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BUSINESS GAMES AS STRATEGIC MANAGEMENT LABORATORIES

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ABSTRACT

It has been suggested complex, computer-based business games can serve as controlled strategic management research laboratories, yet there is little evidence on the validity of such approaches. This paper examines the degree that a sophisticated business game establishes the conditions and thus creates a laboratory whereby the field's Environmental Contingency paradigm can be investigated. Using Duncan's environmental uncertainty framework, the simulation was able to create contrasting objective environments but the study's participants incorrectly identified the nature of their environments and dealt with highly limited portions of the competitive environments presented to them. More importantly, the strategies that were implemented were almost uniformly incorrect for the competitive conditions posed by the simulation. These results suggest business games cannot be used as laboratories for studying the environmental contingency paradigm although they may be appropriate for studying phenomena associated with organizational learning and leadership/followership development patterns.

INTRODUCTION

It has been suggested from business gaming's earliest years that both human-based and computer-based simulations could serve as organization research laboratories (Bass, 1964; Cohen & Rhenman, 1961; Shubik, 1961). Early examples can be found in such studies into system-wide responsiveness, adaptation or organizational learning as those by Chapman, Kennedy, Newell and Biel (1959) and Cangelosi and Dill (1968). While this was originally a general call, the use of business games for controlled strategic management research has been more recently made (Nees, 1983; Schwenk, 1982; Lant, 1994). When advocating business games for such research, the general virtues of conducting laboratory-based organizational research have been stated both classically (Bass, 1964; Smith, Mitchell & Summer, 1985; Weick, 1965) and more recently (Dickinson, Gentry, Burns & Wolfe, 2005; Glynn, Lant & Milliken, 1994; Lant & Mezias, 1990; Keys & Wolfe, 1990).

If a simulation is to be successful at serving as a laboratory for the study of any phenomena, it must possess in its structure those elements that are idiomatic or indicative of the real-world situation it is attempting to emulate. Thus if the study's object is to obtain controlled insight into the politics and interpersonal maneuverings associated with arriving at a within-group consensus in decision-making situations, the relatively closed, human-based simulations such as *Looking Glass Inc.* (Lombardo, McCall & DeVries, 1990) or *The Organization Game* (Miles & Randolph, 1985) may be entirely appropriate. As cited in Thompson's (1967: 9) classic *Organizations in Action*, however, the Simon-March-Cyert (Cyert & March, 1963; March & Simon, 1958; Simon, 1957) tradition has inspired a research stream that looks at the organization as a socially created and environmentally-influenced "problem-facing and problem-solving phenomenon".

Because many large-scale, top management-type business games are available for organizational research, and because of the attractiveness and convenience of business game-based research, this paper presents a study that tests the degree to which players in a sophisticated business game recognize the nature of the industrial environment the simulation presented to them. This environmental focus has been taken because the nature of the management team's decisions are circumscribed, and the team's success is determined, by how well that environment has been dealt with.

LITERATURE REVIEW

When dealing with the organization's environment, an array of concepts has been used in the management literature. The "environment" can be one that lies inside or outside the organization (Boulding, 1978). It can also be one that is remote and lies far in the organization's background versus one that is more immediate and challenging. The former has often been referred to as the firm's general (Daft, 1998) or socio-political environment (Newgren, 1977; Wilson, 1974) comprised of elements or sectors that have little direct influence on the firm's activities or the decisions its managers make (Priem, Love & Shaffer, 2002). The latter, very immediate environment has been referred to as the firm's task environment (Thomson, 1967; Dill, 1958) or the

organization's domain (Levine & White, 1961). This is the environment the organization must interact with based on the field of action it has chosen for itself or has been forced upon it by pressures beyond its current control (Carlson, 1951; Pfeffer & Salancik, 1978).

Once the literature established that the firm operates as an open system, attention then turned to the features or patterns associated with the organization's environment, followed by how these characteristics had to be dealt with if the firm was to be successful. After determining that these different environments exist, it was then discovered each one required different managerial coping skills and company structures (Burns & Stalker, 1961; Duncan, 1972, Lawrence & Lorsch, 1967) Thus it has been found that the firm's environment has a direct influence on the organization's ability to survive given the nature of the resources available to it. These resources can run the gamut from being munificent or barren (Castrogiovanni, 1991; March & Simon, 1958; Staw & Szwajkowski, 1975), randomly distributed and available to all (Wernerfelt & Montgomery, 1986) or clumped and parceled out between firms in an unequal fashion (Dill, 1958; Emery & Trist, 1965).

Much conjecture and research activity has also been spent on the environment's (1) change rate or dynamism and (2) complexity as indicated by the number of information points that managers must process (Galbraith, 1974). This work stems from the belief the organization is an interpretive system that collects data, interprets that data and gives it meaning, and then chooses an action to be taken (Daft & Weick, 1984). Accordingly the organization's cognitive abilities come into play where there is the firm's (1) actual, physical objective environment, (2) a version of that environment that is perceived or constructed in management's mind, and (3) that part of the environment that is acted upon.

Many instruments have been created (Harrison, 2003) to measure the nature of the firm's perceived environment. They all, however, basically stem from those first created by Duncan (1969; 1972) and later Khandwalla (1977) and Miles & Snow (1978). In each instrument's case, company managers were asked the source or sources of any outside-felt uncertainties encountered while making decisions for their units. Miles & Snow developed a 25-item questionnaire to measure the predictability of the external environment's sectors comprised of suppliers, customers, competitors, financial/capital markets, government and labor unions. The Khandwalla four-item instrument measured the intensity of competition, dynamism and predictability of various sectors of the organization's external environment while Duncan queried managers in twenty-two decision units found in three manufacturing organizations and three research and development companies (n=122). *En toto* these instruments have in common the recognition that the organization's decision makers perceived they were unable to accurately predict the nature of the external environment which with they had to interact because of the environment's (1) number of elements found in their environments (can this be just changed to complexity?), and (2) the change-rates associated with those elements. The two factors of complexity and dynamism, in combination, led to the existence of the amount of uncertainty associated with the decision-making situation.

Regarding the actual, rather than the proposed use of computer-based business games as research laboratories, an inventory compiled by Dickinson, Gentry, Burns & Wolfe (2005) indicated seventeen different games have been used in thirty-two separate studies. The examination most relevant to this paper's strategic management-level objectives was that by Segev (1987). It used an Israeli version of *The NYU Management Game* (Kenner & Uretsky, 1989; Uretsky, 1973) that was, in turn, adapted from *The Carnegie Tech Game* (Cohen, *et. al.,* 1964) to determine the existence of any link between game player strategy, the strategic management process, and company performance. It generally found high correlations between the four Miles & Snow (1978) strategy types and Mintzberg's (1973) three strategy-making modes. Only partial support was found for the hypothesis that high correlations exist between strategy/strategy-making fit and firm performance. The failure of this hypothesis prompted the speculation that both the simulation itself, and the conditions within which it was administered, were inappropriate. For the former case, the game did not allow stock issues and loans to be used by the firms, as the study did not want to mirror Israel's then-rampant inflation. For the latter, it was noted that the participants were students and not managers, poor play did not damage their business careers, all activities were short-term and compressed, motivation to play was for grades rather than promotions or salaries and there existed attempts to "crack the game" rather than focussing on long-term results. There are additional indications, however, that the game used in the study was not appropriate. While Mehrez, Reichel & Olami (1987) found that the game accurately represented the oligopolistic nature of the country's detergent industry, as well as the role of export markets in the Israeli economy, its structure did not allow for the strategies of forward or backward integration, concentric or conglomerate diversifications or the number of ways by which a firm could differentiate the three brands it offered as well as the number of distribution centers that could be established in the countries available.

Faria and a variety of his colleagues have generated results that are even more condemning of a business game's ability to serve as a laboratory for studying environmentally induced player responses. Faria & Dickenson (2000), Faria, Whiteley & Dickenson (1990) and Whiteley, Faria & Dickenson (1990) found that players made decisions that were only moderately related to the demand factors that needed to be dealt with if they were to be successful. While the players sensed that changes in their competitive environments were occurring, they were very inaccurate regarding the amount of change that was coming about. Further evidence that players do not sense, or act upon the nature of their competitive situations, was found in the studies by Welling-

ton, Dickenson & Faria (1991) and Wellington & Faria (1997). In these two studies the industries possessed one perfect player. Each industry's live, student players were unable to follow or "learn" from the decisions made by the industry's perfect, artificial player even though the artificial player should have been emulated. Lastly, Wellington & Faria (2001) reasoned players might have had difficulty discerning the nature of their competitive environments due to the complexity of the games being played and this complexity factor was the possible source of their inability to understand their environments. In this study, players were engaged in PAINTCO V (Galloway, Evans, Berman & Wellington, 1997), a very simple five-decision game where only two environmental variables were manipulated. Even under these conditions, players were unable to understand the nature of their environments.

HYPOTHESES

For games to be used as laboratories, participant perceptions of the situation being simulated must be reasonably accurate. Otherwise, the researcher would not be able to draw valid conclusions regarding environmentally contingent participant behavior or outcomes in the game. Thus, this study examined whether participant perceptions of environmental complexity and dynamism reflected the conditions being simulated. The hypotheses have been stated in the form where a positive result indicated support for the use of business games as strategic management research laboratories for the study of environmentally contingent decisions and company performance. Thus a rejection of the hypothesis indicates the business game employed in this study could not be used in this type of research. The following hypotheses were tested:

H_1: Players in a business game having a simple environment will correctly identify that environment as being relatively simple.

H_2: Players in a business game having a complex environment will correctly identify that environment as being relatively complex.

H_3: Players in a business game that has a static environment will correctly identify that environment as being relatively static.

H_4: Players in a business game that poses an environment that is simultaneously simple and static will correctly identify that environment as being simple and static.

H_5: Players in a business game that poses an environment that is simultaneously complex and dynamic will correctly identify that environment as being simultaneously complex and dynamic.

H_6: Players in a business game enact environments that are appreciably smaller than the business game's objective environment.

METHODOLOGY

The study's subjects (n=44) were part-time MBA candidates enrolled in a capstone strategic management course at a southwestern university. As shown in Exhibit 1, they averaged 27.1 years of age with an age range of 23-43 years. The majority were male, had pursued undergraduate business degrees and occupied lower-management or staff positions in their companies. They played *The Global Business Game* (Wolfe, 2003) in self-selected management teams usually having three (3) players per team. The game itself is a relatively complex top management type game that has firms competing in the television set industry. Play ran for ten (10) decision rounds in three (3) separate industries with ten decision rounds simulating 2½ years of business operations. Though play ran through ten rounds, each firm's comparative profit performance was assessed after only eight rounds, to guard against recording the results of end-game strategies. That profit assessment accounted for 30.0% of the participants' grades in the course.

EXHIBIT 1
Participant Demographics

Age	27.1
Sex:	
Male	56.8%
Female	43.2%
Undergraduate Major:	
Business	63.6%
Non-Business	36.4%
Managerial Position:	
Upper	2.4%
Middle	21.4%
Lower	14.3%
Other	61.9%
Business Experience (Years)	4.0

Before the game began, all players were exposed to the strategic management field's basic concepts, strategies and tools, via the lecture and discussion approach. All players also had available to them, through the game's dedicated website as well as being cited in the game's Player's Manual, a variety of experiential exercises designed to help them create an integrated and responsive management team, set their firm's goals, analyze their competitive environment and to choose and implement an optimal strategy. The website also contained a number of Power Point presentations and Excel-based workbooks that handled many of the game's details such as determining a factory's proper maintenance budget, creating pro *forma* income statements and cashflow analyses, calculating a plant's wage bill, making advance purchases of raw materials and forecasting the yields on stock and bond issues.

When designing the game, its author attempted to insure that the "knowledge domains" of the fields of strategic management (Wolfe & Rogé, 1997) and international business (Klein, Fleck & Wolfe, 1993) were covered while also

EXHIBIT 2
Possible Strategies and Game Implementations

Strategy	Game Implementation
Low-Cost Leadership	Use least-expensive raw material mix. Produce products in the country or countries with the lowest labor costs. Replace expensive assembly-line workers with automated equipment. Pay minimum wages and commissions to sales force. Budget minimum advertising expenses. Budget minimal training programs.
Differentiation	Invest in R&D to obtain a unique Patent and differentiated product line. Become a Patent licensee. Seek to globally dominate one of the industry's price/quality segments.
Focus	Concentrate on only one TV set size. Focus on only one price/quality segment. Concentrate on only one country Focus on one Economic Zone.
Retrenchment	Exit a country, countries or Economic Zones. Cut back on the array of television sets either manufactured or marketed. Cut back on the number of channel participants used in a country or Economic Zone. De-emphasize the sales of one-sized set over the other or others. Decommission a factory or factories.
Divestiture/Liquidation	Sell off assembly-line capacity to others in the industry. Sell off Automaton capacity to others in the industry. Scrap a country's plant and equipment.
Concentrated Growth	Emphasize set sales in those countries or Economic Zone(s) with greater than average growth prospects. Emphasize sales of the set size with the greatest growth potential. Dedicate all efforts to manufacturing and selling products in the country with the greatest growth prospects.
Market Development	Enter all virgin markets available. In all markets invest heavily in advertising programs. In all markets pay the highest sales commissions in each market to spur sales. Create the greatest coverage of all geographic areas through the highest level of Sales Offices and Distribution Centers. Replace all Independent Wholesalers with Company-Owned Wholesalers to obtain dedicated channel participants.
Product Development	Obtain Patents by investing heavily in R&D programs. Become a Patent licensee if another firm obtains a Patent if the firm's own R&D effort fails to create Patents. Obtain a series of Patents, either from in-house efforts or through purchasing Patent licenses.
Horizontal Integration	Augment the use of Independent Wholesalers with Company-Owned Wholesalers. Replace all Independent Wholesalers with Company-Owned Wholesalers.
Joint Ventures	Share industry special reports. Subcontract television set output. Make Private Label bids. Sell manufacturing capacity to another firm; Re-badge the output for the company's own sales. Share new-product R&D efforts.
Domestic	Make and sell products only in the firm's Home Country. Insure that the products sold in the Home Country are uniquely fitted to its customers' needs.
Multidomestic	Compete in a limited number of countries. Establish manufacturing operations in the country(ies) where sales are contemplated.
Global	Compete in all countries available. Offer essentially the same product in each country. Manufacture the company's products from the single source that delivers the lowest system-wide landed costs.
Transnational	Compete in all countries available. Differentiate the firm's products into three quality/price categories. Dedicate one plant in the country in each Economic Zone that features low production costs to the production of one of the chosen three quality/price categories. Transship to each country the differentiated outputs that best fit the country's demand characteristics along the dimensions of quality and price.

striving to compensate for the lack of ethical and social issues associated with most computer-based business games (Wolfe & Fritzsche, 1998). Thus, game players had available to them the widest range of strategies available to game players, while also being confronted with a number of strategic and tactical problems. The various strategies available to game players, along with how they could be implemented, are presented in Exhibit 2 using the strategy frameworks of Pearce & Robinson (2003), Hitt, Ireland and Hoskisson (2003) and Porter (1980). The game's output also generated information that supported the use of the strategic management and international business tools typically associated with those fields. This format was selected because of its ability to present players with the factors and components that comprise the firm's internal and external environment and the two environmentally based dimensions associated with decision-making uncertainty.

Because of Duncan's (1972) basic research into the field of perceived environmental uncertainty that research tradition was employed in this study. Exhibit 3 presents Duncan's original exposition on the firm's environmental conditions. The game's scenarios were manipulated so that two separate industries were created that emulated the environmental conditions found in Duncan's Simple/Static and Complex/Dynamic decision-making situations as shown in Exhibit 4. One week after the game ended, participants completed a 47-item questionnaire of which eight (8) randomly placed questions employed Duncan's conceptualization of the decision-maker's environment.

EXHIBIT 3
Environment State Dimensions and Associated Perceived Uncertainty

	Simple Cell 1: Low Perceived Uncertainty	Complex Cell 2: High Perceived Uncertainty
Static	(1) Small number of factors and components in the environment (2) Factors and components are somewhat similar to one another (3) Factors and components remain basically the same and are not changing	(1) Large number of factors and components in the environment (2) Factors and components are not similar to one another (3) Factors and components remain basically the same
	Cell 3: High Perceived Uncertainty	Cell 4: High Perceived Uncertainty
Dynamic	(1) Small number of factors and components in the environment (2) Factors and components are somewhat similar to one another (3) Factors and components of the environment are in continual process of change	(1) Large number of factors and components in the environment (2) Factors and components are not similar to one another (3) Factors and components of environment are in a continual process of change

EXHIBIT 4
Game Environmental State

	Simple Cell 1: Low Perceived Uncertainty	Complex Cell 2: High Perceived Uncertainty
Static	(1) One country market—United States (2) One product—25" television sets (3) No growth in the American television set market (4) All demand forecasts are perfect and completely accurate; All forecasts of raw materials costs, labor costs, interest rates and stock market indices are perfect (5) All economic conditions regarding raw materials costs, labor costs, interest rates and stock market prices are constant	

	Cell 3: High Perceived Uncertainty	Cell 4: High Perceived Uncertainty
Dynamic		(1) Six country markets—United States, Mexico, Germany, Spain, Japan and Thailand (2) New market entrants occur at will. (3) Two products— 25" and 27" television sets (4) Erratic and divergent growth in all markets (5) All long-term demand forecasts are imperfect and inaccurate; All short-term demand forecasts deviate in a random manner from the long-term demand's forecast for the same business quarter (6) All long-term forecasts of raw materials costs, labor costs, interest rates and stock market prices are imperfect; All short-term forecasts of these costs deviate in a random manner from the long-term demand's forecast for the same quarter (7) Spurious events affecting costs occasionally arise—chance to revise sales promotion strategy; changing Quality Control strategy and questioning the industry's global nature

scale indicating the degree of support for each statement. The instrument's other questions dealt with the Miles & Snow (1978) and Mintzberg (1973) environmental contingency frameworks as created by Segev (1987) and were not part of this study's objectives.

RESULTS

The first test examined whether the game players recognized the essential features of the environments within which they were competing. If they did so it could be reasoned decisions made in the game were being at least partially shaped in response to their firm's external environment. If not, player decisions were being influenced by factors independent of the game's simulated external environment. A Chi-square test found players correctly classified the nature of their industries when they were in environments that were Simple and Static but made incorrect identifications when competing in environments that were Complex and Dynamic. A further Chi-square test of responses to the twin environmental components associated with Cell 1 and Cell 4 found very few players characterized their situations correctly. Those in the Simple/Static situation most-often believed they were in a Complex/Static situation. For those in the Complex/Dynamic environment, their most-frequent response placed them in none of the four environmental combinations. If a definitive choice was made, the Complex/Static environment was chosen.

The study's last test compared the environment enacted by the firms versus the objective environments within which they were competing. It was found that the typical firm in the Complex/Dynamic, Cell 4 environment simplified its situation by enacting an environment possessing far fewer markets, factories and selling operations than were available. Those in the Simple/Static environment, possibly because they already resided in a restricted situation, enacted environments that were closer to their objective environment Finally, regardless of the nature of their environments, all firms enacted environments that were much smaller than the ones to which they could have responded.

The study's original hypotheses and their support or rejection are restated below:

H_1: Players in a business game having a simple environment will correctly identify that environment as being relatively simple--Accepted.

H_2: Players in a business game having a complex environment will correctly identify that environment as being relatively complex--Rejected.

H_3: Players in a business game that has a static environment will correctly identify that environment as being relatively static--Accepted.

H_4: Players in a business game that poses an environment that is simultaneously simple and static will

correctly identify that environment as being simple and static--Rejected.

H_5: Players in a business game that poses an environment that is simultaneously complex and dynamic will correctly identify that environment as being simultaneously complex and dynamic--Rejected.

H_6: Players in a business game enact environments that are appreciably smaller than the business game's objective environment--Accepted.

DISCUSSION

The results from this study showed that players in both the Simple/Static or Complex/Dynamic competitive environments did not recognize their industry's basic, underlying characteristics. Because of this lack of recognition, it can be reasoned that the players were responding to other elements associated with the gaming situation given their need to make decisions in a timely manner. If they were not responding to their environment's basic conditions, the question then becomes one of what *did* the firms do with their situation or what was the basis of the decisions they made? To answer this question, a series of *post hoc* e-mail interviews were conducted one week after the game had ended to determine the rationale for each firm's "strategic" decision. A 100.0% response rate to this survey was obtained.

If the firm was to be successful in a purely administrative science fashion, it would have ideally followed the three-step interpretive model that states the firm collects data, interprets that data and gives

it meaning, and then crafts an appropriate action (Daft & Weick, 1984). Based on the e-mail interviews, all players felt under pressure to make decisions but many of them were uneconomic or misguided as to both the strategies chosen and their implementation. In the Simple/Static environment, two of four companies added large amounts of capacity when no profits could be obtained from this investment. Two of four companies pursued a correct generic focussed low-cost strategy but did not choose the most-economic method for obtaining the requisite low costs. In the Complex/Dynamic industry, which offered a greater number of options and challenges, only one of ten companies chose the optimal strategy of Globalization while also implementing it correctly. All other companies choose strategies that entailed limited scope and diversity. They did this by opting for strategies that were convenient Domestic strategies or limited scope Multinational strategies. A large number of technical errors were also committed. These errors indicated a lack of knowledge regarding the true costs of the various decisions made as well as the optimal way to obtain the results they wanted. Given these faulty implementations it would be impossible for firms to receive definitive profit and loss feedback on the wisdom of the strategies they were pursuing. The role of strategy choice and implementation accuracy has been examined previously (Wolfe & Chanin, 1993) where it was found high game performance was associated with firms that pursued the correct strategy and implemented it accurately. The lowest-performing companies pursued an incorrect strategy inaccurately. Firms that either inaccurately implemented the correct strategy or accurately implemented the incorrect strategy obtained intermediate results.

A review of the implementation quality exhibited by the teams playing the game was undertaken through the use of GAMECOACH, a piece of custom Excel-based software that reveals the accuracy of the decisions made by firms in *The Global Business Game* regardless of the chosen strategy's propriety (Wolfe, 2005). That analysis revealed the following types of implementation errors:

1. Adding capacity to a current plant, or building a factory in another country, without recognizing the full costs and cash flows associated with such a decision.
2. Attempting to ship finished goods overseas without providing receiving operations in the target countries.
3. Not recognizing the correct level manpower supervision, training needs and work rules and work ethics associated with each country's labor force.
4. Undermaintaining factory operations.
5. Attempting to start factory operations without a supply of raw materials.
6. Consistently expecting greater productivity from a factory than had been generated historically on a plant-by-plant basis.

More importantly, it should be noted all the above problems could have been solved by using either the appropriate accounting, finance or operations research tools presented to the players in their MBA program, and/or by using the relevant Power Point presentation or spreadsheet program available on the game's dedicated website and often referred to in the Player's Manual.

Based on the implementation failures observed, it appears a major impediment to the use of a business game of any type for strategy research lies in the fact that for much of the simulated firm's life-time its players are learning the game's rules, or how to run their companies. In real-world companies, its strategic managers know how to run their companies in a technical sense, or have technical underlings serving them who would either (1) deal accurately with implementing the chosen strategy or (2) be able to intelligently advise top management on alternative ways to obtain the desired strategic results.

These implementation failures, as well as the overall unwillingness or inability to rationally design the correct strategy for their companies, may indicate why Segev (1987) found few associations between company performance and the strategy fit exhibited by his companies. It was reasoned in that case the players did not receive the same incentives as those offered in real-world companies and that a short-term, course-related perspective was taken. To these delimiting factors there must be added the fact that his

firms, like those in this study, obtained poor results from strategy implementation failures rather than strategy design failures and that the student teams themselves lacked the homogeneity and *esprit de corps* found in dedicated real-world top management decision-making groups.

While it has been concluded this study's sophisticated game should not be used as a laboratory for studying environmentally induced aspects of strategy design and implementation, it could be argued that the very fact players did not accurately perceive their environments makes them even more viable for studying a firm's ability to succeed. This is because real-world managers themselves also often hold imperfect perceptions of their environments (Sutcliffe, 1994). More importantly, real-world firms can sometimes be successful despite inaccurate perceptions (Aldrich & Pfeffer, 1976). The central concern raised by our findings, however, is *not* whether the perceptual accuracy of simulation participants mirrors that of real world executives. Rather, we are arguing that it is inappropriate to infer that the actual differences in simulated environments somehow shaped participant choices if those actual differences were not reflected in participant perceptions of their environments.

Thus, we are not questioning the value of simulations as learning tools for participants, but we are observing that their value as experimental laboratories for research purposes may be limited to such areas as examining the organizational learning process, leadership ascendancy and group decision-making dynamics. We make this speculation because the situation into which the players are placed demands the production of a real decision that has consequences for the group, and each member has partial bits of knowledge that may or may not be shared or invoked, group dynamic processes must come into play. The realistic *tabula rasa* created by a game may bring forth, in an observable laboratory setting, which also generates archival decision inputs and company results, the tracking of a firm's evolutionary processes from team growth to maturity.

CONCLUSION

Whereas managerial perceptions of the environment may influence strategic decisions and resulting organizational actions, it is the actual environmental conditions, which influence the outcomes of those actions (Dill, 1958). If, as we found, game participants do not perceive their environments accurately, then inferences cannot be drawn as to how the simulated conditions may have influenced participant decisions or decision processes. It would be inappropriate to conclude, for example, that dynamism influences decision processes just because processes seem to differ when alternative levels of dynamism are simulated. If participants do not perceive different levels of dynamism being simulated, then the posited relationship between dynamism and decision processes could be spurious. It would be better to assess participant perceptions of dynamism to test for effects of perceived dynamism, or to conduct such assessment as a form of manipulation check to determine whether participants were really perceiving the levels of dynamism being simulated. Such assessment of perceptions would be worthwhile even in studies of environment-outcome relationships, despite the fact that actual conditions likely influence outcomes directly because it would help researchers understand why those in simulated firms took the actions leading to the particular outcomes observed.

One might argue that, at best, these findings generalize to studies employing the particular game used here. Still, these findings raise questions as to the value of all games used as strategy research laboratories unless, perhaps, they are used to study the firm's cognitive and organizational learning processes. Most games are of relatively short duration. Unlike company situations, no decision makers have years of experience and familiarity with a simulated situation. The results here suggest that simulation participants seldom gain an adequate understanding of the environment being simulated because they are too busy learning how to play the game itself during the run of the simulation. (Does this study show this? I didn't get this impression. What data is available from this study to reach this conclusion?) It is unlikely that this limitation is restricted to the game used here.

Nevertheless, future research is needed to verify whether similar findings can be attained when other games are employed. Additional research is needed to determine exactly where and how strategy researchers might employ games. Furthermore, researchers must adopt tight experimental controls such as manipulation checks, comparison groups, and random assignment of participants across experimental groupings to ensure the internal validity of their findings and conclusions.

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