Chapter 9
Creating Order Out of Disorder Through Intuitive Flexibility

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1 Introduction

The fast-changing world is in turbulence and is generating an inhospitable environment for ad hoc and informal ways of creating and selling products. Due to breakthrough technological changes, the business competition is becoming more complex. In this scenario, one has to find certainty out of uncertainty, linearity out of nonlinearity, order from disorder, and harmony from chaos for sailing through the business turbulent water. It should be our endeavor to find stability out of instability.

Chaos is a form of instability where the specific long-term future is unknowable. Stacey (1993) has defined chaos as "an irregular pattern of behavior generated by well-defined non-linear feedback rules, commonly found in the nature and human society." Also, chaos means disorder and randomness in the behavior of a system at the specific level; it also means that there is a qualitative pattern at a general, overall level. The future unfolds unpredictably but it always does so according to recognizable family-like resemblances. History repeats itself, but never in the same way. Chaos theory expert Edward Lorenz (1961) asks: "does the flap of butterfly wings in Brazil set off tornado in Texas." Every problem is intertwining of order and disorder and is a function of some recognizable variables from where a predictive model should be found out of the complex problems. This is generally done by finding localizing temporary regions of stability out of instability.

Communication chaos is the worst disorder/uncertainty found today due to IT-enabled services and IT boom taking place in technological/managerial issues. Due to the presence of many means of communication like Internet, mobiles, telephones, and e-services, dependency has increased on these without efficiently getting feedback communications. The "process" and analytical techniques including fuzzylogy or

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fuzzy set theories do something to solve and address the chaotic disorders, but intuition as well as experiential learning comes more handy, most of the times. Herein, intuition may be defined as "the way we translate our experience into action" or in other words: "ability to sense or know immediately without reasoning" (Klein 2004). As most of us know that even the predictive models like decision making fail, the intuition takes over as fail-safe method, since these dimensions come out from depth of "experiential learning." Once intuition combined with flexibility, it becomes a powerful tool to cope with complex problems. Flexibility is holistic approach – synthesis and not simply analytical – which can be defined as ability to change or react with little penalty in time, effort, cost, or performance. Flexibility is a multidimensional concept, which demands agility and versatility for coping complex situations (Sushil 2008).

Intuition sometime is also interpreted as "sixth sense." "Intuitive flexibility," thus, can be defined as "translating learning experience into a versatile potential activity to facilitate solving a problem." There are definitely some regular patterns found in irregular or chaotic categories, and with analysis and processing technique, new order can be found out from chaos. The process may be defined as "an organized group of related activities that together create a result of value to customers" (Hammer 2001). Any process is better than no process. There are many sources of chaos and uncertainty. There should be strategy and tactics to deal with uncertainty and disorder.

In this chapter, few live case studies have been discussed. These are as follows:

(a) Toyota Motors of Japan – manufacturing uncertainty
(b) Labor union case study of a DRDO organization
(c) Intuitive forecasting of snow avalanches

Any organization must remove the existing instability of chaos or uncertainty for effective performance and efficiency. The systematic structured work culture, process-based analysis, logical thinking, and eventually creative and intuitive flexibility are the answer to most of the chaos and disorder obtaining in the business world (Pathak 2005).

2 Cause and Effect to Chaos Theory

In true sense, "chaos theory" was first discovered by a meteorologist, Edward Lorenz (1961/1972), in the American Association of Advancement of Science in Washington D.C. In mathematics and physics, "chaos theory" describes the behavior of certain nonlinear dynamical systems that under certain conditions exhibits dynamics that are sensitive to initial conditions. Simply, "chaos theory" comes from the fact that the systems that the theory describes are apparently disordered, but theory is really about finding the underlying order in apparently random data (Edward 2002; Gollub and Baker 1996). According to Stacey (1993), chaos unfolds unpredictably, but always it does so according to recognizable family-like resemblances.

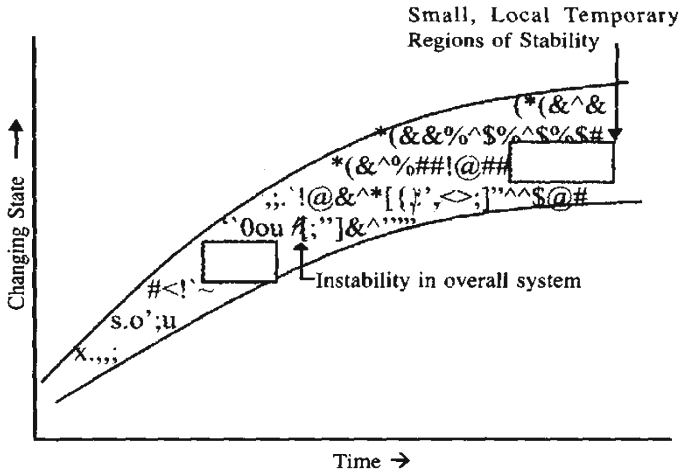

Fig. 9.1 Chaos theory: chaos and complexity

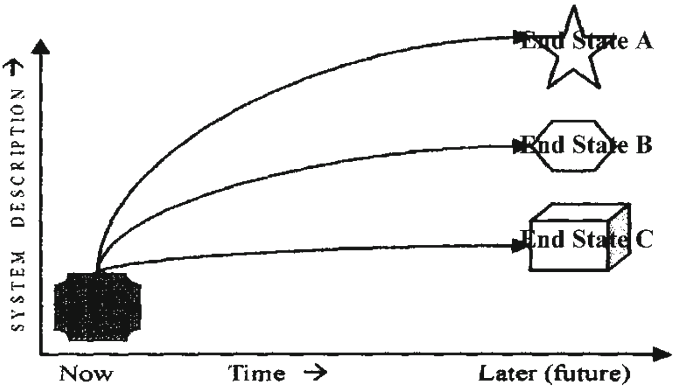

Fig. 9.2 Future emerging scenarios

Chaos is the result and repercussions of the cause and effect. Chaos has number of potential variables and there can be infinite number of outcomes-solutions. As can be observed in Fig. 9.1, there are few patterns of stability amidst instability chaos. In the nature, cases of snow precipitation – pattern of snow flakes, from dendritic to round stable grains and examining the pattern of waves of ocean from beach level and observed from a higher cliff gives distinct pattern of the waves in their ebb and flow exhibit such patterns (Patel 2005). Both the patterns may lead to immediately a conclusion – a viable variable outcome. The various emerging outcomes- solutions can be noticed from Fig. 9.2, which gives concept of emerging scenario in the form of End State A, End State B, and End State C (Allio 2002).

Observing the chaos and disorders from a worker's level and at CEO level makes a difference. The universe works with clockwise precision, in spite of many local disorders and chaos. The cosmos solar system and the study of our planet reveal many patterns of the flow of forces between and on planets. We should not go beyond the law of the nature. All the outcomes of infinite variables are the consequences of the intersection of tangible/intangible snapshots and have interconnectedness which is to be understood clearly.

2.1 Some Steps to Create Order Out of Chaos

Managers and the top leaders (CEO) should exercise the following steps (de Wit and Meyer 2004):

(a) Encourage self-organizing groups: Top managers encourage to create this type of conducive environment.
(b) Provoke multiple cultures: The people should be rotated between functions and business units.
(c) Design of the use of power: The application of power in particular forms has fairly predictable consequences of group dynamics.
(d) Expose the business to challenging situations: Most imaginative and competent competitions will be a unified effort for all to build sustainable competitive advantage on global scale.
(e) Devote explicit attention for improving group learning skills: This eradicates the existing mental blocks and inculcates absorbing and harmonious work culture and interconnectedness.
(f) Creating resource slack: At least people will not be negative minded for generally complaining about lack of resources (Simchi-Levi et al. 2004).

3 Process as a Problem-Solving Technique

Systematic process and its analytical approach to the problem solves many disorders. Process is a technical form and is defined as "an organized group of related activities that together create a result of value to customers" (Hammer 2001). Process has four main ingredients which are to be correctly understood:

(a) Group of activities
(b) Related and organized
(c) Together
(d) Result

Process is decidedly distinct clarity. The absence of process is not freedom – it is anarchy (chaos). With a disciplined process, rework, repair, and redesign are reduced, which reduces last-minute fire drills and results into both greater customer

satisfaction and reduced costs. With power of process, the order can be created where chaos reigns. Some broad steps have been cited as follows:

(a) Identify signs of dysfunction.
(b) Leverage people's creativity with the power of process.
(c) Make innovation repeatable through detailed process design.
(d) Don't let people tell you that creativity conflicts with process.
(e) Create a process-friendly company by aligning facilities, compensation, and structure around processes.
(f) Ensure everyone understands process.
(g) Be resolutely committed to discipline, teamwork, and shared responsibility.
(h) Accept the fact that not everyone will get it.

4 Information Uncertainty: A Major Communication Threat

There are five uncertainties of information: missing information, unreliable information, conflicting information, noisy information, and confusing information. We can be uncertain because we are not able to trust the information. Similarly, today having most of the technological devices, communication can be confusing, as there are too many media of usage and feedback communications are used sparingly. The voice mails, e-mails, SMS or fax, telephones, video, sound clips, pictures, schedules, calendars, workflows along with web browsing, e-commerce, IT-enabled services, etc., complications have increased.

Microsoft Head, Bill Gates suggests "unified communications to enable close the gap between the devices we use to contact people about business information" (Indian Express, Pune, 28 Jan 08). We should also understand the difference between information and communication. The former is one way traffic whereas communication is a two-way activity and "feedback communication" is a significant tool and dominant factor which makes all the difference.

There are following tactics for managing uncertainty:

(a) Delaying: Many cases of yesterday's chaos/problem turn out to be solved today – with the lapse of time. Intuitive delay brings calm in real crisis.
(b) Increasing attention: Monitoring and paying more attention to the situation is one way out.
(c) Simplifying the plan: This is one of the easiest way to reduce uncertainty by reducing complexity of the plan we are formulating.
(d) Shaking the tree: Sometimes the best way to handle uncertainty is to conduct a preemptive strike against it, to actively shape the environment.
(e) Intuitive decision making: The process of sense-making intuitively brings in desired solution.
(f) Filling the gap with assumptions: Instead of gathering more data, we can reduce uncertainty by making assumptions about missing data (what are they like).

(g) Using incremental decisions: One of the most common tactics for handling uncertainty is to take an incremental approach. Instead of deciding all the issues at once, we can make a small investment and see if it works. We don't always have to commit to a new product.
(h) Embracing the uncertainty: When the organization is more adaptive than the competitors, then uncertainty works better. We can embrace uncertainty, when we treat our plans as platform for change. Also, sometime "tolerance for ambiguity" works as a smoke screen that preserves harmony while an organization works its problems out.

5 Opening the Door of Intuitive Flexibility

We have seen a few definitions about "intuition" earlier. In this section, we will arrive at fulsome definition of intuition and "intuitive flexibility." Researchers and psychologists have difficulty in agreeing on a clear definition of intuition. However, some consensus is reached that intuition:

- Is a nonconscious process
- Filters information nonsequentially
- Relies on emotional cues (www.icaa.org.au/charter, 2008)

"Intuition is the way we translate our experience into action." Or, intuition may be "the ability to sense or know immediately without reasoning" (Klein 2004). Or "intuition is apparent ability to acquire knowledge without a clear inference or reasoning process" (www.wikipedia.com, 2008). Or, "intuition is knowledge gained of something without the use of reasoning or the five basic senses" (www.blogs.ibobo.com/mehndi, 2008).

But "intuitive flexibility" takes us further, which may prepare us for the future (whether immediate or farther) with vision, solve problems with insight, and use a sharing (people-oriented) approach to work. The earlier definition of "*intuitive flexibility*" in this chapter can be fine-tuned to "Learning non-consciously to recognize patterns and translating experiential reflections to facilitate evolving competitive decisions for solving problems (Sushil 2008)."

Herein it is observed that "intuitive preference" is somewhat different than "rational preference," which is solving problems with insight, rather than analysis.

In this chapter, few case studies have been discussed wherein "intuitive flexibility" has been applied for better performance and throughput of the product. The lessons learnt from these cases have been highlighted.

6 Combating Technology-Based Uncertainties

High technology is full of challenges due to its inherent uncertainty and the associated risk and complexity. The projects are multiuser, multi-project environment, and complex. This calls for the integration of technology development into product

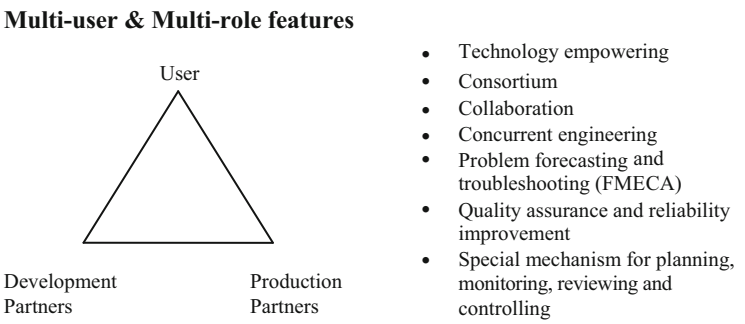

Fig. 9.3 Combating the uncertainty

development projects. The various approaches required to combat the uncertainty are as follows:

(a) Specific focus is required on problem forecasting, troubleshooting, and contingency planning.
(b) Technology empowering.
(c) Consortium approach.
(d) Collaboration.
(e) Concurrent engineering.
(f) Quality assurance and reliability improvement.
(g) Problem forecasting, modeling, and simulation.
(h) Special monitoring mechanism for planning, reviewing, and controlling.

The technology also has to be contemporary and product development should take into account multiuser and multi-role features. Some of the remedial measures taken for high technological uncertainties are depicted in Fig. 9.3 briefly.

Ramanan and Sushil (2001) have also discussed complexity and science of chaos theory – has been discussed for an IT-service company. It brings out statistically important features and variables for a problem-solving technique.

7 Toyota Motors: The Power of Intuitive Flexibility

On Monday, 3 Feb 1997, Japan's largest motor manufacturer, Toyota Motor Company, announced that all the assembly lines had come to grinding halt due to a devastating fire which took place at the premises of one of its affiliated suppliers – Aisin Seiki. The company was producing brake master cylinder for several of Toyota's models and was the only supplier of brake fluid proportioning valves. Though, Toyota works on JIT (just-in-time) and manufacturing flexibility principles, Toyota founder Shoichiro Toyoda was among the first to admit that his company's brand of JIT is still not perfect but remains convinced that this system is still the best in longer term. The system still allows the cost reduction through

suppliers' economies of scale and engenders a spirit of commitment among the affiliates.

There were no alternatives left for harnessing the particular component parts from anywhere else. In this case of the unfortunate incident, the Toyota's founder rallied around 20 of Toyota's other affiliated suppliers to immediately set about retooling, retaining employees, and setting up new production lines in an "intuitive flexibility" mode apart from showing his organizational coordinated flexibility without loss of time. Again by 7 Feb 1997, Toyota had started assembly line at all of its plants successfully restoring output to 90 % of its usual level. Full production was resumed by following Monday. Resuming production and harnessing assembly lines by rallying around 20 of Toyota's affiliated suppliers after the catastrophe probably is the highest degree of intuitive flexibility within only four days time (Christopher 2001; Chopra and Meindel 2003).

Lessons learnt from the above case study are as follows:

(a) The founder of Toyota Motors, through his intuitive flexibility, showed exemplary organizational capability in rallying around 20 of the suppliers/vendors and harnessing the resources immediately after the catastrophe.
(b) The founder of Toyota, Shoichiro Toyoda, with his indelible experiential reflections recognized the impending chaos of production of the components and took the intuitively competitive decision within an unimaginable short period of time, whereby resuming the full production.

8 Labor Union Case Study of a DRDO Establishment

This is another live case study of a union labor chaos during 1999 – a case of Defense R&D Organization (DRDO) at Pune. For secrecy's sake, the organization is named as "*XYZ DRDO Lab or Unit*." During a span of hardly 6–7 years, three directors were changed due to superannuation. Call them Directors A, B, and C. Directors A and B have retired since and Director C is serving still. Both Directors A and B were from XYZ DRDO unit only, and they had started their career from this laboratory and risen to director level.

Director A towards his retirement time during 1999 had conveyed the employees for considering the cases of their children wards for providing more job opportunities. Style of Director A was rational and was based on "balanced scorecard" as well as under the rules only. Work was being done in a regular way under packaged-time-bound program, and workshop productivity was more resorted to on OT (overtime) based incentive. Productivity and growth of this establishment was quite good in the Director "A" period. Many new projects and new programs had been arranged in this period apart from infrastructural developments. People and workers had faith in Director "A." After taking over by Director B from Director A during the year 1999, the new incumbent became more strict/stringent

as well as rigid on many fronts. Some of the broad issues considered were as follows:

(a) Jobs for employee relations strictly on high-merit basis and after passing some strict tests.
(b) Attendance of staff/officers, almost four times a day.
(c) OT (overtime) doing the job in the workshop should be stopped/curbed.
(d) Contractual/tendering not from the relations of serving/non-serving (retired) personnel.
(e) Temporary duties (TD) and TA/DA became more stringent.
(f) Natural growth of the establishment due to new projects/programs including infrastructural facilities.

Some routine facilities were also put on restrictions like parking the visitor vehicles outside the main gate (also implied for employees of the unit). Some facilities like unit CSD (Canteen Store Department) and taking petrol/diesel, pollution checks (PUC), etc., were also denied. Also closing the main gate of DRDO colony was done which later yielded to the pressure of workers and only a wicket gate was provided. Just after taking over the command/control of XYZ DRDO unit by the Director "B," the very first point of employment of wards/relations of the employees caught fire and employees started agitating. Intuitively sensing the result of union, CCR&D (Admin) – Chief Controller R&D from DRDO HQ, New Delhi – came to Pune and intervened the whole affair. The CCR&D devised a moderate plan of employment before the Pune Unit Union Leader could approach the National Union Leader and JCM (Joint Consultative Machinery) in this regard and could appraise of the unrest. This timely intervention from CCR&D averted the major crisis from breaking down the organizational machinery.

Later on during early 2006, the new Director C (outsider – from other establishment) took over the command from Director B and, within a span of 6 months, intuitively liberalized the above-cited essential facilities without hampering the discipline and performance of the unit. The much talked about main gate was also opened as desired – the people sighed in relief. In the present scenario, there is no problem to the people of the organization and deliverables to the customers. Both the interventions of higher command (CCR&D) and Director C have given examples of "intuitive flexibility" and averted the major crisis on the face value or also have taken care for future eventualities as well.

The present case of possible labor union chaos cites the following significant points:

(a) Director C, sensing the state of uneasiness, within a short span of time, liberalized the essential facilities without hampering organizational efficiency.
(b) Opening of the main gate also eased out the tension of employees.
(c) Both the interventions of higher command (CCR&D) as well as Director C have shown higher degree of intuitive flexibility in averting the major impending crisis.

9 Intuitive Forecasting of Avalanches

Snow avalanche occurrence takes place in hilly terrains, which are snow bound either seasonal or perennial pattern. In India especially the snow-bound regions of Himalaya pose this threat. It becomes more aggravating where the defense personnel and the villagers in those remote areas live round the year. One of the defense establishments, Snow and Avalanche Study Establishment (SASE) located at Manali (HP) and Chandigarh, looks after the prediction of snow avalanche for the safety/security of the line of communications (L of C) and people living in those regions (Perla and Martinelli 1975).

In this chapter, a case study of avalanche forecasting of Sonamarg (J&K) area near to Baltal area has been taken. A road passes from Srinagar, Z-Mode, *Sonamarg,* Drass, and Kargil to Leh. The predictions of avalanches are mainly based on the following parameters (Pathak 2008):

(a) Terrain configuration of the avalanche gulley – its slope, vegetation, geometry, etc.
(b) Roughness of the base of gulley, boulders, vegetative cover, and cross-sections of avalanche formation zone, avalanche path, and debris zone
(c) High intensity of snow pattern (precipitation)
(d) Weakening of snow cover by snow metamorphism
(e) Diurnal thermal regime
(f) Moisture conditions of snow cover
(g) Meteorological and environmental parameters
(h) Sun orientation (SE or NE facing) of the gulley and slope exposition
(i) Fragility of the mountainous track/terrain

In the Sonamarg area, there are five avalanche sites: A1, A2, A3, A4, and A5. Every year either of them should occur. The first author is associated with over three decades with SASE and its geocryological activities. The "intuitive reflections" of forecasters and the experiential prediction of the locals are also one of the important factors. Right from 1978 to 1979 winters till recently, it has been observed that "intuitive flexibility"-based prediction of avalanches occurs to the accuracy of 75 %. A5 avalanche site has especially responded to this monitoring study. Even in other countries like Switzerland (Davos area), Austria, and White Mountains of New Hampshire (USA), these types of studies are resorted to.

10 Conclusion

The fast-changing business world is becoming turbulent and generating an inhospitable environment for ad hoc and informal ways of making the products and services. The competition is becoming more complex and chaotic. The uncertainty of information and communications in the era of IT-enabled services is creating more disorder. In any amount of chaos, disorder, and instability, some pockets of stability

do exist, and from that, by application of "intuitive flexibility," some competitive decisions can be evolved, which ultimately solve the problem.

"Chaos theory" has been defined and analyzed for combating organizational and technological uncertainties. Chaos unfolds predictability, but always it does so according to recognizable family-like resemblances. Few case studies like Toyota Motors of Japan, DRDO labor union crisis, and avalanche forecasting based on "intuitive flexibility" process have been suitably presented. "Intuitive flexibility" of the top management has solved the major critical issues of both Toyota Motors and DRDO labor union cases.

This chapter deals with various cause and effects of chaos, disorder, information, and communication uncertainties. The few case studies discussed herein may open up new vistas for coping with chaos and disorder in the organizations, thereby transforming them to achieve organizational excellence.

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