Development and Change Through Scenario Planning

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This paper examines the role of scenario planning as a development and change intervention. To do so, this article provides an overview of scenario planning and an overview of development and change in organizations. The article then builds on the philosophical orientations of development and change through scenario planning introducing the concepts of autopoiesis and requisite variety. The article concludes with implications for HRD professionals.

Keywords: Development and Change, Scenarios, Teleology

Purposes of the Paper

The purposes of this paper are 1) to provide an overview of scenario planning and its key concepts, 2) to use Van de Ven and Poole's (1995) classifications of development and change in organizations to assess scenario planning as a change intervention, 3) to expand on that classification by introducing the concepts of requisite variety and autopoeisis and 4) to discuss the implications of scenario planning as a change intervention for HRD professionals.

Scenario Planning -- Overview and Key Concepts

In essence scenarios are possible futures or contingencies. A set of techniques covered under the umbrella notion of scenario planning can be of significant value in helping an organisation determine its future direction and develop contingency plans in the event of a disastrous occurrence. The facilitation of scenario planning workshops and associated activities should be within the armoury of an accomplished HRD practitioner.

A *scenario* can be defined literally as the script for a play. In management terms it is "a tool for ordering one's perceptions about alternative future environments in which decisions might be played out" (Schwartz 1991, p. 21). Hermann Kahn, who founded the future-oriented Hudson Institute in the mid 1960s, and pioneered the technique of future-now thinking whilst previously working for the RAND Corporation after World War II, was one of the first to adopt the term and develop the concept. He particularly liked the emphasis it gave on creating a story or myth which helped people break out of their mental sets and consider the "unthinkable". "Future-now" thinking encouraged people to write a report that drew upon their imagination as well as detailed analysis, as though they were living at some point of time in the future.

The process of scenario planning generally involves the development of three or four diverse plots and associated narratives, each of which illustrates the possible playing out of major forces driving change within a system, the interrelationship of these driving forces, and critical uncertainties in the environment (Wack 1985).

Shell is the organisation most associated with scenarios. In 1973, the world's biggest oil crisis to date was caused by the Organisation of Petroleum Exporting Countries (OPEC) collectively agreeing to a strategy that tripled the price of oil. The oil companies, with the exception of Shell, were totally taken by surprise. The prevailing mental set was that the companies making up OPEC were so disparate that they would never reach agreement on a collective price raising or production reducing strategy. It was `thinking the unthinkable'.

Shell, however, had been caught out in the past by relying on conventional forecasting techniques whereby they judged the future through extrapolating from the trends of the past. Experience had taught the company that they were dealing with an increasingly turbulent environment and could be caught out by discontinuities, step-changes, cataclysmic events happening `out there'. In particular they had not anticipated events in Mexico in the 1960s where the government nationalised the oil wells without compensation. As one of the biggest operators in Mexico, Shell suffered far more than its competitors. It concluded that its previous approach of relying on business projections based on past performance and extrapolated forward in time by regression statistics were totally

inadequate. They concluded, as had Peter Drucker some years previously, “the greatest danger in times of turbulence is not the turbulence - it is to act with yesterday's logic” (1964. P. 14).

Accordingly it incorporated scenarios into its strategic forecasting ideology, anticipated the possibility of a co-ordinated OPEC strategy, and planned the future as though that was a likely happening. But, as subsequent events impacting on Shell have shown, scenario planning is not a panacea. Shell had its blind spots on the environmental front, as demonstrated by the Greenpeace protests that prevented its disposal of the Brent Spar vessel in 1995?

A Group-Based Approach to Scenario Planning

Scenarios can be remarkably simple. One very effective approach is to divide a group into 3. One sub group is asked to visualise an environmentally friendly world 20 years into the future in which the green party is predominant. Ask them to reflect on a typical working day. What do they see when they wake up in the morning? What do they eat for breakfast? Where do they go to work? What transport do they take? What do they note about the physical working environment? And so on.

A second group goes through the same process; only they imagine themselves to be in a world dominated by a political party whose priority is high technology.

A third group are given a free hand to visualise the world assuming that it is the culmination of the trends they are experiencing at the present? What world do they envisage?

After having been given a period of time to give free rein to their creative ideas, a specific question is put to each group by the facilitator in the capacity of a consultant. For example: Your client organisation is considering investing in a large open learning training centre. Is this a good idea? What form should it take? Then finally, their collective ideas are pooled and `presented' to the client.

The problem with scenarios is that they can still contain blind spots in what Shell have called `the gentle art of re-perceiving'. Pierre Wack of Shell Oil, who has been one of the most influential figures in developing scenario planning as an accepted management tool, realised that managers' mental models would have to change if scenarios were to have any real impact:

> Every manager has a mental model of the world in which he or she acts, based on experience and knowledge. When a manager must make a decision, he or she thinks of behaviour alternatives within this mental model.....From the moment of this realisation, we no longer saw our task (in scenario planning) as producing a documented view of the future.....Our real target was the mental models of our decision makers; unless we influenced the mental image, the picture of reality held by critical decision makers, our scenarios would be like water on a stone (Wack 1985, p. 13)

Midpoint Scenarios

Beckhard and Harris (1987) referred to the value of *midpoint scenarios* in thinking through and refining the desired outcomes of a change process. The technique involves writing a scenario of what the organisation should look like at an intermediate point of the change effort. It should be detailed, and behaviourally oriented in focus and describe what one would expect to see, hear, even feel in the projected situation at the mid point of six months.

They give by way of example a proposed merger between two business sub units with a target for successful implementation in 12 months time. The process entails asking managers involved in the implementation process to imagine themselves in a helicopter, photographing several days of action with a camera that has a very wide-angle lens. Record the detail that the camera would see. Where would the business sub units be in 6 months time? Who would be managing which parts of the work? What would be the information flow? Who would be responsible for which decisions and why?

The approach should not be viewed as an invitation to fantasise problems away. It represents part of a personalised description of what those responsible for the change process are committed to achieving. The task of constructing the midpoint scenario cannot therefore be delegated. The way they describe scenario preparation is akin to structured visioning.

Disaster Scenarios

Many scenarios have been created to enable strategic contingency plans to be developed by bodies such as civil defence and local authorities in the event of possible disasters. Many large organisations have used them to evaluate the likely effects of such eventualities as flood, earthquake and tempest.

Defensive Scenarios

Some organisations use scenarios as part of a visionary way of perceiving the future. Others use them as checking mechanisms on threats to the current organisational steady state or as constraints to proposed courses of action. Shell, for example, have set up a think tank to include those opposed to its policies, who are invited to suggest environmentally friendly solutions to potential issues they might have to face in this area.

A Stepped Approach to Developing Scenarios

Kleiner (1994) proposed the following stepped approach to developing scenarios

1. Refining a Sense of Purpose

Scenarios become no more than an academic exercise unless they address genuine concerns. These should be compelling, shared by the entire group (ideally of between 8-20 people) and beset with uncertainty. Examples of concerns could be `Should we move towards overseas markets?'; `What sort of career should we prepare graduate trainees for?'. Articulating the focus is deceptively complicated, especially since participants, although sharing a common interest should have diverse backgrounds. As with visioning, it is important to move beyond the concerns that people think they have to those which truly engage them.

2. Understanding Driving Forces

Scenario building entails an understanding of two different types of driving force. Predetermined forces are relatively predictable. Barring some unforeseen calamity we can predict with reasonable accuracy the number of forty year olds existing in a given country twenty-five years from now. But the vast majority of forces at play contain considerable uncertainties. Will consumers continue to regularly want new media products? Will the tiger economies continue to invest heavily in Western economies? Although it is not possible to know all of the answers one can become far more aware of why events may move in one particular direction, and the implications of such a movement.

The predetermined elements provide the boundaries within which scenarios are constructed; the act of isolating key uncertainties helps identify the key ramifications of the decision. In practice the process can entail members of the group engaging in independent external research.

3. Scenario Plots

Developing scenarios involves creating “classic stories” based on what would happen if some future event or occurrence impacted on the current situation. You create several stories of your own, trying to make each be internally consistent and evocative of a future that takes you out of your prevailing preconceptions. Each story can then be enriched and embellished with accounts of what might plausibly happen. Kleiner referred to scenarios at New York University dealing with the future of global information networks. One possible future in which information flows were dominated by large corporations was called the “keiretsu world”, named after the Japanese industrial consortia. An alternative “virtual world” depicted a situation in which large companies were no longer necessary, and information flows were devolved.

4. Strategy, Rehearsal and Conversation

Having developed a small number of scenario plots, consider each in turn. What strategies would be effective assuming that the proposed futures came to pass? What would it feel like to live in those worlds? Insights can be gained by rehearsing the scenarios as though each was a piece of improvised theatre, with each participant in their creation taking the part of a different key player. It also helps to recount the scenarios to others, and draw upon their response to make the world-view richer. The criteria that test the completeness of the process include;

1) Will this strategy stand up in, say, a keiretsu world?'
2) If a virtual world comes to pass, will the organisation be prepared?

Delphi Technique

Over the years a number of techniques have been used to help forecast and gain some degree of insight into a given organisation's future. One well-known approach is called the Delphi technique and it is commonly included in the scenario generation process. It is based on the Ancient Greek tradition of going to the oracle at Delphi for advice. In general terms it entails presenting a given problem to a number of experts or gurus, and independently soliciting their advice on the likely future. Individually they are then presented with the views of the others and given the opportunity to refine their views.

The Delphi method is widely used as a technique to identify technology futures drawing upon a range of experts. It is held to be more at the “certain” end of the future forecasting spectrum compared to the use of scenarios (Ringland 1998). Nevertheless scenario planning, although structured in a somewhat different way, has affinities with the Delphi technique and many approaches to scenario planning similarly draw upon a range of experts. Where it differs from the Delphi technique is the reliance on stories about the future

An Example of Scenario Planning and Delphi in Practice

In 1993, the UK government initiated a "Technology Foresight Programme" through the auspices of the Office of Science and Technology (OST), the lead agency for government funding of the science base through the universities and research councils, with an annual budget of œ1.3 billion. The specific objectives of the Programme are `to bring together business people, engineers, scientists and government in networks which identify emerging and longer-term opportunities in markets and technologies'. At an early stage panels of experts were set up to conduct foresight analysis for each of 15 designated economic sectors. Panels were invited to consult as widely as possible with other people in their sector across the country, to form links with other panels where possible, and in the process to consider the following questions

1) What are the likely social, economic, environmental and market trends over the next 10-20 years?
2) Which areas of R&D and underpinning science, engineering and technology best address those future trends?
3) How best can public funds be used to sustain an innovative science base to support future national prosperity and quality of life?
4) To what extent should regulation, skills, educational facilities, and other factors be taken into account?

When the panels began their work, the OST organised a series of Delphi surveys seeking views from over 3,000 experts on topics concerning the future of the technologies in the 15 sectors. The results of the first round of questionnaires were analysed and sent back to the original respondents to see if they wished to revise their judgements in the light of the findings. This helped to develop better mutual understanding and consensus on priority topics.

The way the Delphi survey was orchestrated was not successful in this case. There were too many questions; and the postal survey method was alienating and missed out on the face-to-face contact necessary if one is to encourage a dynamic and creative debate. The process might have been more effective had a one-stage questionnaire survey been undertaken that was highly focused on key issues, and then the results been presented for interpretation and debate at a series of interactive workshops. (Anderson 1997)

Development and Change in Organizations

Scenario planning can be classified as an organization development and change intervention. Perhaps the most unique aspect of scenario planning is its inclusion of the individual, group process, and organization levels as its targeted domains of improved performance (Chermack & Lynham, 2002). That is, scenario planning aims to alter the ways in which individuals and groups perceive their world such that seeing the world anew leads to different ways of acting and includes a direct impact on the organization level. Relatively few works have centered on scenario planning as a change intervention, however, scenario planning is more frequently being coupled with traditional strategic planning processes and therefore can be included as a portion of strategic interventions (Cummings & Worley, 2001).

Van de Ven and Poole (1995) provided an assessment and classification of four core approaches to development and change in organizations, namely, 1) life-cycle, 2) teleological, 3) dialectical and 4) evolutionary. Each of these has utility in classifying change in organizations and scholars often integrate varying aspects of these typologies to explain change events.

Life-Cycle Approach

The life-cycle approach to organizational change suggests that change follows a set of phases. Van de Ven and Poole (1995) stated: "According to life-cycle theory, change is imminent: that is, the developing entity has within it an underlying form, logic, program, or code that regulates the process of change and moves the entity from a given point of departure toward a subsequent end that is prefigured in the present state" (p. 515).

Teleological Approach

Teleology is a philosophical doctrine that promotes the idea that a goal or purpose is what guides the alteration of any entity. That is, any entity moves toward a goal or purposeful end state. Most models of strategic planning centered on this approach to change -- specifying the goal or desired future state and then implementing and developing plans to achieve it. "Proponents of this theory view development as a repetitive sequence of goal formulation, implementation, evaluation, and modification of goals based on what was learned or intended by the entity" (Van de Ven & Poole, 1995, p. 516).

Dialectical Approach

Based on the distribution of power, the dialectical approach to change suggests "the organizational entity exists in a pluralistic world of colliding events, forces, or contradictory values that compete with each other for domination and control" (Van de Ven & Poole, 1995, p. 517). Dialectical theory is based on Hegel's philosophical work. At its essence, Hegel's view suggested that for every thesis, there exists an anti-thesis, and that synthesis finds some balance or alternative between the two. Organizational change from this perspective requires "two distinct entities that embody these oppositions to confront and engage one another in conflict" (Van de Ven & Poole, 1995, p. 517).

Evolutionary Approach

In the evolutionary approach, change proceeds "through a continuous cycle of variation, selection, and retention" (Van de Ven & Poole, 1995, p. 518). That is, selection happens in industry and organizations according to scarce resources, environmental factors, and competition. While there are a variety of specific viewpoints regarding evolution, its application in the context of organizational change simply promotes the idea of some continuous process of novelty, choice, and then competition to replicate it.

Table 1. *Approaches to Organizational Change (Based on Van de Ven & Poole, 1995)*

Table 1

Approaches to Organizational Change

Family	**Life-Cycle**	**Evolution**	**Dialectic**	**Teleology**
Key Metaphor	Organic growth	Survival	Conflict	Purposeful cooperation
Force	Predestination	Competition	Opposition	Goals

Scenario planning appears to include characteristics of more than one of these fundamental orientations toward development and change in organizations. Thus the remainder of this article will focus on the orientations and characteristics of scenario planning as a development and change intervention, and the implications for HRD professionals.

Scenario Planning as an Approach to Development and Change

Scenario planning exhibits characteristics of the dialectic and teleological approaches to development and change. While the bulk of these characteristics fall into the teleological approach, the core method of operation for scenario planning is through dialogue. While it does not appear that scenario planning requires conflict and opposition, dialogue is the primary means through which mental models and assumptions are revealed, shared and ultimately changed.

Scenario planning most prominently exhibits characteristics of the teleological approach to development and change in organizations. All of the available methods for conducting scenario planning center on a focal issue or goal. Some works have linked scenario planning and system theory on a conceptual level (Ward & Schriefer, 1999), and seem to support the notion that scenario planning follows a teleological approach to organization change. That is, scenario planning begins with some assumptions about development, namely, that organizations strive toward goals and core purposes commonly stated in corporation missions and visions.

Recent developments in system theory pertaining to teleology include the notion of teleogenesis. That is, while it is certainly appropriate to assert that organizations strive to reach goals and accomplish purposes, it is equally appropriate to assert that organizations can generate and create their own purposes.

A *teleogenic* or purpose generating system is a system that seeks a set of related goals for which it was created (Banathy, 1993). Mechanistic and organic systems can be purpose*ful*, meaning that they serve some purpose but they do not generate purpose. Teleogenic systems incorporate and build upon the concepts of autopoiesis, and requisite variety. Scenarios and scenario planning incorporate these concepts and are attempts to develop purpose-seeking systems by providing and constructing a vision for the future.

Teleogenic systems can incorporate several other modes of systems: mechanistic, organic and teleogenic (Banathy, 1993, Harkins & Kubic, 2000). For example, the pilot of a sailboat is dealing with several mechanistic systems in the operation of the sailboat, several organic systems in computer navigation and weather systems, and is functioning as the integrative teleogenic system that brings the others together and provides purpose and intent. Teleogenic systems are most effectively and appropriately applied to human systems, because, as Von Bertalanffy (1969) stated, "True purposiveness is characteristic of human behavior, and it is connected with the evolution of the symbolism of language and concepts" (p. 79).

An exciting idea in teleogenic systems is the notion that there are too many options to plan for any one set of circumstances and the implication is that instead of choosing, and understanding of teleogenic systems will allow humans to create their own futures (Banathy, 1993). Thus, scenarios and scenario planning allow decision makers within human systems to design custom systems that devise and constantly revise their own purposes and seek new areas of advantage within their own environments. To this end, teleogenic systems develop what has been referred to as autopoeisis and generate requisite variety. These concepts will be explained and described as they apply to organizations and scenarios.

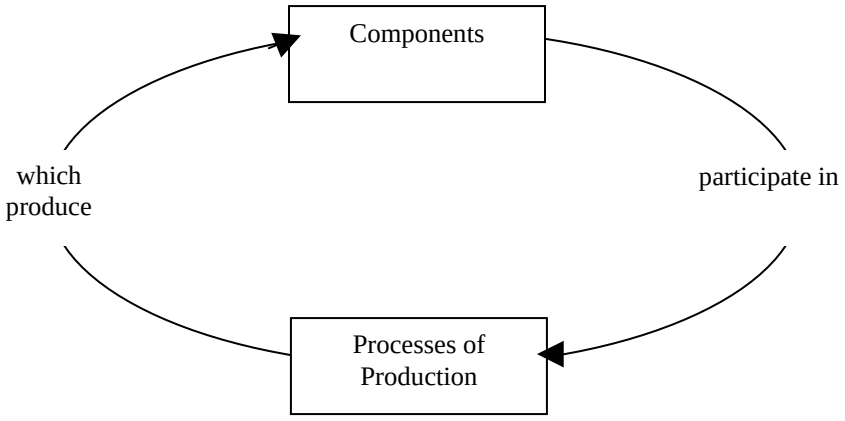
Autopoiesis

Maturana & Varela (1973) based their system theory work on 4 fundamental assumptions about the nature of systems, namely, (1) that systems are autonomous (2) the behavior of the whole is generated by the components and their interactions with neighboring elements (3) observers can perceive both systems and their environments and how they interact and (4) the observation of function can only be made by an observer who can interact with both the components and the whole. Maturana & Varela considered two key questions in the analysis of what differentiates organic system from mechanistic system:

1) What is it that a system produces?
2) What is it that produces the system?

Maturana & Varela used a cell as an example of a system. Consider for a moment what it is that a cell produces. Cells produce their own components, which therefore produce the cell itself in a cyclical and ongoing process. "A cell produces, and is produced by, nothing other than itself" (Mingers, 1995, p. 11). This is the core of autopoiesis. The word means, literally, self-producing, which is exactly what a cell does. (Figure 1 displays the circular processes of production).

Figure 2. Circular processes of production (Mingers, 1995)



The organization of a system demonstrates the properties of the system as a whole and occurs on a conceptual and abstract level. Organization is found in concrete examples in reality, while structure often refers to the generality lying behind such examples (Mingers, 1995). The distinction between organization and structure is, therefore, in the distinction between the whole and its parts. In these terms, organization refers to the events (often empirically detectable) and structure refers to the underlying assumptions.

In other words, autopoetic networks must continually regenerate themselves in order to maintain organization. Autopoiesis is not confined to the physical world (Mingers, 1995; Martuana & Varela, 1973) thus leaving open the possibility for communication, social systems, or a set of concepts to also be defined as autopoietic systems. A concern around the concept of autopoiesis is in its application to these other systems. Human systems become extremely complex, which makes the origins of autopoiesis within them, something mysterious. Human systems become more abstract because of their complexity. For example, one cannot observe a business organization in the same way that one can observe a cell under a microscope. Thus, a common problem in the application of system concepts is a failure to make the switch in perspective. Looking for characteristics of autopoiesis in human system from the mechanistic perspective will not yield very powerful results. The key to autopoiesis in human system is in the relationships among components.

Autopoiesis is evident in human systems and organizations and can be considered by first asking the same questions posed by Martuana & Varela, which are both critical questions in scenario planning (Schwartz, 1991; van der Heijden, 1997):

The use of heuristics often provides an answer to the first question. For example, the business idea (van der Heijden, 1997) is designed to articulate the key products and processes without which the organization would not exist. The second question is more difficult to answer. The organization system is sustained by the continuous input and output of resources. In today's world, the primary resource of concern is a financial one. If an organization is not financially viable, it will not be in business for long. Thus, business organization systems can be described as autopoietic because they naturally strive to regenerate themselves through the perpetual flow of inputs, processes and outputs and because they must regenerate their resources to sustain themselves.

Scenarios as autopoietic systems. The actual stories generated in the scenario planning process can also be viewed as autopoietic systems. van der Heijden (1997) referred to the notion of the "strategic conversation" (p. 46) which is an example of autopoiesis in the scenario itself. A strategic conversation occurs when individuals participate together, share ideas about patterns, reflect together, build a common course of action, and act together. The strategic conversation is the collective consideration, deliberation, planning, and action of members of an organization. In this context "the learning loop works as a positive feedback loop" (van der Heijden, 1997, p. 47). The assumptions of the strategic conversation are that organization structure exists in action and interaction, and that action and interaction take place through conversation or dialogue.

Requisite Variety

Key to the notion of teleogenic systems is the concept of system anticipation or preparedness. In systems, this is accomplished through the development of requisite variety. The law of requisite variety states that "the larger the variety of actions available to a control system, the larger the variety of perturbations it is able to compensate" (Ashby, 1956, p. 206). Where requisite refers to "required" (Webster's New World Dictionary, p. 529), this type of variety is that which is required in the environment.

Ashby (1956) used the simple example of a press photographer to demonstrate the concept of requisite variety: "A press photographer would deal with twenty subjects that are (for exposure and distance) distinct, then his camera must obviously be capable of at least twenty distinct settings if all the negatives are to be brought to a uniform density and sharpness" (p. 212-213). This example is simple but the law of requisite variety can also be applied to large, more complex systems.

Requisite variety in scenarios. One function of scenario planning is to provide organizations with the required or requisite variety to cope with the external forces of the business environment. These forces can be multiple and from differing domains, for example, societal, technological, economic, environmental, and political are all environmental domains that contain interrelated forces influencing organizations (Mintzberg, 1994). Scenarios can then be used to "windtunnel" (van der Heijden, 1997, p. 57) the organization itself, and consider possible actions in a considerable number of plausible yet challenging situations. An organization with requisite variety is an organization that has considered many plausible futures and how it might adapt and change to cope with each different environment. An organization with requisite variety is an organization that is relatively prepared for a number of plausible options.

Scenarios allow organization decision makers to think through decisions they might make in the future and consider their possible implications. Because of the imaginary capacity of the stories themselves, an aim of the stories is to provoke managers and executives to think what is considered unthinkable, and to explore the events thought not possible (Wack, 1985). In short, scenario stories help organizations develop preparedness for a *variety* of plausible future environments, thus expanding the adaptability of the organization.

Implications for HRD Professionals

This article has 3 key implications for HRD professionals. First, this article provides a summary of key scenario planning concepts for HRD professionals. Second, it identifies scenario planning as a development and change intervention. The implications of this include the requirement for HRD professionals to be familiar with and knowledgeable about scenario planning practices. Finally, this article has examined the theoretical and conceptual foundations of scenario planning as a change intervention. Based on Van de Ven and Poole's (1995) work, this article has illustrated a teleological set of assumptions that underpin scenario planning interventions and introduced the further concepts of autopoeises and requisite variety. Conceptually, the case has been made illustrating how scenarios can generate these concepts. However, these concepts are on an abstract level and are difficult to research. Therefore, the object of this article has been to describe the fundamental assumptions that often precede and accompany an engagement in scenario exercises.

While few concrete conclusions can be made at this point, it seems that an important one can: by virtue of its positioning as a development and change intervention and also by its apparent foundation in system theory, scenario planning is within the domain of HRD professionals and therefore HRD professionals should be developing their knowledge and expertise about the phenomenon. Further, an opportunity exists for HRD professionals to research and develop their role in a strategic process that is of increasing importance in today's organizations.

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