IS/IT and Dynamic Business Change

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Abstract

This paper notes that the autonomy of ‘boundary spanning’ units are becoming critically important as organizations continue to decentralize. This dynamic business change and the consequent new configurations are believed to have a significant and pervasive impact upon the role of IS/IT. The formal ‘technology push’ common to these circumstances is clearly inappropriate given the emergence of these increasingly diverse and complex structures. IS/IT leveraged advantages may be enabled through more emphasis upon informal managerial coalitions and interdependent groups where successful business transformation incorporates behavioral adjustments. This paper presents an analysis of three case studies in this respect, which demonstrate that the competitive environment encompasses multiple dimensions of change. This will necessitate attention to improving the organization culture through intense information sharing and communication enhanced through IS/IT implementation.

1. Introduction

Companies are increasingly being forced to reorient their organizational arrangements and practices to meet the changing business requirements ([12]; [20]). Indeed the persuasiveness of computing and telecommunication technologies has placed considerable importance on the use of Information Systems and Technology (IS/IT) within organizations [8]. A significant feature of this changing business orientation has been the emphasis for more autonomy of subsidiary units where cooperation is emerging as the main characteristic with less centrally initiated control. An organizational configuration entailing an organic structure (often termed as ‘network’, ‘virtual’, ‘lateral’ organizations) which facilitates the intense sharing of information, partnerships, cooperation, coordination, team work and strategic alliances are considered to provide flexibility in dealing with such changing business environment (see, [11]; [14]; [7]). The degree of importance placed on IS/IT and change issues is interesting, especially in light of a telling statistics where leading practitioners of radical reengineering report that in Fortune 1000 companies, success reports are well below 50% (some have even reported them to be as low as 20%). More often than not, the corporate leaders seem to get more excited about the solutions to myriad of problems that their organizations may face. This has resulted in the imposition of technological solutions onto ill-conceived and little understood problem areas. The accepted view is that most organizational activities can be both automated and informated [22]. However, the ‘technology push’ generates the belief that advanced technologies, such as Electronic Meeting Systems, Multimedia, Tele-working, Video-conferencing, Groupware, EDI, EFTPOS, etc, are the only requirement for organizations in the information age. In such situations, the management is often left wondering about the causes of failures. In reality, however, organizations can successfully leverage IS/IT related advantages by inculcating a culture of trust based on informal coalitions between dependent groups ([4]; [6]).

This paper presents findings from three successful IS/IT related change initiatives. It argues that successful business transformation is not only dependent on using appropriate technology, but also on the adequate consideration of behavioral/pragmatic aspects and necessary formal/structural adjustments. The paper is divided into five sections. Following a brief introduction, literature on evolving organizational forms is reviewed. Section three presents case studies from British Petroleum, Asea Brown Boveri and John Brown Engineering. Section four discusses and summarizes key findings. Section five presents the conclusions and future research directions.
2. Dynamics of Change

Organizational changes driven by the emerging economy trends of liberalization and intense competition are witnessed against the backdrop of the electronic age. Backhouse [2] refers to these emergent arrangements as ‘Information Networks’ where organizations are not characterized by physical assets but by a “network of individuals who create, process, hold and distribute information”. The researchers’ views on IT enabled organizational changes can broadly be classified into three categories based on the focus they accord viz. Pragmatic/behavioral focus, formal/structural focus, and technology focus.

Pragmatic/behavioral focus on the organizational changes points at a cultural change in individual and group behaviors and a change in business practices through formation of intra and inter-organizational teams facilitating intense information sharing among them. According to Charan [5], formation of core groups or alliances within organizations is based on individuals drawn from various levels of hierarchy as well as from different functional disciplines and geographical locations, interacting with each other. The core group forms the network entailing a strong information linkage between them. The relationship between the members of this group is not only formal but also informal which results in a significant level of social coherence. Manifestations of inter-organizational teams are evidenced through the increasing number of strategic alliances cutting across organizational and national boundaries. Organizations become “location and structure independent” ([15]; [9]) and are constantly influenced by the changing nature of their environment. This pushes them to make collaborations within and beyond the confines of their firm ([3]; [18]). Both electronic and human networks support these collaborations. Increasingly individuals and companies are setting up such transnational networks that pay absolutely no heed to national boundaries and barriers [1]. Many Multinational corporations made an entry into the East European countries and other developing Asian economies in 1990s through strategic alliances with local leading companies. For instance IBM alliances with Kvant in Russia, Coco-cola’s and Pepsi’s entry into Indian market etc.

Morgan [13] traces the evolution of organizational structures from traditional monolithic, centralized and hierarchical organizations into loosely coupled organic networks. The new organic forms strike a balance between radical decentralization; driven by the need for more responsiveness and autonomy to subsidiaries, and centralization that connotes stricter controls. Co-operation emerges as the key design principle in the new network organizational forms. Such structures facilitate intense sharing of information and a high level of inter-personal and inter-organizational connectivity. Keidel [10] argues that the traditional approach to organizational design, emphasizing trade-off decisions between centralization and decentralization, is too limiting. He recommends ‘organizational geometry’ as a way forward where co-operation assumes an equal status with control and autonomy.

The technological perspective on the organizational changes relates to the opportunities for the extensive exploitation of IS/IT. Nolan [16] originally argued that a ‘bureaucratic hierarchy’ adopted by most organizations could usefully be enhanced with an IS/IT-enabled network. The technological perspective considers these to be formed through the physical linkage of people and processes within organizations. Rockart [19] noted that the organization is seen as information rich, and by connecting information, people and skills together the firm in aggregate is more effective. This is to consider an IS/IT-enabled network as being fundamental to the management of functional, geographical, value chain integration and team support. In order to be more efficient, effective, and responsive organizations give prominence to the use of networks and IS/IT. Facing pressures of organizational costs containment and external competition, many companies are rushing headlong into adopting IS/IT. The objective is to support these co-ordination-intensive activities which are most prevalent in network organizational structures. Clearly, the complexity of this issue is the extent that IS/IT could indeed support these mainly non-coordinated activities. These have been termed by Englert, et al [6] as ‘ad-hoc-cooperation-processes’ where the technology is required to augment management practice.

Clearly, there is an extensive reliance upon the features of the technology to achieve these aims of an organization. However it is argued that since these new organizational forms entail increased informality, mutual trust and co-operation, leveraging of technological potential is contingent upon creating an appropriate information culture. The contention of this paper is that successful changes constitute equal importance to all the three dimensions of change namely pragmatic/behavioral, formal/structural, and technology. Over emphasis is on any one of the dimensions without being adequately complemented by other dimensions may lead to undesirable results. The network organization should have an information focus and not the technical emphasis commonly prescribed. This is evidenced through the following case examples where each organization has experienced dramatic structural change in recent years and has considered the opportunities for IS/IT exploitation.
3. Case Studies

This section describes cases from British Petroleum (BP), Asea Brown Boveri (ABB) and John Brown (JB). The purpose of the examples is to analyses the processes, main drivers and enablers for change in network organizations. Data collection was carried out through personal interviews, correspondences with different employees and published reports. BP, ABB and JB were chosen because of major organizational change efforts that the three organizations have been involved in and their claim that they were moving towards a networked structure. There is, however, no evidence of any company operating as a perfect networked organization but the gradual move towards embracing this concept is apparent within all three.

3.1. British Petroleum

The British Petroleum (BP) group has three core businesses: oil exploration and production; oil refining and marketing; manufacturing and marketing of petrochemicals. The original hierarchical form of the organization, with a large corporate center and a multitude of corporate level committees, required a significant review particularly at a time when the firm was badly hit with the world recession of the early 1990's and a situation aggravated by a unified European market. Consequently, the ‘Project 1990’ program was initiated. The program emphasized a restructuring drive that would help the company move from a hierarchical structure to a more flexible network model. The main impact of the program resulted in large-scale redundancies. A number of high level committees were drastically reduced and the corporate center was ‘down-sized’ by outsourcing several of the service divisions. The IS/IT department was one of the casualties of this downsizing trend followed by delayering of the management. The objective was to devolve more autonomy for decision making to the operating units. The hierarchically structure was replaced by small flexible teams where managers would network and create their own patterns of interaction. The new organization chart had no similarity with the traditional image of an organization. It consisted of sub-units or teams within a large corporate structure. While the CEO headed the organization, representatives of four committees (Audit, Compensation, Health, Safety and Environmental and External Affairs) undertook advisory roles and provide strategic directions for the overall functioning of the group.

A new form of relationship was developed with the suppliers by giving them a financial stake in the success of the project. This is was to enable cost cutting as crude oil prices continued to remain low where the shared services made a significant contribution towards savings. As the Chairman puts it “our aim is to add value by creating a whole that is greater than the sum of its parts” (BP annual report and accounts, 1993).

3.1.1. The Impact of IS/IT within BP

The restructuring initiatives within BP stressed the importance of multidisciplinary and cross-locational teams as a means for effective networking. Information sharing therefore emerged as a vital element in the new form. This has resulted in transforming the information infrastructure, which has lead to significant investments in IS/IT. An IS/IT manager at BP termed the earlier IS/IT set up as "hotchpotch". This was primarily because of incompatibility in the existing software and hardware tools. The organization was very poor in maintaining standards. This often resulted in compatibility problems. Commenting on the state of electronic communication, the IS/IT Manager said that since different functional groups chose their own communication software, it was often difficult therefore to engage in inter-group activity.

In parallel with developing an organizational climate conducive for new working patterns, the information systems department had to revamp the information infrastructure. As a first step, corporate wide hardware and software standards were established. Since the adoption of new technologies was not a priority, a concerted effort was made to move towards an information culture. This resulted in stress being placed on enhancing awareness about existing simple office tools such as spreadsheets and word processing. Continuous training and help desks assisted in establishing a comfort factor among the users. New technologies were introduced at a gradual pace, often after pilot testing and assessment of imminent needs. Co-ordination between BP sites was seen as a serious problem. To develop mutual trust among the members with different views and cultural backgrounds workshops were conducted allowing the free airing of ideas. Moreover, this provided a chance for face to face interactions to know and understand each other. For instance, the BP Health, Safety and Environment technology team followed a theme-based approach to the formation of groups. Thus, each individual technologist contributed as a member of at least one, and frequently several, themes. In the new BP style changing culture meant changing 'the way we do things around here' through a framework for cultural change termed ‘OPEN’ (Open thinking, Personal impact, Empowering and Networking).

3.2. Asea Brown Boveri

Within Asea Brown Boveri (ABB) the major breakthrough was the formation of a new organizational form through its merger with a Swedish electrical
engineering company (ASEA). Asea Brown Boveri currently employs more than 200,000 people and is spread geographically across the world. In one of the Financial Times/Price Waterhouse surveys, ABB has been cited as a model multinational industrial enterprise. In theory it follows a matrix structure entailing complex interconnections. The corporate center of ABB is located in Zurich where the executive committee determines the company strategy, identifies key competitive strengths and sets the geographical priorities. Although the central executive committee advocates a strong centralized reporting structure, the transformations over the years have resulted in nearly 1200 units. These are spread across various countries, each being further sub-divided into profit centers employing approximately 45 people. Following the merger with ASEA the development of ABB took place in two phases firstly dominated by acquisitions and reducing excessive capacities and the second a consolidation phase. ABB also eliminated intermediate layers of control thereby transferring additional responsibility to the operating units. The first level of networking at ABB resulted in the clustering of identical businesses of the company around the world. This resulted in the formation of business areas and management groups. While the groups were responsible for taking a global view in their particular markets this facilitated development of a global strategy for companies within that particular business area. Besides setting worldwide standards for cost, quality and performances managers also determined the allocation of export markets for each unit and the optimal allocation of research resource and expertise. Activities of purchasing and supply management were also allocated to the Business Area leaders. The actual location of the Business Areas is dependent on the geographical area in which they operate.

The second level of networking resulted in national level clusters. Such clusters are headed by a country Chief Executive Officer (CEO). The main responsibility of a country CEO was to manage ABB resources with a strong country focus. This country-based focus balanced the specialist emphasis of the Business Area leaders, thus helping to synergise the efforts. Since every country CEO was required to concentrate on national level issues, it helped in harmonizing company's objectives with national interests. This is an important issue especially for countries with emerging economies. In India, for instance, ABB is striving for joint ventures and take-overs in the energy sector. Currently the sector is in the control of the central and state governments where the operations are by no means run efficiently. Hence and redundancies following a take-over becomes a serious national issue. Consequently the CEO had to plan ways and means to handle the situation which calls for a close co-ordination with the governmental agencies. Abetted by the new structure ABB has been very successful in managing its business.

3.2.1. The Impact of IS/IT within ABB

ABB’s style of working involved the formation of multinational teams to look at problems and solutions. The small teams at the level of business areas were built by people drawn from different nationalities. The teams had to travel widely, gain first hand knowledge of national issues and were required to interact with people at local level. At times when there was a risk of the teams reverting back to national groupings where the CEO interfered in the hiring decisions, thus acting as a control agent. In addition, members of the same function from across the national boundaries were allowed to meet once or twice a year to exchange their experiences. The meetings were often considered as a means for creating personnel contacts and networks. During such meetings, the performance data of each unit was widely publicized. This was an integral part of the information exchange program at ABB. The inherent purpose of all these activities was to maintain a good communication among employees such that coherent working patterns could be established. Communication channel redundancy is an accepted practice at ABB to ensure that messages do get communicated. It has been reported that there is however doubts about the intentions to share such information. The CEO feels that there is a "strong tendency amongst European managers to be selective in this respect Taylor [21]. Within ABB the important potential of information technology became evident through the development of a corporate-wide database of experience and expertise of people. This greatly helped in matching the group themes or issues with the available skills that could contribute to a theme. However, the success of the database depended on how often it is being updated.

3.3 John Brown Engineering

John Brown Engineering was founded in the 1830s and by the time the company was acquired by the diversified Trafalgar House Group in 1986, it had built a global presence through a collection of relatively small offices around the world. Each office ran its own show, offering a local service to local customers. Offices had their own areas of expertise, skills and culture; they inherited within the old company structures. The management at the top of the engineering division recognized the strength of the cultural heritage and unique skills in these independent companies and wished to preserve them rather than rationalize or homogenize into larger masses. But, the size of many of the offices restricted them to bidding for small projects, or to taking-on contract staff to man larger projects as typically, a large project might require up to 40% extra temporary
manpower, which was considered both expensive and inefficient. Also, small offices rarely had all the skills required for large projects, finding these skills from other parts of the organization would incur travel and time costs for the rest of the Group.

The increased competitive scenario particularly from driven by the low cost, hi-tech competition from the East has become a matter of serious concern to John Brown Engineering. For example, Hyundai and the Agip oil field project off the coast of Libya. John Brown had won the contract for design and project management, but construction went to Hyundai - based on the company's hi-tech, low cost proposition - said a John Brown senior manager. Winning big projects, from companies, which were becoming more global in their outlook, was seen by John Brown top management as essential for the company's future. These were the bread-and-butter contracts that allowed predictability in earning streams and cash flows back to John Brown. There were also the beginnings of a trend from these customers for finding more cost-effective ways of working with contractors. Though the local presence through its offices spread across the world, provided John Brown with good 'shop window' visibility, and knowledge of local requirements and peculiarities, they lacked the ability to take on big projects to emphasize its global presence as compared with its key competitors. A long term survival in the Engineering & Construction business meant a global presence with a friendly local face; a low-cost, but comprehensive mix of services; the ability to deliver on both large and small projects; plus the skills and means of developing long-term, problem-solving relationships with clients.

Aiming a global client while retaining the local strengths, John Brown pivoted its strategy on creating virtual global business teams, much like the business area concept of ABB. The new way of working involved a high degree of collaborative working among experts sitting in far-flung offices. John Brown Engineering exploited the IS/IT potential to this end in linking all the offices to John Brown International Network (JOIN) and adopting common standards and platforms. Though there were hostilities, obviously because of diverse cultural backgrounds and practices followed by various units, such hostilities were evened out through a careful and balanced implementation process. The process involved a significant amount of technological changes moving from the older proprietary systems to an integrated environment sharing common platforms and applications. To steer the technological changes, John Brown developed a network of functional champions. The construction division IS/IT manager explained the process as: ‘We try to involve as many people as possible, the people who are going to be using it. We have a lot of requirements to satisfy from major projects. We are skeptical about the software industry; we do not believe what people tell us, so we knew we would have to do lots of pilots to take the product into the businesses and try them out for real. There is no better way of testing a program than running a few tenders through it. You soon learn how easy it is to use and how good the functionality is.’

### 3.3.1. Impact of IS/IT within John Brown Engineering

A single IS/IT strategy document was published for Trafalgar House Engineering Division, based on detailed review conducted across the division by the business community. Packages were the preferred approach whenever possible. But in some cases, John Brown had to develop its own software to allow it to differentiate itself from its competitors and deliver its strategic vision. However all developments were undertaken within a clear IT framework of technical standards etc. In particular developments that John Brown undertook themselves included JOIN (John Brown International Network), the global, high speed network which was to provide the electronic corridors to the global office. The network had to accommodate client/server computing between around 8000 PCs, 700 CAD workstations and over 170 corporate UNIX servers in 40 diverse locations. Whilst the technology was not particularly innovative, John Brown worked innovatively with 3Com, the US computer networking company to develop a form of advanced data compression, enabling cheaper and quicker information transfer along JOIN. The company boasts that JOIN responds within half a second, even between London and Melbourne - any longer and users would not feel they were in the same office - said a global office enthusiast. John Brown was innovative in the way in which they combined bespoke and standard packages to deliver overall functionality to the business (e.g. ENGINES for data, SCOPE for project management and NAVIGATOR for document retrieval.). Twelve potential estimating packages, all fitting the company’s requirements for Unix-based multi-user systems, were identified initially by the functional champion. This was whittled down to four to undergo rigorous demonstrations for potential users. The demonstration phase resulted in a choice of one package for full-scale piloting. It was installed in two regional offices and tested on major projects. A primary objective of the piloting phase was to test the quality of support for the system. New systems were introduced in a phased manner.

Gradually, a standard practice emerged where project manager from the user community, was in charge of introducing new systems company-wide. He would assemble a team to go to the office wishing to implement.
In this case, the team worked out how to migrate from the legacy to the new system and created a plan. This, warts-and-all, was presented to the top team at the implementing office as well as to the client to make sure all knew the implications and to reassure both that they were not going to pay any of the incurred costs. This achieved, the team from John Brown, a team composed of personnel who had been closely involved with the new system’s development, provided user training on-site. This helped build trust in the new system and ensured as smooth a transition as possible from old to new.

4. Discussion

Both ABB and BP relied on the conventional communication links such as telephone and fax, which are further augmented by information exchange over EDI links and electronic mail. ABB’s executive committee in Zurich regularly collects the performance feedback through their centralized reporting system, the Abacus, which provides monthly data of all profit centers. However, face to face meetings are still considered to be of utmost importance by both BP and ABB, in order to develop mutual trust and co-ordination. In the case of John Brown, IS/IT played a key role in enabling the collaborative working of experts from various offices spread across the world through networking and choice of common application platforms for working. IT in this case was considered a key leverage point in company’s objective of taking up global and big projects. Though IS/IT’s importance here is undisputed, the successful implementation of new applications and systems to enable team working could primarily be attributed to the meticulous and cautious implementation approach bringing in functional experts as ‘champions’ of the application development process and maintaining their participation throughout the project. Such an approach sought to minimize the resistance anticipated due to cultural differences and varying work practices in different offices.

In the light of the above discussions about some organizational attempts towards networking and the type of IS/IT support they have, we find that although these organizations realize the importance of IS/IT in their new forms, their main thrust is to find ways and means to build better teamwork and mutual trust. They do not seem to depend entirely on information technology for achieving this objective. Rather they believe that teamwork and mutual trust can be attained only through intensive efforts to bring people together to provide open forums for cultural exchange and by creating an informal atmosphere. Experience of BP Health Safety and Environment team and the cultural exchange programs exemplify this point. Similarly ABB also finds, traveling and personal contacts as the key to creating cultural harmony. However, this does not mean that IS/IT is of less significance. The technological proclamations have bought in many products in the market from E-mail and Fax to Groupware, multimedia. These products indeed provide support in developing group dynamics. The networked organizations discussed in the previous sections have put into use these products, though to a limited extent at present. The advent of the new products may create an illusion that intensive electronic integration is absolutely essential for networked organizations to survive, where as the findings of this study suggests that use of IS/IT has been incidental to the success of networked organizations.

While the three case examples above illustrate successful change to new organizational forms, where emphasis was more on a ‘soft networks’ thus enabling organizational integration, it may also be worthwhile to look at another case where an attempt to implement a large scale integrated system was made (focussed on ‘hard-wiring’ and automation). The case examines the development of a large information technology project in a major multinational chemical corporation. The system studied was a commercial system, a large-scale networked system designed to carry out customer order processing, provide corporate level stock control, and facilitate dispatch and distribution management. The implementation of the system involved integration across the organization distributed geographically over a wide area and functioning style and structure of different plants varied. The initiative of the system was business led and was considered of strategic importance to the business. Prior to the launching of the new system there had been a multiplicity of local commercial systems. However the implementation of the system met with several problems causing resulting in cost and time overruns. Apart from the technical and project management problems, the author notes that there were problems arising from the organization structure of the company. There appeared a difference in the perspective of various sites as regards the changes envisaged, lack of smooth interactions and internal power conflicts.

This case example further reinforces the argument that system integration or networking is not the solution to organizational dynamism, but it is the organizational culture which matters and cultural change is not a technological phenomena. Instead the organizational culture is one which is evolved through continued interaction of people’s values and beliefs and organizational systems and institutionalized over a period of time. Gerhard Schultmayer, the chief executive of Siemens Nixdorf Information systems (SNI) believed that a company could make extreme changes if these are supported by changes in communication. He has championed a company-wide cultural change program through a “change agent program” wherein high-potential
individuals are selected each year are selected to work in teams on special projects. SNI used electronic mail as a key technology in supporting their initiatives.

5. Conclusion

While land, labor, capital and machinery were considered as key inputs in an industrial economy, today's information based economy relies on knowledge as one of the most important assets of an organization. No doubt, IS/IT is viewed as the potential media in perpetuating the knowledge enabling people to share the knowledge.

The case examples discussed in this paper demonstrates that organizational changes driven by the current competitive environment encompasses multiple dimensions of change which include not only formal structural changes and use of technology, but also a set of pragmatic initiatives aimed at improving the organization culture. The new organizational forms entail intense information sharing and communication between individuals and peer groups with in and outside the organizational boundaries. Advanced IS/IT usage is obviously an important factor as the very nature of the changes demanded pivots on richness of information and information sharing, as Powell [17] points out, over-emphasis on technology and systems has encouraged organizations to exclude many other factors which influence their structure.

The institutionalized culture in many of the organizations are characterized by hierarchy and controls which differs widely from the cultural norms evidenced in successful network forms discussed in the above case examples. This would mean that unless the underlying characteristics of the organizational culture finds an enabling match in the solutions propounded by the new IS/IT tools, it is unlikely to establish and sustain a productive use of technology in the organizations. The case examples also demonstrates that, in a professional environment common goals are more important while technology can play a complimentary role.

6. References

