The University of Michigan Press.

Kelm, M. 1997. Schumpeter's theory of economic evolution: A Darwinian interpretation. ***Journal of Evolutionary Economics***, 7: 97-130.

Kezar, A. 2001. ***Understanding and facilitating organizational change in the 21st century: Recent research and conceptualizations***. Washington, D.C: ASHE-ERIC Higher Education Reports.

Litchfield, R. C. 2008. Brainstorming reconsidered: A goal-based view. ***Academy of Management Review***, 33: 649-668.

Oswick, C., Fleming, P., & Hanlon, G. 2011. From Borrowing to Blending: Rethinking the Processes of Organizational Theory Building. ***Academy of Management Review***, 36: 318-337.

Prendergast, R. 2006. Schumpeter, Hegel and the vision of development. ***Cambridge Journal of Economics***, 30: 253-275.

Schumpeter, J. A. 1934. ***The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle***. New York: Oxford University Press.

Van de Ven, A. H., & Poole, M. S. 1995. Explaining development and change in organizations. ***Academy of Management Review***, 20: 510-540.