

Learning from Nature: Design Drives Evolution

By Busawayan Lam and Nikolaos Fininis

The Greek philosopher Aristotle was perhaps the first to note that man is by nature a social animal. Indeed, from the very beginning of human history, social groups have formed to help their members survive and to support one another. In modern society, our increasingly complex social structure has led to diverse social groups—many of which can be classified as organizations. In this case, an organization can be nicely defined as “collectives of people whose activities are consciously designed, coordinated and directed by their members in order to pursue explicit purposes and attain particular common objectives or goals.”¹ Pursuant to that, in any organization, a defined structure (e.g. the chain of command) and supporting mechanism (e.g. the code of conduct) are required. Any given organisations are, to a certain degree, expected to grow, evolve and adapt to their environments—just like living organisms in the nature. Perhaps ‘*living organism*’ could be used as a metaphor to describe the structure of organization. In this way, the lessons we have learned from the nature about how living organisms evolve can be applied to explain the change in organization. We also want to explore the role of design in helping organizations evolve and adapt to changes.

In The idea of using the living organism as a metaphor to explain organizational structure is not new. Gareth Morgan² has applied that simile to describe organizations, noting that nature is structured from small to big, and from simple to complex—moving from organic molecules, to cells, to organisms, to populations, to groups of different species, to the entire biological ecology. In this way, individuals can be seen as organic molecules; groups of individuals as cells; organizations as organisms; groups of similar organizations as populations of certain species; and the social/economic ecology as the natural ecology.

As with living organisms, organizations can be defined as an open system—a system that regularly exchanges feedback with its external environment. Taking the inspiration from the work of Austrian biologist, Ludwig von Bertalanffy³, Morgan (2006) explained that “organizations, like organisms, are “open” to their environment and must achieve an appropriate relation with that environment if they are to survive.” Thus, organizations can influence and be influenced by their environments and each other. Moreover, the management of the interrelated subsystems *inside* (e.g. the company’s various functions and divisions) in response to the environment *outside* is crucial to the survival of both living organisms and organizations.

In order to efficiently manage the internal subsystems within organizations, a number of organizational theories that recommend strict systems of administration and authority have been proposed—one of the most famous of which, Frederick Taylor’s “principles of scientific management,” suggests that workers with well-defined responsibilities are at the base of a pyramid, and the task of creating the vision for an organization is exclusively given to the executive at the top of that pyramid.

¹ J. McAuley, J. Duberley, and P. Johnson, *Organization Theory: Challenges and Perspectives* (Harlow, UK: Prentice Hall/Financial Times, 2007, p. 12).

² G. Morgan, *Images of Organization* (Thousand Oaks, CA: Sage Publications, 2006).

³ L. Bertalanffy, *General System Theory* (New York: George Braziller, 1969, p. 38).

Although strict approaches might help to address practical aspects of the management (e.g. task coordination and control), theorists have acknowledged the need to address the *soft* aspects of management (e.g. staff satisfaction), and, hence, a number of theories have been introduced to help senior management better understand and enhance people's motivations. Experts have argued that it is in the best interest of any organization to keep its employees happy and satisfied, since emotional well-being directly affects the productivity and efficiency of their work, which, in turn, enhances the performance of the organization as a whole. Even psychologist Abraham Maslow has suggested that meaningful work has a place in his hierarchy of human needs.

If we continue to use a single organism as a metaphor with which to study an organization, we can also study natural evolution as a means to explain how organizations evolve. In nature, species evolved through a process called natural selection, which Charles Darwin described as "the gradual process by which heritable biological traits become either more or less common in a population as a function of the effect on inherited traits on the differential reproductive success of organisms interacting with their environment."⁴

Variation, of course, exists within all populations of any living organisms. This variation happens partly because of random mutations in the genome of a living organism—a kind of change initiated from the *inside*. Throughout the life of any living organism, a number of *outside* factors (e.g. food and climate) come into contact with it and gradually influence its unique traits. Thus, variation can also be the result of interaction between an organism (an open system) and its habitat as well as other organisms (e.g. peers or predators).

Evolution through adaptation

The process whereby living organisms become better suited to their habitats and outperform others is called *adaptation*. Adaptation is a driver of evolution, since it causes living organisms to alter themselves and become more sophisticated in the pursuit of gaining an advantage over their environment, their predators and/or their peers. As writer and business professor Leon C. Megginson famously stated, "It is not the most intellectual of the species that survives; it is not the strongest that survives; but the species that survives is the one that is able best to adapt and adjust to the changing environment in which it finds itself."⁵ In nature, adaptation can broadly be categorized into three types:

- *Changes in habitat*. This brings evolution to the species, which may relocate to a more suitable place or come up with new mechanisms to cope with the changes. This situation can be compared to a change in the marketplace (e.g. the entry of new competitors, changes in user demands, the introduction of new legislation), which directly influences organizations in that sector.
- *Co-adaptation*. This is described as a "process that happens when two or more species influence each other's evolution."⁶ Co-adaptation implies that two species interact with each other over a long period of time and, thus, can drive each other's evolution. The relationships between these

⁴ C. Darwin, *On the Origin of Species* (New York: Oxford University Press, 2008).

⁵ L.C. Megginson, presidential address, Southwestern Social Science Association convention, San Antonio, TX, 1963, p. 4.

⁶ D. Futuyma, *Evolutionary Biology* (Sunderland, MA: Sinauer Associates, 1986).

species can be positive, neutral, or negative—for example, a non-toxic species may mimic the characteristics of a toxic one in order to protect itself from predators. This situation can be compared to the relationships between two organizations, which could function as a partnership (a supplier and a buyer) or a rivalry (competitors).

- *Internal adaptation.* This can be described as the development of traits that help a population of a species become better suited to its habitat by adapting its internal structures—for example, a lizard that evolves its bone structure to improve its air descent. This situation can be compared to organizations that disrupt, re-define, or re-invent themselves. For example, consider the transformation of Apple, which began as a computing company and ended up as an innovative digital solution provider.

Adaptation and design

Design has potential to be applied to 1) trigger changes from within; and 2) help organizations adapt to a changing outside environment. Lester, Piore, and Malek (1998)⁷ have noted that organizations need to become more flexible, responsive, and agile in order to survive in today's highly competitive, rapidly changing, and increasingly unpredictable marketplace. The authors observed that the management of organizations can be broadly classified into two approaches: analytical and interpretative.

The analytical approach (which reflects a traditional “management” perspective) focuses on addressing well-defined problems and business objectives. As a result, it seeks to fully understand and analyze the environment before planning and executing a course of action. In contrast, the interpretative approach perceives management as an open-end process where end results are not rigidly predetermined. Consequently, rather than trying to work on fixed-term plans, managers constantly interpret the situation and adjust their strategies and course of action accordingly. Ongoing dialogues with key stakeholders (customers, suppliers, and partners) are crucial to the success of this approach and enable managers to identify and respond to emerging issues promptly, positively, and effectively.

Lester, Piore, and Malek observed that design disciplines excelled at working with uncertainty and made a good use of the interpretative approach. For instance, all design projects contain a certain degree of uncertainty: changes in customer needs, technologies, regulations, competing offerings, and business environment. Hence, design disciplines have learned to be flexible and responsive to these changes. Moreover, all design projects require inputs from various disciplines. Thus, building good work relationships and maintaining regular dialogues with all key stakeholders are crucial to success. Working collaboratively with different stakeholders makes them likely to buy into the idea; this is particularly useful when it comes to radical change. The authors concluded that there are a number of useful practices that general managers could learn from design disciplines.

⁷ R. Lester, M. Piore, and K. Malek, “Interpretive Management: What General Managers Can Learn from Design,” *Harvard Business Review*, March/April 1998, pp. 86-96.

The work of Boland et al.⁸ also highlighted that a number of design practices could be applied to help organizations adapt to changes more effectively. Design practices (and especially “design thinking”) could potentially be applied to support all types of adaption. Consider the following case studies.

Change in habitat

The rapid growth of the Chinese economy has made mainland China an attractive place for foreign investors. In 2014, China was described as the market with highest potential for technology companies,⁹ and many western companies have entered the Chinese market in the past decade. This surge resulted in a significant increase in the number of mobile devices per users, the rapid growth of Chinese internet users, and the improvement of infrastructure. In other words: Changes in the marketplace (habitat) created a number of opportunities and threats for domestic companies (native species). It was observed that successful technology companies in China (for example, Alibaba, Huawei, and Lenovo) made good use of design thinking to take full advantage of the situation. Huawei and Lenovo invested heavily in product design development to retain their local customers and expand the market base. Their designs have won a number of international awards including iF and Red Dot, which helped the organizations gain recognition and establish themselves as global brands.

Co-adaptation

There are several types of co-adaptation, but here we will use *mimicry*, which was already described above. It is plain to see that many retailers mimic the traits of leading brands in their own brand products by offering comparable product ranges, and even similar packaging. Consequently, any new developments in leading brands’ products are likely to influence the products of the brands that mimic them. This kind of practice, however, also drives evolution in the leading brands themselves. Many of them use design thinking to explore new ways of differentiating themselves and building strong relationships with customers through non-physical aspects that cannot be copied easily. They may compete on emotional or spiritual values (e.g. Guinness and Red Bull), use compelling stories to engage with customers (e.g. Coca-Cola and Ben & Jerry’s), deliver memorable experiences to develop strong connections (e.g. Heineken’s Experience and Cadbury World), and provide meaningful services (e.g. Ecover’s refill service). Evidently, design thinking plays the key role in the evolution of both parties—coming up with similar offerings at lower costs, and adding emotional value.

Internal adaptation

Design has been used as a source of inspiration for many organizations. Roberto Verganti has explained that design is about making sense (of things) and of making things more meaningful; his thought, therefore, is that design can be used to re-define the meaning of products, services, experiences, and organizations. His book, *Design-Driven Innovation*, suggests that design should go beyond responding to

⁸ R. Boland, F. Collopy, K. Lyytinen, and Y. Yoo, “Managing as Designing: Lessons for Organization Leaders from the Design Practice of Frank O. Gehry,” *Design Issues*, vol. 24, no. 1 (2008), pp. 10-25.

⁹ X. Zhu and R. Hong, R. (2014) “How Some of America’s Biggest Tech Companies Are Expanding into China,” *Business Insider* (online): <http://www.businessinsider.com/us-tech-companies-expanding-into-china-2014-6>.

user needs—even user expectations, since users may find it difficult to articulate their latent needs and envision the future. Leading brands (e.g. Sony, Dyson, and Google) have successfully employed design to explore new possibilities rather than respond to needs and changes from outside. Other organizations, such as Philips, begin the innovation process by investigating unexplored territories, identifying viable options, and coming up with visionary concepts. Subsequently, suitable applications for particular concepts will be identified, followed by a roadmap on how to expand new opportunities further.

Design drives evolution

Clearly, there are a number of similarities between the design process and the way in which living organisms evolve. In nature, the evolution process begins with some form of trigger (e.g. changes in habitat). Through the process of trial and error (mutation and natural selection), suitable solutions (or adaptive traits—traits with functional roles that enable an organism to gain an advantage over its environment, predators, and/or peers) can be derived. In organizations, the evolution process also begins with some form of triggers—both external factors (e.g. changes in market conditions) and internal factors (e.g. visionary ideas from design disciplines). Through the iterative design process (concept development + implementation + prototype & test), suitable solutions can be achieved.

It can be seen that design thinking could potentially support all kinds of adaptation, which in turn, helps organizations evolve to become better suited to their environments and outperform others. In order to make the full use of design to drive and support the evolution in organizations, a suitable design management model is needed. The design function (a design team, a design department, and/or a design manager) should be placed in a position where it can initiate and implement changes (for example, being involved in the early stages of innovation development), and be given responsibilities to identify emerging issues. It must then be properly supported to respond to these changes promptly and effectively through having access to the necessary resources and expertise in the organization.

Some of the above discussions echo the idea of design leadership proposed by Raymond Turner in his book *Design Leadership*. Turner argued that design management is reactive, since it focuses on making strategic approaches that respond to change. However, design leadership is *proactive*, since it concentrates on envisioning the future. Turner wrote that “design leadership helps define the future, design management provide the tools for getting there.”¹⁰ The essence of design leadership includes helping organizations envision the future; generating tangible business scenarios in the light of the future vision; using design-related skills to clarify the implications of those scenarios for the company and its customers; and ensuring the most appropriate design direction is selected to realize the company’s wider strategic intentions.

To help organizations evolve from inside out and outside in, design should play both proactive and reactive roles, initiating and implementing changes as well as responding to external changes. Design management is often divided into two levels: strategic and operational. While strategic design management can focus on the proactive role by driving the changes from the inside, operational design management can concentrate on the reactive role, by constantly monitoring changes from the outside and responding effectively.

¹⁰ R. Turner, (2013) *Design Leadership*. NY: Routledge, p.9.

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