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Schizoid Incoherence, Microstrategic Options, and the Strategic Management of New Organizational Forms

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Most musings on the strategic management of new organizational forms—e.g., loosely coupled systems, information-technology-enabled networks, and virtual organizations—exhibit two fundamental research weaknesses. First, the “new organizational formists” are insufficiently grounded in research on old organizational forms and old organizational strategies. Second, most studies of new organizational forms are insufficiently grounded in data from the new organizational forms they purport to explain. This leads to a situation in which chroniclers of an important change in organizations are too-often ignored because they are atheoretical and aempirical. This study of John Brown Engineering & Construction’s adoption of an explicit information technology strategy provides a specific research context in which to consider three related phenomena. The first phenomenon is the continual movement in organizational forms, from firms, to bureaucracies, to institutions, and—most recently—to loosely coupled systems, information-technology-enabled networks, and virtual organizations. The second phenomenon is the continued accumulation of strategic options: cost leadership, differentiation, strategic alliances, vertical integration, diversification, globalization, and merger and acquisition strategies. The third phenomenon is the notion of “schizoid incoherence,” a condition common to sensemakers, decision-makers, and strategy makers in which there are numerous possible directions to take.

Most musings on the strategic management of new organizational forms—e.g., loosely coupled systems, information-technology-enabled networks, and virtual organizations—exhibit two fundamental research weaknesses. First, the “new organizational formists” are insufficiently grounded in research on old organizational strategies and old organizational forms. Second, the “new organizational formists” are insufficiently grounded in data from the new organizational forms they purport to explain. This leads to a situation in which chroniclers of an important change in organizations are too-often ignored because they are atheoretical and aempirical.

This is a study of John Brown Engineers & Constructors (John Brown). John Brown has a proud heritage dating back to the 1830s. They were acquired in 1986 by Trafalgar House Group, which acquired Davy International in 1991 and combined the firms to create an engineering and

construction firm ranked third in the world, after the U.S.-based firms Bechtel and Fluor Daniel. In 1991, John Brown had 25,000 employees in 182 offices in 30 countries. In the 1990s, John Brown adopted an explicit information technology strategy which allowed it to become one of a new-generation of information-technology-enabled success stories (Dhillon and Lambert, 1996).

John Brown provides a specific research context in which to consider two related phenomena. The first phenomenon is the continued accumulation of microstrategic options: cost leadership, differentiation, strategic alliances, vertical integration, diversification, merger and acquisition, and globalization strategies (Barney, 1997). The second phenomenon is the notion of "schizoid incoherence," a condition common to sensemakers, decision-makers, and strategy makers in which there are numerous possible directions to take (Greenwood and Hinings, 1988; Hinings and Greenwood, 1988).

OLD SCHIZOID INCOHERENCE

In a thorough analysis of strategic organizational change processes, Hinings and Greenwood (1988) mapped a series of "organizational tracks" by which organizations changed from one design archetype to another design archetype (Greenwood and Hinings, 1988). In an idealized linear transformation from Design Archetype A to Design Archetype B, there is a mid-point at which the organization is presumed to be half-A and half-B. Hinings and Greenwood referred to this point on the organizational track as a brief period of "schizoid incoherence." In our research on loosely coupled systems and information-technology-enabled networks, we have come to believe that schizoid incoherence is not a temporary condition in complex organizations. Instead, we notice firms in a constant state of schizoid incoherency.

Martin (1992), in her analysis of the corporate culture literature, noted a similar phenomenon. In the early stages of culture research, researchers believed in Paradigm 1, an Integration Paradigm, in which organizational members were presumed to share a common set of values and beliefs. In the middle stages of culture research, researchers believed in Paradigm 2, a Differentiation Paradigm, in which organizational culture was presented as the interaction of several subcultures. In late stages of culture research, researchers believed in Paradigm 3, a Fragmentation Paradigm, in which individual organization members manage a portfolio of subcultures which slice through the organization. The movement from Paradigm 1 to Paradigm 3 is a movement from infrequent and short periods of schizoid incoherence to constant, long periods of schizoid incoherence. The organization does not know if it is currently in Design Archetype A, B, C, D, E, F, or G, and it does not know if it should try to move toward Design Archetype T, U, V, W, X, Y, or Z.

To make some sense of schizoid incoherence, we use the John Brown case in 1995 to exemplify a firm at a point of schizoid inco-

herence. Although John Brown has reinvented itself as an information-technology-enabled loosely coupled system, we find that its own particular brand of schizoid incoherence in 1995 can be clarified by the application of standardized analyses from strategy (Barney, 1997). We argue that in their quests to reduce uncertainty, new organization forms need not be divorced from old organizational strategies.

Instead, we find it helpful to shift the focus from macrostrategies to microstrategies. Simon (1976) noticed earlier than most theorists that there was a correspondence between 1/ the bounded rationality of organizational members, 2/ the loosely coupled nature of organizational forms, and 3/ the value of small modules of behavior. As uncertainty and ambiguity go up, organizations are moving from firms to bureaucracies to institutions to loosely coupled systems (Orton and Weick, 1990), which require more use of leverage points, logical incrementalism (Quinn, 1980), action rationality (Brunsson, 1982), and small wins (Weick, 1984). Mintzberg (1994) noted in his book, *The Rise and Fall of Strategic Planning*, that many corporations believed that strategic planning was giving way to strategic thinking and that strategic thinking was giving way to strategic action. We try to capture this meltdown in strategic theory by focusing not on large, complex, generic strategic plans, but on the identification of a set of microstrategic options.

OLD MICROSTRATEGIC OPTIONS

In 1995, when we join John Brown in its schizoid incoherent state, the firm has been successful with its information technology strategy. **Table 1** shows the 1994 revenues of the nine largest Design/Construction firms (Gale Research, 1995). John Brown's competitors are imitating its information technology investments, and they are thought to be 18 months away from providing similar capabilities. Inside and outside the organization, discussions are being held on what microstrategic options the firm has. We have grouped these options into seven categories provided by Barney (1997).

Table 1. 1994 Revenues of Nine Largest Design/Construction Firms (in millions of dollars)

Bechtel Group Inc.	6,429.0
Fluor Daniel Inc.	3,863.0
John Brown/Davy	2,337.0
Raytheon Engineers & Constructors Inc.	1,949.0
McDermott International Inc.	1,789.7
M.W. Kellogg Co.	1,055.3
Austin Co.	781.9
Foster Wheeler Corp.	695.0
Granite Construction Co.	693.4

Adapted from Gale Research (1995)

COST LEADERSHIP MICROSTRATEGIES

The first set of microstrategic options can be classified under the label of cost leadership strategies. John Brown in 1995 faced new low-cost, high-tech competitors from Asia. First, John Brown could work on leveraging its access to low-cost factors of production around the world. The creation of the John Brown International Network (JOIN), in which complex CAD (Computer-Assisted Design) files can be transferred around the world in times less than half a second long, provided the "electronic corridors" of the "global office." The capacity to quickly transfer complex files throughout the world makes it possible to route engineering tasks from higher cost areas such as Japan, the United Kingdom, and the United States, to lower cost areas, such as India. Less expensive resources in less expensive countries can be applied to reduce the overall costs of projects.

Second, John Brown could focus more attention on reducing engineering man-hours required on projects. Engineering man-hours are a large portion of the cost of engineering and construction projects. At the start of the 1990s, John Brown's senior managers identified a list of needs for the future. One of them was to find ways to meet customer demands for reduced engineering man-hours per project. The SCOPE software program now automates many design tasks, which allows for a reduction in engineering man-hours. The ENGINES system reduced the time required for an engineer to produce an electrical loop diagram (and a typical project could require approximately 2,000 of these drawings) from four hours to about 25 minutes. The time required to produce an equipment list was reduced from about 16 hours to about one hour.

Third, John Brown could develop a cost advantage by finding means to reduce Total Installed Costs of plants for its clients. This was the second objective identified by senior managers at John Brown in the early 1990s. To reduce the Total Installed Costs, John Brown focused on eliminating design flaws which are not discovered until after the original plans are made. The reduction of errors in the latter stages of a project has revolutionized the design process and cut costs at the same time. Three-dimensional "virtual" representations of plant equipment layouts, for example, allowed construction workers to forestall unworkable designs while those designs were still on the drawing board. British Petroleum observed that John Brown's systems had reduced their Total Installed Costs by 21%.

Fourth, John Brown could focus attention on the reduction of information duplication. This was the third objective identified by senior managers. In the 1980s, engineering plans existed in the organization from several stages of the project. Paper copies accumulated in offices around the world and there was confusion about which plans were outdated, which were current, and which needed to be revised. In John Brown's global office, the Navigator system now serves as the single document repository. By placing designs on information technology systems, it became possible to keep continually updated plans on the network, reducing the confusion caused by information duplication.

Fifth, John Brown can use its global network to reduce travel and lodging expenses incurred per project. John Brown has 25,000 employees at 182 sites in 30 countries. If one of those sites controls a relationship with a client who wants to build a complex plant in another part of the world, a less networked firm would be tempted to send the controlling site representatives to another part of the world to do the engineering and construction work. By investing in its global network, John Brown is able to encourage cooperation between sites which reduces the amount of required travel and lodging expenses.

DIFFERENTIATION MICROSTRATEGIES

John Brown also faces a variety of microstrategic options which can be classified under the label of differentiation strategies. First, they can continue to invest in information technology as a way to differentiate themselves from Bechtel, Fluor Daniel, and other competitors. The general consensus in the industry is that John Brown is clearly out in front of the competition in terms of integrated Information Technology (IT) systems. The company has won several awards for its information technology prowess, including the UK and USA Open Systems User of the Year awards, the Sunday Times IT for Business Excellence award, and Arthur Andersen's award for Technological Innovation in IT. For five years, the Trafalgar House Group invested \$16 million a year in information technology at John Brown, which led to a worldwide recognition of John Brown as an information technology leader. If, as threatened in 1995, the Trafalgar House Group were unable to continue this funding, prospective clients might see this as a decreased commitment to an important factor of differentiation.

Second, John Brown can use its information technology to differentiate itself from its customers on the basis of speed. John Brown worked with 3COM to develop innovative compression algorithms to use with the JOIN system. They achieved a demanding benchmark: any response slower than half a second meant that users would not feel they were in the same office. An early way to increase speed through information technology was by concurrent engineering, in which multiple offices could be applied to a single project. John Brown moved from 12 mainframes to a more distributed system of 8,000 personal computers, 700 CAD workstations, and 2 mainframes. A more advanced way to increase speed is to move projects around the world in a global rotation. John Brown can create 18-hour, 20-hour, or 24-hour work days which begin in Tokyo, pass through New Delhi, London, and New Jersey, and end in San Francisco. The presence of 182 sites in 30 countries allows for complex routings of projects through time zones to decrease the number of weeks and days a project requires.

Third, John Brown can differentiate itself from its competitors on the basis of customization. British Petroleum and ICI have chosen to use John Brown on engineering and construction projects because John Brown is able to create specially designed systems constructed

around BP's and ICI's internal protocols for information sharing. These capacities to specialize have helped John Brown secure lucrative long-term contracts ahead of its direct competitors.

Fourth, John Brown could focus more attention on differentiation by product mix. John Brown is trying to have a low-cost, but comprehensive mix of services and the ability to deliver on both large and small projects. To have credibility for the large projects, they have invested in global information technology. To have local contacts for the small projects, they have retained their 182 offices in 30 countries. They attempt to cover both engineering and construction.

STRATEGIC ALLIANCE MICROSTRATEGIES

The third category of microstrategic options is strategic alliances. First, John Brown can position itself as a strategic partner with many of its clients. John Brown now supplies key clients with its software and spends twelve weeks on-site training clients in the use of the new software. DuPont's Vice President Howard Todd and Merck & Co.'s Vice President of Manufacturing Rick Weed now state that "John Brown has the best systems in the business" and both firms use the systems developed by John Brown as their "corporate standard worldwide".

Second, John Brown can develop strategic alliances with its clients around other business areas as well. The last item on the list of five success-oriented objectives listed by John Brown senior managers in the early 1990s was to take advantage of new opportunities which might become available as large oil and pharmaceutical companies outsourced "non-core" activities which could become lucrative additional revenue streams.

Third, John Brown can position itself in strategic alliances with some of its suppliers, such as 3COM or Oracle. In a strategic alliance, John Brown and a supplier would agree to jointly provide a service to a third party.

VERTICAL INTEGRATION MICROSTRATEGIES

The fourth broad category of microstrategic options is known as vertical integration strategies. Porter's (1980) strategy text presented the infamous five forces model: threats from suppliers, competitors, clients, potential new entrants, and potential substitutes. In Porter's next text (1985), less attention was paid to potential new entrants and potential substitutes, and more attention was paid to specific stages of the value chain between suppliers, the firm, and the clients. These texts summarized and encouraged growing attention to the value chain, the value constellation, the value network, or the value system.

One option for John Brown is to vertically integrate backward with some of its suppliers. John Brown uses many suppliers: construction

components, construction equipment, design hardware, design software, and information systems suppliers (e.g., 3Com and Oracle). John Brown could integrate backward by acquiring one or more of these suppliers. For example, if John Brown became highly dependent on a division of Oracle to provide services to its customers, and if Oracle felt that its strategic interests were best served in other industries than engineering and construction, John Brown could vertically integrate backward by acquiring a division of Oracle.

A second option for John Brown is to lightly vertically integrate forward with some its clients. In the 1980s, John Brown's relationships with its clients were described as adversarial: clients claimed that they needed 150 of their people to mark "man-for-man" 150 of John Brown's people to check for errors. A fourth objective for senior managers at John Brown in the early 1990s (after reducing engineering man-hours, reducing Total Installed Costs, and reducing information duplication) was to maximize client satisfaction and get closer to the client. Managers at John Brown believe that they have been able to change the relationships from an adversarial relationship to a relationship based on trust.

A third option for John Brown would be to heavily vertically integrate forward with an acquisition or the development of a new downstream business. In an acquisition, John Brown would acquire a small downstream client or a small division of a downstream client. In an in-house development of a new downstream business, John Brown would forward integrate by creating a new capacity, such as a manufacturing division of its own.

DIVERSIFICATION MICROSTRATEGIES

The fifth general category of accumulated microstrategic options is diversification. Many firms look for related businesses which would allow them to leverage existing capabilities. John Brown could move into a variety of new businesses. First, John Brown could serve as a digital archive for plans, a capability known as "data-for-life." One of John Brown's software systems, labeled ENGINES, is used for data storage and manipulation. The creation of new devices which can convert plans, documents, or previously digitized plans into files in the ENGINES system opens the possibility for John Brown to enter the new business of "data-for-life".

Second, John Brown could start bidding for so-called "brownfield" maintenance contracts. The advantage of diversifying into facilities management is that the revenue streams are guaranteed by 30- to 40-year contracts. John Brown's 182 offices in 30 countries around the world give it a global presence which it could use to move into the facilities management business. Another reason to move into this industry is that John Brown's engineering, construction, and facilities management businesses could provide important learning benefits to each other. John Brown Engineers & Constructors would become John Brown Engineers, Constructors, & Facilities Managers.

Third, John Brown can leverage its information technology group's skills by creating an IT consulting business. Peters (1992) has long argued that the best test of a staff unit's capacity to add value in an organization is whether or not other organizations are willing to hire the staff unit. Thus IBM has developed a variety of consulting units over the years, BMW has a design unit which works on projects outside the automotive industry, and most university print shops accept tasks from entities outside the university. Although John Brown's managers have emphasized that their intent was to concentrate on engineering and not develop software or networks, the company in fact developed considerable expertise in these areas. For example, they employed a Rapid Application Development (RAD) approach, traditionally held to be the fastest way to develop software. As one manager stated, "The classical methods for developing software just don't work... Now we deliver prototypes as soon as is feasible and develop from there".

John Brown can leverage their own success in creating an information-technology-enabled organization by analyzing the needs of other organizations, modifying and installing their software, and training other firms' employees in the use of the technology. Under this scenario, John Brown's information technology staff could be redefined from a cost center to a profit center.

Fourth, John Brown could reevaluate its commitment to the construction part of its business, and focus more attention on the engineering side where it has invested so much money in information technology. This is not a diversification strategy, but a de-diversification, or specialization on a stage of the value-chain strategy. John Brown's small offices around the world are able to tap into the global network to win large design contracts, but they do not have similar capabilities when it comes to building the actual plants, and they have gone on to lose the construction portion of the contracts to competitors.

GLOBALIZATION MICROSTRATEGIES

The sixth category of microstrategic options fall under the label of globalization strategies. First, John Brown could continue to invest in new sites throughout the world. John Brown has invested in the creation of 182 sites in 30 countries. These sites give John Brown local "shop-window" visibility and provide local responsiveness. These offices provide several strengths—convenience to clients, understanding of cultural heritage, familiarity with local regulations, and a mastery of local business peculiarities. The IT investments made by John Brown complement the local responsiveness with global connectivity, so that although there are 182 offices, John Brown is able to argue that they have 25,000 employees in one big office. John Brown tries to achieve a standard it refers to as 'a global presence with a friendly face'.

Second, John Brown could try to reshape their 182 sites around regional hubs. The global rotation which allows for 18-hour, 20-hour, or 24-hour workdays could be run through the regional hubs, rather than through the smaller sites, thus saving resources on global communi-

cations equipment. The use of a regional hub strategy would also allow John Brown to reduce the size and power of its London office and decentralize control closer to project sites around the world.

Third, John Brown is able to identify, nurture, and route projects to offices which have specific capabilities. Through a skills database, John Brown is able to practice a form of world sourcing in which projects which require certain rare skills can be routed through the John Brown Information Network (JOIN) and Navigator to sites which maintain those specialized skills. This transnational global strategy (Bartlett and Ghoshal, 1989), in which the world is seen as a global chessboard around which projects can be moved, has helped John Brown attract and retain clients. Strengths in particular offices can be tapped readily through John Brown's information technology.

Fourth, John Brown could play an economic patriotism card by presenting themselves as the only non-American top three engineering and construction firm. U.S.-based Bechtel and Fluor Daniel have approximately \$5 billion in revenues compared to John Brown's \$2.5 billion in revenues in 1995. John Brown could position itself as a non-American supplier to non-American firms in the territory known euphemistically by American firms as ROW (Rest Of the World).

MERGER AND ACQUISITION MICROSTRATEGIES

The seventh category of microstrategic options is merger and acquisition strategies. First, John Brown could try to persuade the Trafalgar House Group to sell off one or more of its other divisions in order to provide more cash to invest in information technology at John Brown. The Trafalgar House Group has been investing \$16 million per year on the improvement of Information Technology systems, but Trafalgar is having a bad year overall in 1995, and may not be able to continue investing in John Brown's information technology. One solution might be to convince the Trafalgar House Group to focus attention on John Brown and Davy International, and to focus less attention on or sell other divisions, such as the Cunard cruise ship line.

One microstrategic recommendation for John Brown is to campaign the Trafalgar House Group to sell the John Brown subsidiary to another corporation. The Trafalgar House Group, though, is predicting a loss of 200 million pounds (\$320 million) in 1995. Faced with a reduced investment from the corporate level, the John Brown subsidiary could position itself to be acquired by a better-performing corporation by arguing that the Trafalgar House Group would need the resources to support its other subsidiaries.

A second microstrategic option would be for John Brown to campaign to have Trafalgar House as a whole purchased by a stronger corporation. The Trafalgar House Group is described by John Brown managers as being hard-hit by the recession, in which they "saw the heart fall from its profit-making interests elsewhere in the Group" (John Brown internal document). There are rumors in 1995 that Trafalgar House will make a demand for cash for the fourth time in five years. If

John Brown is to continue to thrive in its industry, it may need to work to position the entire Trafalgar House Group for a takeover by a firm that is better able to exploit the opportunities that John Brown's information technology has created.

OLD SCHIZOID INCOHERENCE, OLD MICROSTRATEGIES, AND THE MANAGEMENT OF NEW ORGANIZATIONAL FORMS

Of these numerous microstrategic options faced in 1995, the one that was "chosen," was the last one listed: sell Trafalgar House Group to a stronger corporation.

John Brown's new parent company is the Norwegian group Kvaerner ASA. Kvaerner's operating revenues for 1996 were \$8.4 billion, and the Kvaerner E&C division employed more than 11,000 people in 55 offices worldwide before the acquisition of Trafalgar House Group. Kvaerner is reviving its engineering and construction operations. They have agreed to bid on large construction projects in India, and required government approvals have been received. The Trafalgar House Company was previously forced to bid on large contracts as a subcontractor because of its relatively small size, but Kvaerner now offers the financial resources which make it possible for Trafalgar House Company to make and win bids as contractors. Kvaerner also finances internal technology transfers with royalties of 1.25%, which helps make it possible for John Brown to continue investing in information technology (Financial Times, 2000).

The analysis of John Brown allows us to suggest three important points for researchers enamored of "new organizational forms" such as loosely coupled systems and information-technology-enabled networks.

First, it is not a new thing for organizations and the people in them to find themselves in a relatively permanent state of schizoid incoherence. It is not a condition unique to new organizational forms. Furthermore, schizoid incoherence is probably best responded to by microstrategic options than macrostrategic genius.

Second, organizations will respond to schizoid incoherence the way they have always done so, through the accumulation of microstrategic options. We have found it helpful to adopt a traditional categorization of generic strategy types as a sorting schemes for microstrategic options for John Brown. This suggests that perhaps people in schizoid incoherent organizations could also benefit from the structure of old, accumulated strategic options. When John Brown is acquired by Kvaerner, one of the options is exercised, but the accumulated portfolio of options remains for the organization's next phase of schizoid incoherence.

Third, we recognize that there is an ongoing movement in organizational forms, from firms to bureaucracies to institutions to a wide variety of new organizational forms. John Brown provides an intriguing case study of what a virtual organization, an information-technology-

enabled network, or a loosely coupled system might look like in 1995, but it is only a blip in the continual advancement of organization forms. In order to truly understand new organizational forms, scholars need to develop a little less breathlessness and adopt a longer term perspective in which there has always been schizoid incoherence, there have always been accumulated microstrategies, and today's new organizational form will always be tomorrow's old organizational form.

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