ORDERNESS: A NEW DEFINITION OF ALIGNMENT

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ABSTRACT

Decision alignment is the essential to management and critical to participant performance in business simulation exercises. Fundamentally, alignment involves the optimal matching of decision problem characteristics with a known approach strategy. Most conceptualizations of alignment correctly focus on the identification of misalignment; however, these conceptualizations fail to offer the theory needed to guide the decision-maker toward alignment. The decision order alignment visualization described in this article provides the theory for identifying misalignment coupled with an actionable tool for guiding alignment strategies. A visualization tool is introduced that can be incorporated into business simulation exercises offering both developmental and evaluative feedback opportunities on decision effectiveness.

INTRODUCTION

But lo! men have become the tools of their tools. -- Henry David Thoreau (1854)

The implicit assumption and the power of most taxonomy is that things can be classified as homogeneous entities (Bowker & Star, 1999). Most academics are aware that taxonomy lies at the foundations of biological study, where "different types of organisms can be related to one another in a systematic, orderly pattern …" (Goodwin, 1994, p. 107). However, few have examined the underlying order in decision problems. Scherpereel (2006b) develops a taxonomy of decision problems that identifies the three unique classes. Although the theory is sound, the application is difficult and the implication for simulation development is unclear.

In the classification system developed by Scherpereel (2006b), all decision problems are classified into one of three categories called orders. While the first category or order is described as containing routine decision problems with know, deterministic, solution methodologies, the second category includes more complicated decision problems that suggest probabilistic solution techniques. It is the last category containing third order decision problems that is most relevant, and troublesome, to business simulation developers. Third order problems are characterized by complexity and subjected to heuristic solution techniques. Quantitatively measuring the effectiveness of these heuristic techniques is difficult (Newgren, Stair, & Kuehn, 1981).

Many decision problems have a level of complexity that makes a homogeneous classification requisite in theory challenging. To better understand decision problems and identify optimal solution strategies an attempt is made to decompose higher order problems in to lower order problem where robust solution methodologies can be applied. Unfortunately the rigorous decomposition of third order problems into sets of independent lower order decision problems is often impossible. The decomposition process is rarely undertaken in time constrained business situation (Klein, 1997, , 1998; Zsambok, 1997) and by participants in simulation games (Keiser, 1974; Lambert & Uhring, 1983). Instead, many business decision problems are initially characterized as complex or third order and approached using heuristic tools. This phenomenon is evident in participant approaches to simulation games, where problems are approached intuitively despite the existence of valid quantitative tools. The fact that these decision problems possess some characteristics from solvable first and second-order taxonomic classifications is essentially ignored (For a complete explanation of first, second, and third-order decision problems see Scherpereel, 2006b). The result is often decision misalignment and poor performance because of divergent and inappropriate strategies.

Alignment and its opposite misalignment are concepts that have been discussed in the strategy literature (Chorn, 1991; Henderson & Venkatraman, 1991; Labovitz & Rosansky, 1997; McAdam & Bailie, 2002; Mockler, 2001; Strassmann, 1998) but rarely in the business simulation literature (Flynn, 1990; Moschella, 1984). Feedback is only indirectly given to business simulation game participants regarding the effectiveness of previous decisions. Feedback in the form of financial statements and firm performance metrics only partially reflects the effectiveness of the decisions made in the business simulation game. This feedback fails to give clear guidance on how participants might change their decision methodologies in the future.

Scherpereel (2006a) develops a generic definition of alignment that can be used as a basis for developing a feedback tool for business simulation participants. The visual feedback tool developed below is based on this definition of alignment. The tool can be used both developmentally (to guide decision making) and evaluatively (to evaluate decision effectiveness). Given the generic definition that alignment is the matching of a decision problem characterization with an appropriate solution methodology, the objective is to provide clear characterizations of the decision problems in the business simulation and capture the approaches used by the simulation participant.

Because many decision problems found in business simulation games cannot be uniquely classified as first, second or third-order, the implementation of a feedback tool becomes challenging. According to the taxonomy, decision problems (Scherpereel, 2006b) having characteristics from all three decision orders would be classified as perceived third-order problems and strict adherence to the decision order taxonomy would mandate pursuing third-order approaches. Unless the decision maker's perception can justifiably be changed, it will be difficult to provide feedback on effectiveness. Additionally, what feedback is given will provide little valid guidance on future decisions. Each time third-order decisions are encountered they are handled as unique or by previously developed heuristics. If a tool can be developed that profiles the unique nature of third order problems then a decision heuristic can be developed more quickly and the heuristic's effectiveness can be evaluated relative to its profile.

Profiling a decision maker's perceptual changes and the alignment of perceived third-order problems are the focus of the next several sections. A possible "third-order" heuristic decomposition of perceived third-order decision problems is suggested. The methodology developed recognizes that regions along a hypothetical continuum best represent a decision problem's taxonomic classification. Thus, an orderness construct is used to better understand a perceived third-order problem, where the decision problems orderness is defined as an indicator of how much the problem resembles the base class of each of the three decision orders.

The objective of the construct is to answer the question: how much of the perceived third-order problem resembles the characteristics of a homogeneous first-order, second-order, or third-order problem? If the decision problem is mostly third-order, decision order theory alignment suggests focusing on third-order approaches. If the problem has primarily second-order characteristics then second-order approaches might be pursued; similarly, if the problem is significantly first-order then some first-order approaches might be appropriate. Using this decomposition, the perceived orderness of the decision problem must align to the approach methodology pursued by the decision-maker. The alignment of orderness with approach methodology is called a micro level alignment.

This concept of micro decision problem alignment offers a number of possible applications. An assumption is made that the decision-maker is able to make an accurate assessment of the decision problem's orderness or in the case of simulation games, the simulation game is able to feedback an accurate assessment of the decision problem's orderness. It is also assumed that a reasonable assessment of the approach methodologies is possible. Establishing validity for these assumptions requires future empirical and experimental research.

AN ALIGNMENT METHODOLOGY

Scherpereel (2006a) introduced a decision order framework that dictated an alignment methodology. This high level presentation did not pursue the complexity introduced by non-homogeneous decision problems found in most simulation games. To pursue this complexity, the concept of alignment will be placed in the context of current literature. Specifically, the complexity of non-homogeneous decision problem alignment is addressed, and a graphic visualization methodology capable of identifying both the magnitude and direction of misalignments is presented.

OVERVIEW: WHAT IS ALIGNMENT?

Alignment is the essence of management – Fred Smith, Chairman of Federal Express

From previous usage, the concept of alignment as applied to decision problem understanding should already be clear. The objective is to align the approaches available for a particular decision problem with the characteristics of that problem. An analogous term is found in the business literature for aligning the approaches available to a business with the characteristics of the environment in which that particular business operates. Both are concepts of alignment, the former is framed at the micro level and the latter at the macro level.

Labovitz and Rosansky (1997) apply the macro level alignment concept to the management and organization of companies. They define alignment "as both a noun and a verb – a state of being and a set of actions … alignment … refers to the integration of key systems and processes and responses to changes in the external environment" (p. 5). In an article on developing a business's "core competencies," Carroll and McCrackin (1998) state, "realizing the full benefit of competencies is only possible through the integrated process of aligning…." These points are supported in the book "Built to Last: Successful Habits of Visionary Companies" by Collins and Porras (1994), where empirical evidence is presented showing that the companies best able to sustain success over long periods of time are those that aligned their business processes and capabilities to the dynamically changing marketplace.

The usage of the macro level alignment concept has received its greatest support in the information systems literature. Since information systems are key components defining the infrastructure of an organization, assuring alignment between the information system and the business organization is an information systems executive's top priority. This hypothesis is supported by surveys of information systems executives who identify "aligning information systems to corporate goals … as the number one concern over the last five years…" (Strassmann, 1998, p. 1).

As stated by Lefebvre (1992), "most organizations are generally in a state of misalignment." He goes on to observe that "misaligned organizations operate at decreased levels of performance … the more severe the misalignment, the worse the performance (p. 52). Although Lefebvre (1992) uses the term at the macro level to discuss the specific decision problem of aligning a business's information structure, the observation applies equally well to the micro level alignment of specific decision problem approaches with specific decision problem characteristics.

In the business simulation game literature macro alignment concepts have been used to discuss strategic alignment with the environment (Moschella, 1984; Flynn, 1990) and between strategy and organization (Downing, 2000; Scherpereel & Lefebvre, 2004). Micro alignment has been applied and discussed in relationship to feedback constructs such as the balanced score card (Kallas & Suaia, 2004) and group leader-member alignment (Roberto, 2001). However, the development of a feedback tool that can be used both developmentally and evaluatively has not been explored.

MACRO OR MICRO ALIGNMENT

The distinction between macro and micro alignment is artificial. It is a distinction created by the framing and the decomposition of decision problems (Framing is defined as the act of constructing/defining the limits of the system to be subjected to an analysis. This is the meaning implied in this argument). Any decision problem can be framed at a higher macro level; however not all decision problems can be framed at a lower level. This implies that there exists a limit to the useful decomposition of any decision problem. The lowest level that a problem can be framed is defined as the micro level. Thus, a micro decision problem is simply a decomposed macro decision problem. If a macro decision problem cannot be reasonably decomposed, then it is equivalent to the micro decision problem. In this case the macro and micro decision problems describe the same concept.

For example, macro aligning a business consists of adjusting the business's competencies, capabilities, resources, tactics, strategies, goals, and objectives, to the requirements of the marketplace in which the business competes (strategy with environment). This macro alignment decision is typically described using the third-order language from the decision order taxonomy [uncertain, complex, etc. (Scherpereel, 2006b)]. Thus, according to the decision order methodology, it should either be decomposed or treated as a third-order decision problem and approached heuristically. In the former case the macro decision problem would be re-framed into a set of independent micro decision problems. In the latter case, the macro decision problem is equivalent to the micro decision problem. Assuming equivalency, aligning a business consists of adjusting the approaches the business takes to the marketplace, to the characteristics of the marketplace.

Therefore, the generic term alignment will be used to reference micro decision problems as well as non-decomposable macro decision problems. The implication is that it is inappropriate to apply alignment methodologies to decision problems that can be decomposed into independent parts. For example, if a hypothetical decision problem were framed as third-order but could be reasonably decomposed into two independent second-order decision problems, it would be prudent to decompose the problem prior to alignment. Maintaining a third-order conceptualization would dictate third-order approaches and approximating heuristics, when the same problem, decomposed, could be

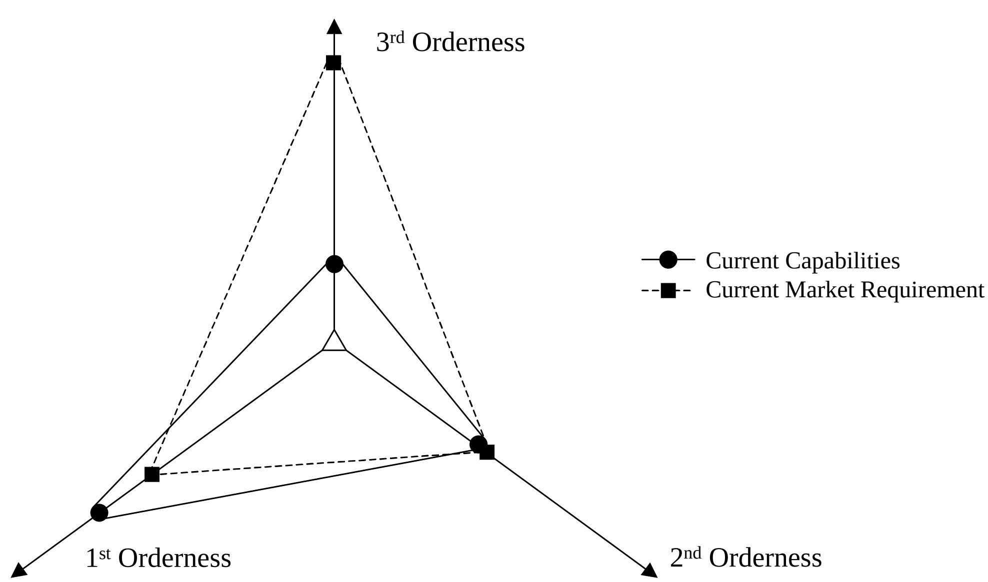

Figure 1: The Three Dimensions of Decision Order Alignment

approached in parts using simpler second-order methodologies and more precise techniques.

There exists an imperative to align a business's decision-making at both the macro and the micro levels. If a business wishes to maintain a sustainable advantage, and operate at peak performance, alignment at both the micro and macro level is required. The decision order taxonomy and methodology provide the basic theory needed to characterize micro and macro decision problems for alignment (Scherpereel 2006a). Identifying the misalignment is the first step in achieving alignment.

Aligning a business means aligning the decisions made by that business. The decision order visualization, developed and illustrated in the following examples, views the business as a portfolio of decision problems. The goal in these examples is not to identify misalignment for a specific micro decision problem, but rather, to identify misalignment of the portfolio. Thus, the decision problem is framed at a macro level. The inclusion of the micro level decision problems in the portfolio are dependent on the macro level selected. As a portfolio problem, the problem is non-decomposable and thus alignment is a valid objective.

BUSINESS CAPABILITY ALIGNMENT

A business can be viewed as a portfolio of resources (Penrose, 1959; Winterfeldt & Edwards, 1986), competencies (Prahalad & Hamel, 1990), or capabilities (Richardson, 1972). The precise makeup of these portfolios will differ slightly in scope. A resource portfolio will place a greater emphasis on the physical assets (size, access to capital, etc.) of the business, while a competency portfolio will emphasize the non-physical assets (skills, knowledge, etc.). Envisioning a business as a portfolio of capabilities seems to allow a broader interpretation that encompasses the core elements of the business's resources and competencies. Therefore, visualizing the alignment of a business's capabilities is chosen as the focus of this example.

Identifying the capabilities of a business is analogous to identifying the business's toolbox of available techniques. As can be done with decision problems, the business capability toolbox can be segmented into a mix of available first, second, and third-order capabilities, or methodologies. Since the capabilities that a business possesses determine how it is able to act and react in the marketplace, business capability alignment consists of adjusting the toolbox segmentation, or capabilities, to the required characteristics of the marketplace.

A business can possess different levels of first, second, and third-order capabilities, and the marketplace can exhibit different levels of first, second, and third-order characteristics. Thus, the two dimensional alignment of a single-order's methodologies to a single-order's characteristics is no longer sufficient. A multidimensional construct is required to represent alignment along all dimensions simultaneously. **Error! Reference source not found.** depicts the three decision orders, each as its own dimension. A scaled "level of orderness" indicates the business's current capabilities and is represented by a circle on the axis. The same scaling is used to indicate the "orderness" required by the current market characteristics.

Alignment is achieved when the "level of orderness" is the same for both the business capabilities and the marketplace requirements. Achieving alignment becomes a strategic objective for the business. As with most strategic objectives there is more than one tactic that can be used to achieve this objective. Two different tactics are proposed in this example. These two tactics are labeled "active" and "passive" response, to describe the role the business takes in

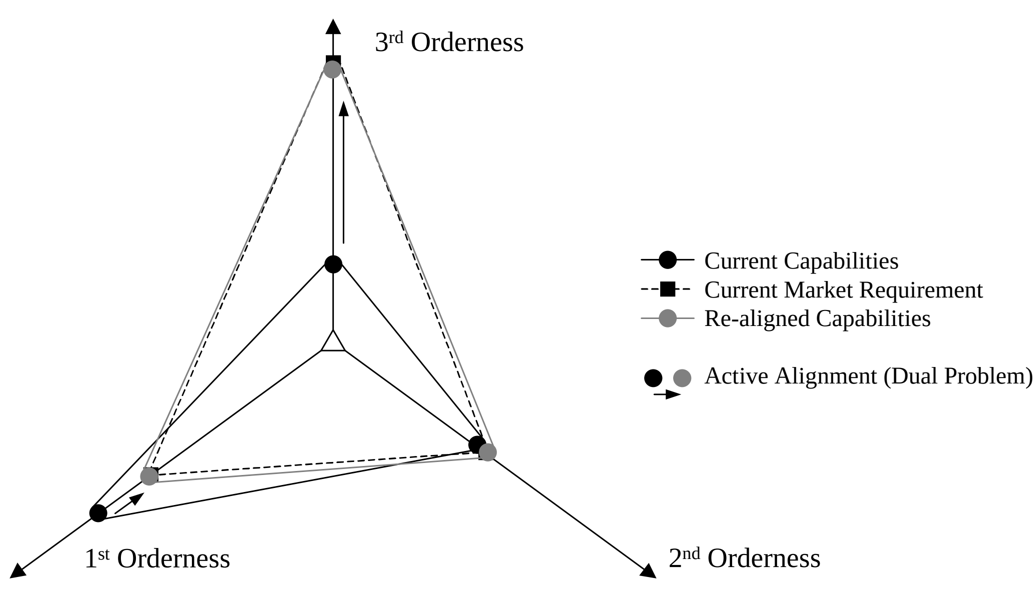

Figure 2: eCommerce Alignment – Active Response

adjusting their capability toolbox.

Given the alignment situation illustrated in **Error! Reference source not found.**, alignment can be pursued by changing the capability portfolio of the business, called active response, or by waiting for the marketplace requirements to change, called passive response.

For example, the Internet has altered the marketplace requirements such that traditional firms find their capabilities out of alignment; they have first and second-order capabilities when the market demands third-order capabilities. If the business chooses an active response, some method of acquiring the capabilities would be implemented. This might take the form of training, hiring, partnering, or purchasing tactics. The goal is an alignment of the business to the changed market requirements. This alignment is illustrated in **Error! Reference source not found.**. The net result is that the business remains competitive in the new eCommerce environment.

However, the business may also choose a more passive response. Realizing that environmental requirements will evolve over time, and the capabilities needed to compete long term in the marketplace may not be the same capabilities required today, the business may decide to simply enhance its current capabilities and wait for the market to settle. With this tactic, the hope is that the marketplace requirements will settle into alignment with the business's capabilities. If the business can survive the shift and the slow adjustments in marketplace, the passive tactic may realign the business as illustrated in **Error! Reference source not found.**.

The visualization above provides feedback to the decision maker on the effectiveness of their decision response. In business simulation games, alignment of capabilities with the competitive environment is critical. Using a similar visualization would assist the decision maker in evaluating performance and altering the businesses strategy appropriately.

BUSINESS PRODUCT PORTFOLIO ALIGNMENT

A similar alignment problem can be conceived where the objective is to align the business's people-competencies with the product portfolio it is offering in the marketplace. This is a common problem, one in which the business's product portfolio has been built over a long period of time and over this same period the competencies in the business have deteriorated due to lack of training investment, misaligned hiring, and attrition. By the time the business realizes that its people no longer fit its product mix, the business alignment may look like the one depicted in **Error! Reference source not found.**.

The business can react to this misalignment by taking a people focus, product focus, or a combination. A people focus suggests tactics that attempt to change the business's people competencies to fit the current product portfolio. This is equivalent to adjusting the decision problem approaches to fit the characteristics. Alternatively, tactics that focus on changing the product portfolio mix to fit the current competencies of the business indicates a product focus. This might involve a redefinition of the business's mission and is equivalent to adjusting the decision problem characteristics to fit the available approaches. It may be difficult to achieve complete alignment by focusing exclusively on either the business's products or the business's people. Therefore, a tactical combination is often implemented.

Business product portfolio alignment is a common objective of business policy simulation games. The visualization presented can be used to monitor performance

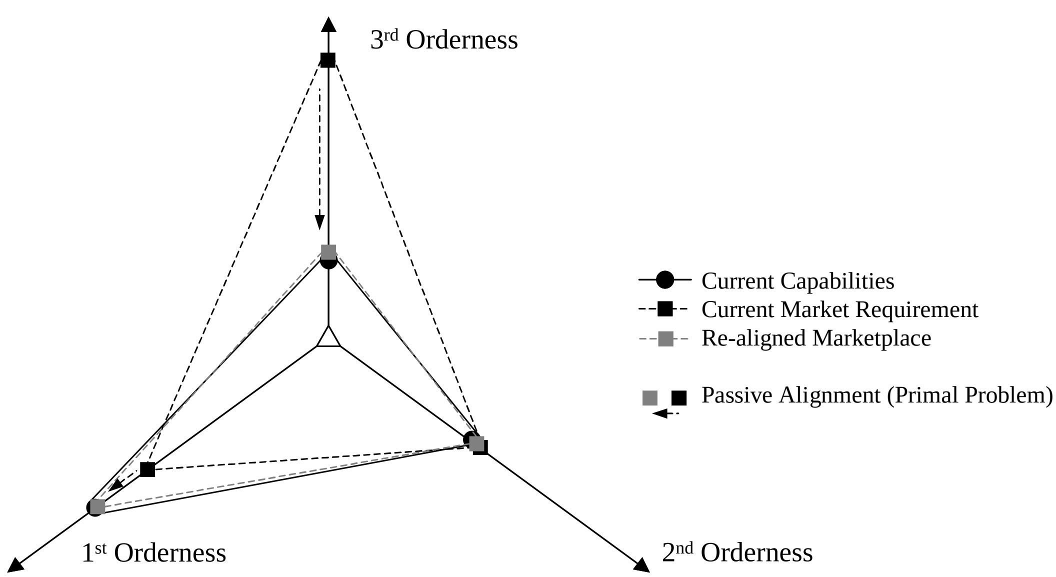

Figure 3: eCommerce Alignment – Passive Response

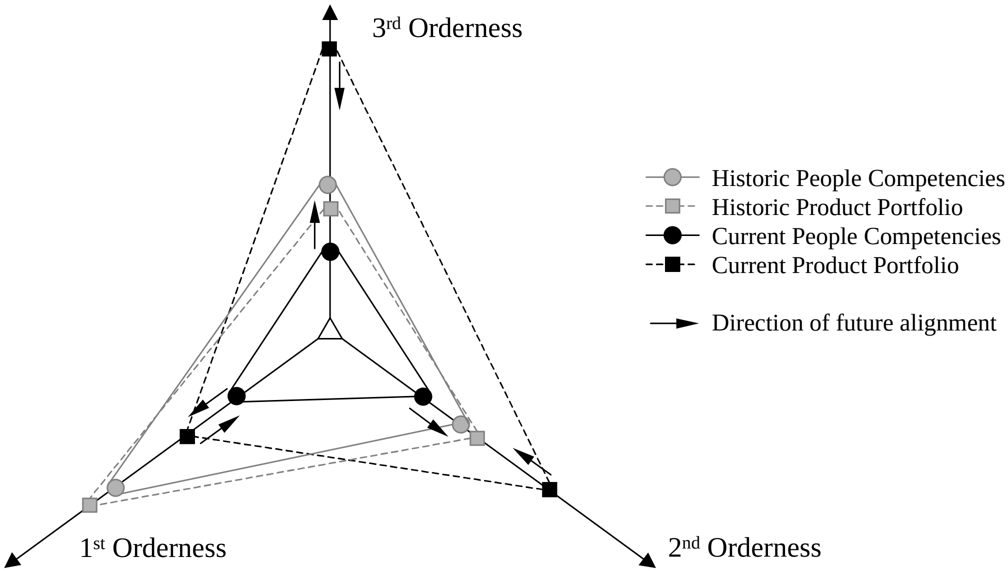

Figure 4: Product/People Misalignment

and guide participants in their decision making. If decision problems are properly characterized and appropriate actions are pursued by the participant, performance will be optimized. A business simulation game that focuses participant's thinking on problem characterization and problem approach alignment will provide them with a skill that can be easily transferred to their actual decision problem situation.

DEVELOPMENTAL AND EVALUATIVE OPPORTUNITIES

As described in the previous two examples, the alignment visualization provides developmental feedback. The objective of this form of feedback is to help decision makers learn from their performance. Whenever individuals are performing a new task or making decisions in unfamiliar environments, as is the case in most business simulation game environments, errors are frequent. Developmental feedback provided by the alignment visualization offers constructive feedback on how to reduce decision errors or how to enhance current decision making approaches.

Although the introduction of an orderness and alignment visualization construct has been focused on providing decision makers with decision making guidance in the form of developmental feedback, it can also be used to evaluate performance. The research in performance feedback suggests that evaluative feedback is not very effective in improving learning and performance (Gibbs & Simpson, 2004; Gueldenzoph & May, 2002; Ohland, Layton, Loughry, & Yuhasz, 2005; Thompson, 2001). However, in a competitive simulation game environment, where winning a multiple round game is the objective, evaluative feedback on decision making effectiveness can serve as a developmental motivator.

IDENTIFICATION AND FOCUSING CHANGE

The decision order alignment visualization provides an actionable tool for identifying the essence of a decision problem and focusing change. The visualization is designed to direct the decision-maker quickly to the dimension of misalignment. Having identified the decision order(s) that is (are) misaligned, an action plan can be developed that targets change directly on the characteristics and/or the decision approach dimensions.

Theory provides the direction. "Without theory, we make endless forays into uncharted badlands. With theory we can separate fundamental characteristics from fascinating idiosyncrasies and incidental features. Theory supplies landmarks and guideposts, and we begin to know what to observe and where to act." (Holland, 1995) Most conceptualizations of alignment correctly focus on the identification of a misalignment. However, they fail to offer the theory needed to guide the decision-maker. (For examples of misalignment identification without an underlying theory see Labovitz and Rosansky (Labovitz & Rosansky, 1997), Carroll and McCrackin (Carroll & McCrackin, 1998), and Collins and Porras (Collins & Porras, 1994)). Incorporating the decision order taxonomy into the alignment conceptualization provides the guiding theory.

The decision order taxonomy provides a unifying language in which all decision problems can be described. Under this taxonomy, confusion regarding strategy alignment, business alignment, competitive alignment, organization alignment, information alignment, and competency alignment is no longer necessary. Alignment is simply defined in terms of the decision problem's characteristic order and approach order. The decision order methodology provides a means of framing the decision problem so that alignment techniques can be applied.

The decision order visualization methodology provides the instrument needed to identify misalignment of non-decomposable problems. Non-decomposable problems are those problems that possess characteristics from all three decision-orders. These non-decomposable problems are described as having different levels of orderness. The alignment visualization allows the decision-maker to identify the decision problem's orderness and to target the specific decision order(s) that is (are) not in alignment. Identifying the misalignment using the multidimensional visualization is the first step in achieving alignment.

For business simulation game designers the implications are significant. The incorporation of a feedback tool that can help participants improve their decision making increases the value of simulation to both the individual and their organization. The individual can see (quantifiably) the improvement in their decision making from decision round to decision round. By changing the focus from the decision itself to the alignment of the decision within the context of the problem, the decision making process is shifted from relying on intuition to one that is based on reasoned response. The organization also has the ability to quantitatively evaluate how effective the simulation was at improving the decision making capabilities of their people. Thus, the orderness visualization offers the business simulation developer a way to validate the claim of improving participant decision making capability.

FUTURE RESEARCH

Certainly there are a number of opportunities for future research as the orderness visualization is implemented in business simulation games. Although in theory the visualization should work the current effort is limited to the visualization's development. The examples given appear to provide evidence of validity but actual field testing is necessary to prove validity. Empirical testing opportunities are numerous, and include: measuring the visualizations effectiveness in both game and actual environments; measuring the time persistence of decision making improvement; and checking if the decision making improvement that occurred in the game environment will translate to the actual work environment.

The need for alignment is recognized as the motivating factor for 66% of the companies implementing balanced score cards (Downing, 2000). However, alignment means different things to different people, and it is unclear what organizations think that they are aligning. This issue provides additional motivation for empirical research. Even though decision alignment has a lot of intuitive appeal, identifying alignment in real business situations may be more difficult than it appears in theory. Thus, strategies for measuring alignment in real business situations may provide additional opportunities for theory development.

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