

Coopting formal and informal structures

Organization structuring from the perspective of complexity theory

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Dr Kajari Mukherjee¹

¹ Indian Institute of Management, Indore

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Abstract

Structuring process—organizing to get things done and achieve results—is considered to be one of the most potent component in strategy realization. Structure connects and weaves together all aspects of organization's activities, its external and internal contexts, so that it functions as a complete dynamic entity. With changing business landscape, companies are struggling with novel forms of organizing. This study aims to fill the arena of void around study of organizational structure. Nonlinear dynamic properties of any system, falling under the hubris of complexity science, suggests structural options that embraces both explicitly mandated formal structures as well as emergent informal structure. Using qualitative research methodology, the study is grounded to the field—a content creating firm in entertainment industry. Seven distinct stages of transformation process are evinced in the process of creating content, as nature of raw material changes from its unsophisticated and/or untampered mode to content fit for monetization. These were mapped in Information (I) space. The grounded theory substantiates that extent of codification in information about raw material and/or work process will drive the structure, and that the organization design that gets generated is a fine balance between hierarchical, bureaucratic structure and self-organized form, each with preponderance across time and space based on distinctive stage of transformation process of raw material. Study argues that such organization structure subsumes both formal and informal ways of working with a fine balance between bureaucratic and self-organized forms. Actual organization structure depicts the messiness of how real organization actually works.

Introduction

Design choices about how organization should be structured are a powerful strategic lever in hands of management. Design connects and weaves together all aspects of organization's activities, its external and internal contexts, so that it functions as a complete dynamic entity. Through scores of research, it is known that environment and internal fit considerations—technology, industry, employee population, size, customer, geographical spread and so on—have a powerful say on design choices^{5·6·12·16·27}. Most of the research in these areas are decades old. And, they belong to an era when external business environment was more predictable, and advances in information and communication technology has not rendered geographical distance meaningless. Thus, there is an arena of void around study of organizational architecture that embraces both explicitly mandated formal structures as well as emergent informal structure. In past two decades, there have been advances in conceptual framework used to study organizations—based on what is loosely called 'new sciences'. These deal with interesting patterns that emerge due to non-linear relations between autonomous entities, which are capable of creating non-normal results through intentional and not necessarily planned, response to internal and external environment, as well as historical accidents. They are seen to provide better understanding of structure and dynamics of modern organization, which is manifestedly less orderly, less predictable, less machine like. The present study uses such conceptual framework, namely complexity theory, to denote an alternate approach to understand and depict organizational structure.

The study explores the often fuzzy boundaries of organizations that employ and manage human capital that is embedded in sets of workers who are not in traditional, full-time employment relationships; pertinently, appropriate governance structures to create and capture value from such human capital. The study was conducted in a project-based company engaged in film production. Such companies create their most vital core asset—movies—through project-based delivery arrangements, whereby a team of diversely skilled specialists and non-specialists temporarily collaborates to manage a set of highly complex and non-routine activities. Such companies compete based on core assets, but have limited control on the actual quality of the asset, which is based on the idiosyncratic personal knowledge of highly mobile, external project participants. The study uses tenets of complexity theory to understand how such a company subsumes both formal and non-formal mores of working with both internal and external employees as they strike a fine balance between the dictates of commerce and creativity.

Complexity theory deals with patterns that emerge due to non-linear interactions amongst constituents of a system, leading to interesting results that exhibits non-causality, non-reductionism and non-determinism with irreversible history and unpredictable future^{7·22·31·37}. Due to paucity of cause-effect linkages¹⁹, feedback is generated that leads to emergent properties. Thus, the system can emerge from minimally structured interaction⁹ as multiple positive feedback moves the system far away from its original form. Emergence leads to the creation of new, often more sophisticated forms. It implies that under certain conditions fine-grained interactions among agents lead to coarse-grained properties of the system as a whole¹⁷. As the system does not

possess any one state—orderliness, complexity or chaotic; different observed states display different temporal dynamics⁴⁰. Equilibrium in complex systems sets around attractors—end state the system reaches as it emerges. Patterning within any given system arises from such attractors around which system settles down; it is the limit to randomness. The present study aims to use various observed states of an organization as they contend with information asymmetry around raw material and/or transformation process to illustrate how both formal and informal relationships operates in an organization.

Design typologies and information assymetry

Structure refers to enduring social relationships and deals with roles performed, intra-group relationships, degrees of centralization or decentralization, and organizational climate of values, expectations and goals²⁶. Such relationship can be depicted in Information (I) space as transactional complexity arising due to diffusion of information based on ability to codify (process of capturing knowledge in succinct form of a code), and abstract (extending these codes to more categories of phenomena and thus generalizing application) that leads to distinct design arrangements⁴. Well codified and abstracted data can be understood, applied and distributed easily; compared to data that is highly contextual; which will require more interactions. This give rise to transactional complexity as interplay of cognitive complexity that focuses on “content of information flow between agents”, and relational complexity that is “structure of the interactions that such flow allows among agents^{4:241}. Need for interactions arise to transform raw material into products/services: task-variability—the number of exceptions individuals encounter in their work, and problem-analyzability—the type of search procedures employees follow in responding to exceptions²⁶. Equivalence of Perrow’s framework and codification and abstraction of knowledge is depicted in Figure 1.

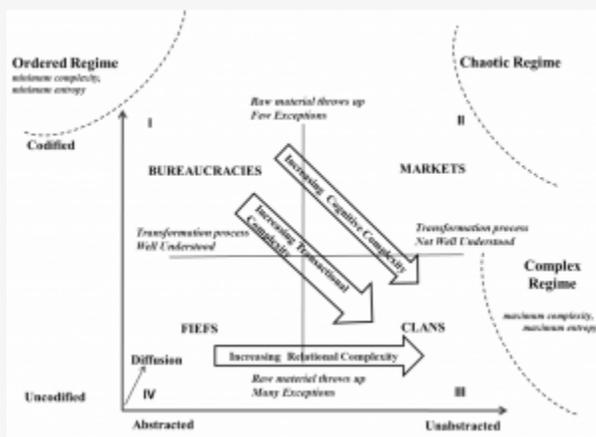


Fig. 1: Locating Perrow’s framework in information space

Research design

The present study, seeks to explain working in an organization using complexity perspective, with intention to bring fore both formal and informal relationships that propel an organization. Structure is explained as enduring social relationships that ensure work gets done. Qualitative research methodology is used, as it is seen apt to uncover and understand what lies behind any phenomenon about which novel insights will be valuable³⁶. Grounded theory is often used where a totally fresh approach to existing theory may be warranted as existing theory do not adequately explain phenomenon, or where existing theory on the phenomenon being studied is minimal. As existing organization theory donot adequately explain phenomenon of existence of formal and non-formal structures well, grounded theories were evolved, “through continuous interplay between analysis and data collection^{33:273} through a single case study using theoretical sampling¹⁴. Data gathering instruments used were in-depth discussion (total 25 in a company of around 75 employees on permanent rolls), in-situ observation, telephone discussions, group interviews (total 6), study of company documents. Appropriate coding framework was developed. The approach allowed the present researcher to understand nature and complexity of the process taking place, gain valuable insights into new topics emerging in rapidly changing field and generate theories from practice².

Research context

The study concentrates on content creating firms in entertainment industry. Content creation soaks up investment; distribution/consumption phases generate revenue. Management thrust is on ideating, creating and marketing content—their core asset, created by transforming raw materials—primarily script and actors. The non-standard raw material evinces task-variability, and transformation process leads to imperfect problem-analyzability requiring atypical solutions and non-planned and mostly feedback driven negotiations. The field work for this study was carried out in a film production house, which was started

in 1970s. It makes Hindi films, part of multilingual Indian film industry—the largest in the world in terms of films made. One of the first publicly listed companies, it is helmed by charismatic screenwriter-director-producer. The company aims to make 2-4 movies a year, enough to create a rolling stock that can open up multiple revenue streams, and offset hits with losses. Table 1 depicts the broad areas of work, grouped around similarity of function and primary control and conflict resolution mechanism.

Table 1

| Broad areas of work, grouped around similarity of function and/or control mechanism | | | | |
|---|---|---------------------|-------------------------------|---|
| Broad department groups | Work areas | Internal / External | Primary controlling mechanism | Primary conflict resolution mechanism |
| Support Groups | Provides support – finance and accounts, legal and contracting, human resources, administration | Internal | Variance reports | Hierarchical: role definition and deterrence. |
| Production Group | Pre-production, production, and post-production. | Almost all Internal | Variance reports | Contractual as well as relational, negotiation based. |
| Creative Group | Converts the idea into a complete film that is suitable for exhibition. Almost all the people are external. | All External | Quality of deliverables | do |
| Marketing & Sales Group | Marketing and selling product across channels and consumption forms | Internal | Revenue inflow | Primarily contractual. Relational with key channel owners of influencers. |

In this company, the production team, comprising largely of in-house employees, is charged with keeping a leash on the commercial aspect of asset creation while catering to the needs of the creative team (highly specialized human capital on hire), which is charged with the creative aspects of asset creation. Such a project-based company are useful examples of Handy's (1990) concept of "shamrock organizations," which have three key parts – the professional core comprises internal employees; outsourced specialist providers are the human capital rented for various facets of the film (e.g. direction, cinematography, music and choreography); and flexible, part-time workers are the apprentices and scores of low-skilled workers such as clapper boys, etc. However, distinction lies in the fact that though roles of these three groups are distinct, the three parts of the organization also work in close coordination, reflecting "dynamic industry and career development processes rather than enduring social stratification."^{11:136}

Typical contour of a film starts with an idea, leading to a script. Pre-production deals with planning including budget, star cast, technical specialists, etc. Production deals with actual process of filming. Post production includes editing, dubbing, background music, etc. Films are sold across various channels, e.g., theater, television, internet. Each film is dubbed as a project. Once budget and talent list is finalized, the senior team typically has a hands-off approach. They oversee progress of project based on daily reports on shoot progress — an apt indicator of length of film canned each day and budget consumed. This company closely parallels 'clan' typology of I space; it cannot climb up I space (Figure 1), towards bureaucratic area, as it deals with information much of which cannot be routinized or analyzable. So, it needs to choose strategic options well, to contain complexity and prevent the firm sliding towards chaotic space, which is discussed next.

In grounded theory approach, data collection, analysis and theory stand in reciprocal relationship with each other. In ensuing paragraphs, data collected, snippets of narratives from interviews and analysis, and literature underpinnings are woven together to fashion a set of grounded theories that attempts to meet the four criteria for judging the applicability of theory to phenomena³³, namely, (1) fit, to see if hypothesis is induced from diverse data, (2) understanding, to see if theory is comprehensible to those who are professionals in the area, (3) generality, to see if theory is general enough to be applicable in diverse context related to that phenomena, and (4) if theory provided control in relation to action toward that phenomena.

Discussion

The nature of raw materials changes as series of actions are taken on it by individuals over a period of time and/or space. Seven distinct stages of transformation process are evinced; where technology, defined by Perrow²⁶ as work done in organization by applying techniques to problem of altering raw materials—materials, people, symbols or things, is applied, and each stage primarily works with a distinctive form of raw material. These stages are either sequential or concurrent, or both with varying levels of complexity (Table 2). Mapping these in I space in (Figure 2) indicates that even for an organization representing 'clan' typology, the structural evolution will be such that there will be relatively more codification/abstraction around some inputs/work processes, compared to others. The quadrant I and II obviously highlights those stages where the raw

materials is understood well enough, but, the transformation process throws up challenges which is across a continuum, ranging from being well understood and amenable to logical solution, to issues which are vague and poorly conceptualized making it virtually unanalyzable. The quadrant III and IV though highlights those raw materials which are not well understood and their variability is such that work processes involved in transforming them ranges across continuum from becoming categorized, to remaining vague and defying analysis.

Table 2

| Transformation technology and nature of raw materials across I space, based on level of diffusion | | | | | |
|---|--------------------------|--------------------------|-----------------------|----------------------|--------------------|
| Sr | Stages of transformation | Primary Raw Material | Level of codification | Level of abstraction | Level of Diffusion |
| I | Conception | Ideas | Low | Low | Medium to High |
| II | Budgeting | Script | Medium | High | Low |
| III | Pre-Production | Screenplay | Medium to High | High | Low |
| IV | Production | Screenplay and Artistes | Medium | Medium to High | Medium to High |
| V | Post Production | Canned footage | High | Medium to High | Low |
| VI | Marketing | Completed film and music | Low | Medium to High | Medium to High |
| VII | Channel Sales | Completed film and music | High | High | Low |

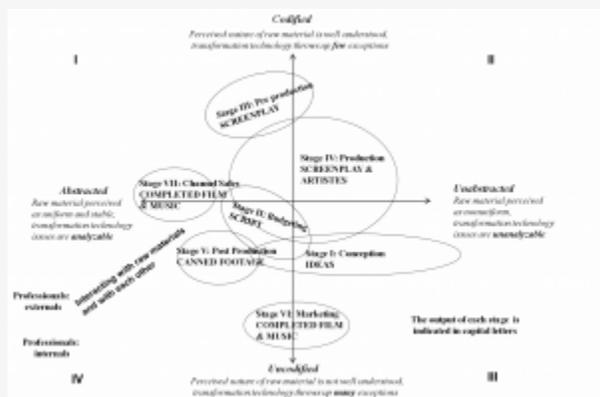


Fig. 2: Transformation technology & raw materials across various stages mapped in I-space

Using Figure 2 and Table 2, it can be intuited, that the data processing constituents in I space dealing with processes which are easily amenable to codification will have more propensity to settle around a structure that revolves around such codification. Standardization of raw material, fungibility of work-processes across industry, depersonalized process-atomization, regulatory requirements ensures that some stages are easily amenable to codification and abstraction. Resultant structure revolves around SOPs, decision rights, rules, norms, and hierarchy that demand few, well-ordered interactions amongst the role holders. The structure is not self-generated, rather mandated and refined through external, pre-mediated interventions. Routines, accountability matrix, milestone-linked deliverables and decision rights are developed and institutionalized. Resultant structure drives efficiency, allows appropriate checks and balances, doesn't encourage disruptive innovation. The stable form endures in absence of any internal/external stimulus.

Proposition I: Those work processes in the company that are amenable to control through standardization will lead to an organization structure that will push the system towards an equilibrium stage with a tendency to settle down around attractor of codification and abstraction

Complex systems generate an underlying pattern because constituents interact partially, not fully that tend towards decompositional hierarchy, in which elements are loosely coupled with one another, with many interactions⁴, and the equilibrium sets around *attractors*. The attractor/s are not a point or center for the system, rather it is the state where the system stays in absence of other factors. Negative feedback mechanism pushes the system to a stable state; positive feedback mechanism makes the system veer towards chaos (Urry, 2003).

In the present case, the system containing the data processing constituents settles down around a basin of attractor due to increased amount of codification and consequent limited diffusion. It tends to achieve the most efficient structure through external, planned or pre mediated interventions. The existing rules, SOPs, daily expense sheet, financial statements, variance analysis, computer systems, have been created to make the conversion of raw material as efficient as possible. In fact, “project-specific, knowledge-based competencies” are an important source of competitive advantage and success in this industry^{11:126}.

Proposition II: The structures that develop around work processes which are majorly codified and abstracted will necessarily be designed through external intervention to achieve efficiency.

The work processes centered on core activities have reached certain level of standardization, so the structure does not demand many interactions. Rather, it fosters limited interactions due to hierarchical/preordained relationship structure. The milestones, accountability matrix, decision rights are easy to develop and implement. In such a hierarchical, well ordered relationship structure, innovativeness is not aided by the structure. The system has settled down to a stable state, and its negative feedback will dampen anything that is not in line with the set order, and push back the system to its stable state (refer Figure 1).

Proposition III: In organizational structure that develops with low level of interactions and high degree of stability to contain transactional complexity, innovative breakthrough will not be aided by the structuring.

The company creates vital core asset through project-based delivery arrangements, whereby teams of diversely skilled specialists temporarily collaborates to manage a set of highly complex and non-routine activities. It has limited control on actual quality of the asset, which is based on personal knowledge, intuition, artistic sensitivity of highly mobile, external project participants. It has to manage the task of assembling the right team that delivers a core asset within the overarching boundary conditions of money, time and creative acceptability.

During film-making project, specialist teams use their technical knowledge, idiosyncratic knowhow and relationships to get the best out of script and actors. Even with most rigorously penned-out schedule, actual filmmaking alternates between periods of frenetic activity and enforced idleness for various crew groups. Though director makes the film, but his ‘right shot’ works only with help of appropriate camera and lighting. Multiple challenges crops up every day, none has ready-made solution. Constant dialogue, revisions and last-minute adjustments are common as creative ambitions are calibrated against time and budget estimates as well as ground realities of shooting. This calibration is possible between innovation-oriented creative team and efficiency-oriented production team in an environment of mutual trust, comfort and familiarity. A real-time production is a complex, chaotic world that thrives on constant negotiation and careful calibrations of each other’s aspirations and demands.

Goal of an organization is “a desired state of affairs which the organization attempts to realize”^{13:6} as they “provide orientation by depicting a future state of affairs which the organization strives to realize”. Goals serve to set the performance expectation that makes the organization tick, as a source of legitimacy, which justifies its action as well as serve as standards such that employees and outsiders use yardstick of effectiveness determined by the degree to which the organization realizes its goals, and efficiency, determined by resources used to produce a unit of output (*ibid*). It is possible to pare the variety of goals in the company as per ²⁶. The project brings together many specialists who have various personal goals, e.g., winning awards, critical acclaim, securing future contracts, apart from earning current fee; their goals are different from company’s goal – a profitable core asset (Table 3).

Table 3

| Variety of goals that drives the organization | | |
|---|--|--|
| Type of Goals | Relate to | Goals as evinced in the Company |
| System Goals | Characteristics of system as a whole, independent of its products | Moderate emphasis on profits, Spread of risks, Economical operations |
| Product Goals | Characteristics of products that organization decides to emphasize | Wholesome family entertainer |
| Derived goals | Uses of power generated by organizational activities | Long term relationship with vendors and others allow disparately long credit |
| Personal Goals | Uses of organizational process to satisfy personal aspirations | Creative satisfaction, pay, job security, protection from arbitrariness |

For example, inhouse production team use their relationships and negotiating skills to ensure controllable reasons should not impede a project; decision rights available (or not) is not seen as an impediment. The cinematographer (with his team), works according to the budget commitments, and vision of the movie director, but strives to highlight his artistic sensibilities; but even within the said constraints he pursues goals of self-satisfaction, accolades, future contracts, etc. Such goals may have rather little to do with system and product goals. This apart, personal goal also take the shape of pay security, job security, protection from arbitrariness, and like. Thus, the organization is actually composed of groups of people—internal, external, or mix of both—each consisting of autonomous entities, who come together to achieve goals—in fact multiple goals. Only some of these goals are overarching and mandated from top. Groups may be held together due to self-interest, specialized knowledge, experience, responsibilities. Only a few groups are pre-mandated, but many forms and disbands to sort issues, or to get work done. As a production person said, “In any shoot, a small team may emerge just to handle the second female lead and her demands. No one tells them to get together. They just come together only on the days that she has shoot schedule to manage her tantrums”. Groups self-organize (autogenesis), and exhibit emergent system properties—the constituents’ actions and other stimuli create disproportionate results. These groups have irreversible history and unpredictable future, form spontaneously and disband likewise, and entail a process of self-making or self-producing (autopoietic).

As the company deals with raw materials not fully understandable and relevant work processes not easily standardized, and so, it becomes relatively easier to make way for and accommodate a variety of goals. As a production assistant noted about his work, “Almost no problem has easy or ready-made solution. Rather, based on my experience, I talk to people, use my past credit of good will to find solutions.” The internal culture of the company is not overtly geared towards creating conducive atmosphere for self-organization. Rather, it has paternalistic culture. Putting it a little differently, there is no way for the company to impose a superordinate goal on everyone in the company, as the way to achieve the same is not fully understood. As it is engaged in activity where it does not understand the process of conversion of raw material fully, or at times even the raw material, spontaneous group formation is likely to be more than otherwise, even without any obvious support from the company to do so.

Proposition IV: Self-organizing will be more in those organizations which have much less codification and standardization of information around the type of raw materials and its transformation process.

The stages (in quadrant III/IV) where the work processes are not standardized or well-ordered throw up a set of challenges for the company. The process of ideation, intuiting the range of actors who suit the parts, deciding whether it should be a big budget or small budget film and entire directorial process as well as marketing and promotional process is non-codified. The mechanics are well understood, yet not the process of organizing those to deliver results. Because information is imprecise, innumerable face to face interactions are necessary. Relationships, many a times, at personal level, plays a huge part in gaining goals. Goals itself are shared and chased through a process of negotiations aided through shared frame of reference comprising of vision, values, guiding principles, systemic memories hereafter referred to as 'simple rules'¹. These hold the system together despite it being a network of relationships among many autonomous entities who interact based on self-interest. These simple rules express the system's overall identity as well as enable system to reorganize through feedback mechanism.

No one person directs these couplings towards a common goal. Rather one or many, common or even conflicting goals are chased by people, yet their interactions provides for a state where the system is neither stable nor chaotic, but poised at edge of chaos. The interactions may yield something which is phenomenal, but yet it cannot be pre-ordained. The moot point of such system is that the goal achievement cannot be predicted well; and neither can the same success be repeated again and again. E.g., a big star signed up for a project, even with a legal contract that regulates the shooting days, can still throw starry tantrums, or sleepwalk through the role. The star is a raw material for creation of core asset. And, the only way to get best out of him is to learn to relate to him—the production team keeps tab on his mood, the directorial team aims to gain the star's confidence by developing a close relationship based on trust and respect.

This myriad set of interactions at times yields a chaotic system; there are many productions which have stalled precisely because the raw material could not be managed well. However, mostly the system is poised between stability and chaotic, as it settles down around attractor/s—self organization means that the system may have multiple possible attractors, with multiple equilibrium that alter with changes in system interconnections; and inside the preferred position space, the system behavior may be highly complex and unstable.

In the company, with its myriad uncertainties, and different strands pulling the system asunder, still the work gets done. Though everyone is pulling in towards so called system/product/derived goals, they are also pulling in their personal goals. These goals act as the attractor that pulls in the system to settle down around it. E.g., for directorial staff, it is the pull of making a successful movie, for production staff, it is getting the project completed within given constraints of budget and time, for vendors, it is to get the payment out (as it is paid mostly after completion of the movie), for the supporting staff, it could be job security. Using the notion of core asset discussed earlier, it can be hazarded that at least in this company, the goals are around core asset. The system of data processing constituents will settle down around attractor/s, which is likely to drive the company ahead, with the assumption that most constituents will find an interest that is attuned to it—this may or may not be the systems goal of the company; rather whatever drives the organization ahead. In this case, it is manifested via the movie project/s (core assets).

Proposition V: The system with data processing constituents coping with unstructured information will settle down around attractor that will be goals, which will be those that coincide with goals of immediate constituents involved, which again are likely to be around whatever drives the organization ahead, and this may or may not coincide with the systems goal of the company.

Work happens in an organization by groups that come together to make things happen. These could be mandated due to very clear hierarchical relationships and well defined way of achieving coordination between departments. Or, it can happen just because people come together forming spontaneous groups. In the company, these critically interacting autonomous constituents settle down around basin of attractors such that they are neither well-ordered stable system, nor chaotic, rather they are poised between these two stages. They cogenerate through convergence of many factors within the organization and its environment, and are expressed in a way that are similar in pattern, yet different in scale across time and space, that is, they are expressed through fractals²⁴ that achieves its complex state through continuous self-reference to a simple initial equation³⁷. Each group, with its autonomous members interpret information, experience, organizational memory, and figure out what needs to be done and how. Each group may be different in how they get things done — no two fractals are same—but they are self-similar. With each iterations, as their individual solutions are fed back into the system and learning gets shared, new fractals emerge.

The output of one group imbues the action of next and this process continues till infinity. These fractal-groups consist of inter and intra department people, internal/external to organization, across hierarchies and knowledge/competence level, with "each situation and event always contain (ing) an essence of the past and it is this fractal patterning that holds the memory acting as the coordinating mechanism"^{25:56}. The organization is conceptualized as composed of fractals; with simple formula "fed back on itself in a complex network"^{37:129}. What each group does is not as important as what results are being produced, and how learning gets fed back into the system to produce evolving feedback, that is seed to more iteration. Fractals being self-organizing fit well into "the spontaneous formation of interest groups and coalitions around specific issues, communication about those issues, co-operation and the formation of consensus on and commitment to those issues"^{29:333}.

The aforesaid discussion essentially incorporates the information processing requirement that drive a structure formation. The

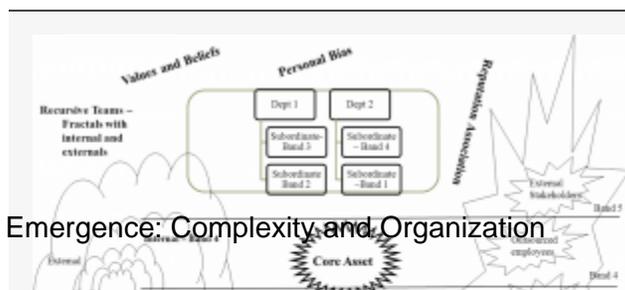
autopoietic nature of fractals takes care of the fact that the constituents themselves glean around to find the necessary information for their goals. Drive for effectiveness—that incorporates corporate as well as individual goals—lead to group formations that are fractals. Fractals “flourish in an environment of adaptive challenge and tend to atrophy when subjugated under heavy hand of social engineering and they foster breakthroughs and outcomes that are unforeseen and unimaginable²⁴:75. The fractals get formed here because otherwise with asymmetry and incompleteness of information about raw materials and ways to manage them, nothing will get done. The essence that is being communicated is that groups get formed to get things done—whether it happens in a small scale or large scale. This concept of fractals take care of issues like relationship that works across departments, spontaneous formation of groups to solve a customer problem, support to an employee who shows good promise, championing an idea that can make an interesting movie, managing recalcitrant stars, and so on. The system comprises of entities who are autonomous and the organization has not been able to come up with codes to restrict or well-order their work. They at best can create ‘conducive environment’ such that their diffused (yet not widely so) interactions leads up to a bifurcation point from whence many possible results are possible. Fractals are just one possibility. Each production project is a fractal. Likewise, the small teams that emerge spontaneously is a fractal, which forms, not because someone is directing them, but because various people’s self-interest gets involved to ensure that roadblocks get eased. These come together and disband easily, but not before a minute portion of it is passed on to the next set of fractals to which each member gets involved. These will vary in size across time and space, during the process of creation of one core asset, but, surprisingly, they have similar pattern. In this case, the fractals come together and recurse because those involved is likely to shared ‘simple rules’ and common believe to get things moving, as conveyed through, “we prefer to work with those who share our vision of film making, and with whom we feel comfortable, even they should feel comfortable working with us”, similar to observation of DeFillippi and Arthur^{11:134} who label it as combination of “human capital (each knowing their own trade) and social capital (each knowing one another).” This finding is similar to that of Mahmud²⁰ who found in an empirical study that an adequate level of trust level, open communication and strength of the value system is needed for self-organization to occur.

Proposition VI: Work in an organization that is grappling with unstructured information will be aided through self-organized groups which are akin to fractals — self repeating shapes across a scale of time or space.

Depicting co-option of formal and informal structures

The Company actually operates in two levels—structured part with departments and its well-ordered way of working, and self-organization emerging as information asymmetry necessitates more number of interactions, and is geared towards result generation through experience, intuition, happenchance and guesswork with free flow of ideas, information, concepts, amongst members coming together at various levels of aggregation. Self-organizing tendency increases when any movie production is under progress. Goal realization/s act as attractors around which fractals develop and maintain themselves; they also acts as the seed for further iterations through feedback process. There is oscillation between stable state and complex state. As multiple projects, at different stages, are handled simultaneously, the company actually contains within itself traces of many states, each trying to settle down around its own set of attractor.

The organization structure can be conceptualized as subsuming both bureaucratic stable form, as well as self-organizing forms, based on respective phase in content creation, and controllability of raw material and/or transformation process. It allows for rapid adaptation to unexpected conditions, with available but not optimal resources⁹.The system has many basins of attractor, some trying to push it up I space, and some trying to push it right towards chaotic region. The depiction of structure (Figure 3), showing the organization as recursive set of systems (fractals) is messy, as any company poised at edge of chaos for most part of its existence is likely to be. But, at a long range an overall order is eminent; this interplay and oscillating between more stable state and more complex state, across time and space creates a unique culture that seems to subsume not only employees (attrition rate is very low even though the company is very conservative in its pay) but also those externals who have been working with them for years and prefer to do so even in future. The pictorial representation shows the organization as recursive set of systems—fractals—which are complex systems settled around attractors and adopt the same generic characteristics. Fractal formation is aided by information asymmetry that necessitates interacting loops to aid in sense making. Concurrently, increasing codification of information, aids in formation of hierarchical relationships (e.g., in departments) that becomes repository of knowledge that aids in efficiency. The structure is itself a complex system subsuming a pull towards stable system via codification; and chaos via extensive search process, poised at edge of chaos around its basin of attraction—core asset. An underlying net of ‘simple rules’ hold the system together. The system functions as a cogent whole, even with various externals joining at various stages, primarily because of holding glue labeled as ‘simple rules’, or rules of the game that allow certain types of interactions^{18.18}



The pictorial depiction of the structure (at Figure 3) is not clinically neat as that of organigram that is an amalgamation of interconnected hubs, “physical or conceptual point at which people or materials move”^{23:89}. McMillan²² suggests an organization structure based on design principles derived from complexity science to create a fractal web; in line with biological forms like human heart and circulatory system that allow for rich flow of communication, distributed leadership and intelligence gathering from environment. Both the aforesaid model does not explicitly comment on how the traditional hierarchical set up will be incorporated into the new structure. Also, both structures are suggested as a superior alternative to cope with uncertainty and rapid changes evinced in today’s business landscape. Both the study, however, does not explicitly state the contingency factors which will be necessary to recast an organization as per new models. E.g., type of industry, size of industry, management orientation, existing culture and value system, nature of business challenges; the present study though identified contingency factors which will propel self-organized forms.

Figure 3, which came out of our study, depicts the company as a system that veers between stable system and more complex form across time and space, based on various phases of content creating. It brings into sharp focus the important role that self-organizing groups play in goal achievement, comprising internals and externals as needed for goal achievement. Internals are part of various functional specializations (labeled as departments). They also belong to various hierarchical levels, depicted as bands. The structure subsumes existing hierarchical structure, and departments, within its ambit around the core asset as the preferred position of the attractor. A complex system can have many attractors, and these impact the degree of self-organization in the system. The behavior of complex system is unpredictable—patterns emerge through interactions of agent with each other in connection to the attractor; the system achieves a state of self-organized criticality without veering to chaotic state—rather it is poised at edge of chaos, and it is here that non-normal results so associated with complex systems are evinced. The structure at Figure 3 underscores this aspect. The nature of core asset—the film being produced—have a tendency to energize the entire system in way which cannot be premediated; with emergent system properties, with irreversible history and unpredictable future; this can cut in both ways – apart from successful productions, the Case Company also had extremely problematic production experiences, where even completion of film dragged on.

Our structure is based on the six propositions which cogently argue that organization subsumes both bureaucratic stable form, as well as self-organizing forms, based on respective phase in content creation, and controllability of raw material and/or its transformation process. The system functions as a cogent whole, even with various externals joining in at various stages, primarily because of holding glue labeled as ‘simple rules’ in complexity theory. The illustration brings out these intangibles, as they make the complex system tick. The structure we are proposing is similar to the “heteromorphic” (H) organization form proposed by Surie and Singh³⁴ while studying the dynamics of cross-border knowledge production. H form comprises “of variety of organizational mechanisms used concurrently and engendering multiple emergent patterns, e.g., formal and informal alliances and other mechanisms along with hierarchy” (47-48).

Conclusion

The necessity for companies to try out new ways of organizing is because of “shift from a physical economy, which was served well by principles of bureaucracy, to an information-intensive economy, whose structural implications are not yet clear”^{8:1144}. The organizational design challenges of today has to cope with variety of paradoxes—combination of internal employees and externals, expectation of “both efficiency and innovation, both global operating control and local responsiveness, both centralized vision and decentralized autonomy” (*ibid*), transparency and discretion. It is widely accepted that informal relationships don’t necessarily coincide with formal structures³⁵, nor do influence that can be exerted through personal relationships coincide with formally mandated power and authority³². The study highlights the great role played by interpersonal relationship, distinctive ways of working, and other systemic rules that hold the paradoxical complex system and prevent it from spiraling to chaos, similar to identifying underlying patterns and synthesizing them into “simple, often competing, rules that enable highly adaptive behavior” (1245) in an organization¹⁵. Attention to structure and behavior in advance helps in navigating unplanned situations by calibrating appropriate adaptive response³—this approach ensures that the system with disparate constituents with conflicting goals still manage to find equilibrium and prevents a free fall to chaos. The study does not dilute need for standardization yet impresses on importance of linkages and processes that are fluid enough to incorporate diverging goals of disparate groups and demands of internal/external environments, yet allowing for enough adaptive tensile strength in the organization. However, the study still does not explain if this approach can help in systemic innovation—the grounded theory only indicates that portion of the complex system does not overtly encourage discrete innovation; and other portion actually gets structured such that creative are encouraged.

The study also highlights that each constituent of the firm can pursue seemingly contradictory goals, yet paradoxically that is not in conflict to the firm's interest, similar to findings of Malnigh²¹ who found that firms evolve differentiated internal structures in response to complex competitive environment via sharing distinct types of information; appropriate to specific process sub-environment, yet these networks coordinate well. While Schilling and Steensma²⁸ suggest that firms use modular structure when faced with environment heterogeneity, present study uses the concept of information asymmetry about raw material and/or its transformation process to explain the emerging self-organized structure.

New organizational forms are expected assume "wholehearted commitment of organization members" towards achieving great organizational results through decentralization, autonomy, empowerment and stronger social contracts¹¹⁴³. But, on the other hand, regulatory requirements, incessant demands of market place and share market, drive for economies of scale and scope requires strong process orientation and standardization. This "depersonalization of employment and business transactions" (*bid*) contrasts with aspiration to enlist commitment and contract can be better explained using the paradigm of complexity where each constituent is supposed to work based on his own self-interest; and yet critically interact to exhibiting emergent system properties.

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