

SCORECARDING AND HEAT MAPPING: TOOLS AND CONCEPTS FOR
ASSESSING STRATEGIC UNCERTAINTY

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Executive Summary

The dramatic changes occurring throughout the agriculture industry are creating new and different uncertainties than the traditional operational and financial uncertainties agribusinesses have faced in the past. These new uncertainties result from strategic choices and a turbulent business climate. The objective of this paper is to present a methodology to understand, assess and evaluate, and manage strategic uncertainty. The approach is to present a mental model that frames assessment of strategic uncertainty from a potential and exposure perspective.

Scorecarding and heat mapping assessment tools operationalize the mental model. A beta test of this mental model and the assessment tools as they were used in an agribusiness educational workshop is presented along with participant evaluation of their usefulness and effectiveness.

The participants in the Forum found that by focusing on the potential of the uncertainty and the likelihood of this potential as well as the exposure and the likelihoods of exposure, they better understood the true impact uncertainty could have on their firm's value. In addition, their perspective was that the methodology was not only an effective way to facilitate understanding of strategic uncertainty, but it also provided useful assessment tools that management can easily incorporate into their company's strategic planning processes. In essence, the scorecard and heat mapping tools provided a time efficient and systematic method for analyzing as well as communicating the strategic uncertainties faced by the firm. Further development and testing is necessary and underway, but preliminary results suggest that the methodology is useful in understanding, analyzing, and communicating the potential as well as the exposure of strategic uncertainty.

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Abstract

The dramatic changes occurring throughout the agriculture industry are creating new and different uncertainties that result from a turbulent business climate. The objective of this paper is to present a methodology to understand, assess and evaluate, and manage strategic uncertainty. The approach is to present a mental model that frames assessment of strategic uncertainty from a potential and exposure perspective. Scorecarding and heat mapping assessment tools operationalize the mental model. A beta test of this mental model and the assessment tools as they used in an agribusiness educational workshop is presented along with participant evaluation of their usefulness and effectiveness.

Keywords

Uncertainty, scorecarding, strategic uncertainty, strategy consensus

Scorecarding and Heat Mapping: Tools and Concepts for Assessing Strategic Uncertainty

The dramatic changes occurring throughout the agriculture industry are creating new and different uncertainties than the traditional operational and financial uncertainties agribusinesses have faced in the past. These new uncertainties result from strategic choices and a turbulent business climate. From both an analytical and managerial perspective, a major challenge in the future will be to assess both the frequency of occurrence and the magnitude of these uncertainties (Economist 2004 and Nottingham 1996). The objective of this paper is to present a methodology to understand, assess and evaluate, and manage strategic uncertainty.

The approach is to present a mental model that frames assessment of strategic uncertainty from a potential and exposure perspective. Scorecarding and heat mapping assessment tools operationalize the mental model. A beta test of this mental model and the assessment tools as they were used in an agribusiness educational workshop is presented along with participant evaluation of their usefulness and effectiveness.

Strategic Uncertainty

The first step in assessing strategic uncertainty requires an understanding of the sources of strategic uncertainty. Boehlje et al. (2005) note that “strategic uncertainty is the sensitivity of the company’s value to inappropriate strategic choices, ineffective strategy implementations, or uncertainties in the business climate. These uncertainties include: 1) political, government policy, macro-economic, social and natural contingencies, and 2) industry dynamics involving input markets, product markets, competitive and technological uncertainties.” Strategic uncertainty is multidimensional and not likely to have an identifiable one-to-one relationship between the uncertainty and management options (Hillson 2003). Therefore, firms must evaluate and manage strategic uncertainty through proactive strategies that capture the potential benefits

of the uncertainty and mitigate the exposures if they fail to act. Teach (1997) developed a taxonomy of total risks faced by a firm. Within this taxonomy, he provides a detailed discussion of the different strategic risks faced by a firm. Table 1 summarizes our adaptation of Teach's taxonomy. The focus is on strategic uncertainty as opposed to risk because it is important for firms to account for the potential or opportunity of the uncertainty as well as the exposure (risk). These strategic uncertainties are more complex and more pervasive than is often perceived. The taxonomy identifies both the potential and exposure dimensions of strategic uncertainty so that the firm can develop appropriate strategies to manage these uncertainties (Nottingham 1996).

INSERT TABLE 1 HERE

Assessing Uncertainty

Assessing uncertainty through qualitative rankings is not a new concept and methods for doing so have been suggested by others (see Groth 1992 for a summary). Firms must be proactive in managing uncertainty to create long-term value because uncertainty has upside potential as well as a downside risk (Pascale et al. 2000). The focus on the upside potential of uncertainty is one of the key factors that differentiates this set of assessment tools from other tools that emphasize only risk exposure¹. Focusing only on uncertainty avoidance could cause a firm to overlook opportunities to create value; uncertainty management should involve assessing both potential and exposure (Talavera 2004).

To understand fully how to manage uncertainty, firms should first assess the critical dimensions of each source or category of uncertainty. Each uncertainty category identified in

¹See Boehlje, Gray, and Detre 2005 for an example of tools focused on managing downside risk.

Table 1 has four critical dimensions: potential, exposure, the likelihood of potential, and the likelihood exposure. These dimensions characterize the uncertainty in terms of the impact each category can have on the firm's profitability, image, and competitive position in the marketplace. Table 2 provides an illustrative listing of the potential and exposure associated with each of the categories of uncertainty. Systematic assessment of these dimensions of uncertainty is the key to understanding uncertainty management. Considering the size of the potential or the exposure of the uncertainty without accounting for the likelihood can cause management to make incorrect assumptions about the uncertainty and its ability to impact company profit (Baldoni 2001).

INSERT TABLE 2 HERE

The dimension of potential refers to the upside or incremental value the uncertainty category offers to the firm. This dimension is often overlooked in managing uncertainty and may result in conservative decisions that ignore the opportunity to create long-term value. Potential can be thought of as the opportunity to create additional profits if the firm exploits an uncertainty (Hillson 2003). When outcomes are favorable, the firm may find itself with such benefits as a new market, more loyal customers, or a distinct cost advantage over rivals. Initiating the uncertainty assessment process by measuring potential can frame the firm's goals in the context of how it can manage the uncertainty to create increased profits or improved financial performance. For example, a business relationship uncertainty in terms of supply chain arrangements might create potential in the form of loyal retailers who promote our agribusiness products over our competitors.

A second dimension is exposure, which is an examination of the downside loss that an uncertainty poses for the firm. Exposure asks, “If this category of uncertainty has a negative outcome, how bad will it be?” Exposure is often defined in terms of how many dollars the negative outcome will cost the company because of lost customers, a tarnished image, legal fines, etc. By assessing the exposure, management is aware of the dangers of the uncertainty and can make informed decisions based on the possible exposure. An exposure that may arise in supply chain arrangement would be if retail sellers renege on the terms of a contract.

Likelihood is the chance a potential or exposure event will occur. Having determined the potential (exposure) of a particular uncertainty category, it is critical to assess the chances or likelihood that this potential (exposure) could be realized. In essence, what are the odds that the potential can be captured, and what are the odds that exposure will occur? For each uncertainty category the likelihood of the potential and the exposure need not be the same or symmetric. For example, the assessment might determine that there is a “medium” likelihood that the potential consequence occurs and “high” likelihood that the exposure consequence occurs.

A Scorecard for Assessing Uncertainty

Anthens (2004) indicates that the impact and effectiveness an IT risk scorecard had on managing IT risks at Delta Airlines came from its ability to enable managers to focus their attention on the risk in an easy to understand framework. The strategic uncertainty scorecard proposed here transforms qualitative discussions into quantitative rankings that facilitate prioritization and focus managerial energy. In addition, it ensures that agribusiness managers recognize the potential or opportunity of the strategic uncertainty as well as the exposure or risk. Table 3 provides a scorecard for assessing each category of uncertainty. The scorecard presented in Table 3 contains the six broad categories of uncertainty identified in Table 2, which are then

rated or assessed on a scale of 1 to 5. A 1 indicates that this uncertainty category is low, unimportant, or has minimal impact and a 5 implies it is high, very important, or has a large impact. To illustrate using our earlier example, the business relationship uncertainty potential is rated 2 with a likelihood of 2, and the exposure a 4 with a likelihood of 3. Where do these ratings come from? In essence, these are a manager's informed assessments about the uncertainty.

Each member of a firm's management team should complete a scorecard; multiple views of uncertainty often arise because of an individual's responsibilities within the firm. An individual's rating is useful, but more valuable is the management team's discussion of why individuals rated an uncertainty at a particular level. This discussion provides insight into the opportunities and challenges these uncertainties provide. The objective is to create a consensus among the management team that results in a company-wide perspective of the strategic uncertainties facing the firm.

INSERT TABLE 3 HERE

Interpreting the Uncertainty Scorecard

Having assessed the potential, exposure, and the likelihoods of the categories of uncertainty, the next step is to choose a strategy for managing that uncertainty that mitigates the downside exposure and exploits the upside potential. Traditional uncertainty management strategies focus on risk mitigation to prevent an uncertainty from occurring, and if it does occur, minimize the exposure (Wilkerson 2003). In contrast, we assess the scores from the company-wide uncertainty scorecard via a heat-map to choose strategies, which exploit potential as well as mitigate

exposure. Buehler and Pritsch (2004) used a heat map to communicate effectively the dollar value exposure for a given risk by business unit. They indicate that the heat map is an effective method for assessing and communicating uncertainty because it utilizes both numbers and colors (reds and greens) to describe the severity of the risk. Their heat map, however, only considered dollar exposure and did not encompass potential or likelihood of potential.

The proposed strategy matrix or heat map used here is a visual aid that highlights the potential, exposure, and likelihood dimensions of the strategic uncertainties. Furthermore, this visual aid motivates a rich and in-depth discussion because the participants are forced to focus their efforts on the most pressing strategic uncertainty. In addition, the generic strategies on the heat map serve as a filter for choosing a specific set of actions or activities for managing a strategic uncertainty.

Using the numbers from the consensus scorecard, the management team can plot each uncertainty's likelihood/potential and likelihood/exposure score on the graphs of Figures 1 and 2, respectively. The likelihood score is plotted on the vertical axis while the potential/exposure score is plotted on the horizontal axis. Each axis is measured from a score of low to high, where a low score corresponds to a number from the scorecard which is less than or equal to three and high is a number that is greater than three. For example, if an agribusiness company's scorecard has the potential of the technology category scored a 5 with a likelihood score of 4, they have assigned technology a high potential score and a high likelihood score - - thus mapping technology uncertainty in the upper-right quadrant of the likelihood/potential graph. This procedure is completed for each of the six categories of uncertainty for both potential and exposure.

INSERT FIGURE 1 HERE

INSERT FIGURE 2 HERE

The graphs provide a visualization of the uncertainty scorecard; the quadrants are color-coded and hand-gestures are utilized to show how a firm has assessed the uncertainty. To illustrate, we will analyze Figure 1, the likelihood/potential graph, beginning in the upper-right hand quadrant and moving clockwise through the quadrants. The upper-right quadrant is shaded dark green and contains a thumbs-up hand gesture, indicating that an uncertainty in this quadrant is beneficial to the company because of the high potential and the high likelihood. The next quadrant, high potential and low likelihood, is shaded light green and is represented by a hand gesture signifying okay. In this quadrant, the uncertainty is unlikely to occur, but if it does, the payoff to the company is significant. The next quadrant is colored red with a thumbs down hand gesture; here, the uncertainty has low scores for likelihood and potential, indicating that there is no benefit from the uncertainty. The upper-left quadrant contains a yield hand gesture and is colored yellow. Even though the uncertainty occurs often, the payoff to the company is small.

The quadrants for the graph in Figure 2, the likelihood/exposure graph, will also be examined in a clockwise manner beginning in the upper-right hand quadrant. The upper-right quadrant is colored red because an uncertainty in this category has a high likelihood of occurring and when it occurs the impact on the company is very detrimental; the thumbs down hand gesture indicates that the company needs to avoid this uncertainty. The lower-right quadrant has a yield hand gesture and is colored yellow because an uncertainty in this category has a damaging impact on the company even though the likelihood of occurrence is low. The next quadrant is colored dark green and contains a thumbs up sign because uncertainties in this

quadrant are unlikely to occur and even if they do, there is little impact on the company; these are uncertainties the firm should absorb. The final quadrant, the upper-left, contains the okay hand gesture and is colored light green; here the uncertainty has little impact on the company even though it has a high likelihood of occurrence.

Notice that the color-coding of the quadrants in Figure 1 and 2 is opposite. This should make intuitive sense; when assessing potential (Figure 1), a high likelihood and high potential (upper-right quadrant) is preferred. When assessing exposure (Figure 2), a low likelihood and low exposure (lower-left quadrant) for the uncertainty is preferred. Thus, both of these quadrants are colored dark green.

To illustrate the heat mapping process, suppose an agricultural seed company's management team has completed a consensus scorecard. Assume the company has state-of-the-art research laboratories, which allows them to capture first mover advantages and attract lifetime customers. Thus, they have assigned technology a potential score of 4.3 (high) and a likelihood score of 3.9 (high), which maps the uncertainty in the upper right hand quadrant of Figure 1. The management team has also assigned an exposure score of 4.6 (high) and a likelihood score of 3.1 (high) which maps the uncertainty in the upper right quadrant of Figure 2. The exposure scores were awarded because the firm is concerned about having tunnel vision concerning their technology as well as concern about obsolete technology platforms.

The next step in the heat mapping process is integrating the graphs from Figures 1 and 2 into a single heat map. By integrating potential and exposure, we are ensuring that the company considers both the upside and downside of the uncertainty when making strategic decisions. The bottom graph in Figure 3 is a visual representation of the integration of the graphs. The likelihood/potential graph in Figure 1 serves as the base, and embedded in each of its four

quadrants is the likelihood/exposure graph. Thus, each quadrant of the likelihood/potential graph is now divided into four quadrants, giving us 16 quadrants for classifying uncertainty. The reason for using the likelihood/potential assessment as the base is that many businesses often fail to recognize the potential an uncertainty offers and concentrate on the exposure of that uncertainty. Plotting the potential first reduces the prospects that management overlooks opportunities.

To illustrate integrating potential and exposure we return to the example concerning the agribusiness firm and the technology uncertainty it faced. The firm scored technology in the upper-right hand quadrant for the likelihood/potential graph i.e. high likelihood and high potential. Focused on this quadrant, recall that the exposure score and the likelihood of this exposure were high. This maps the technology uncertainty in the upper-right hand quadrant of the integrated likelihood/exposure graph. Visually in Figure 3, it can be seen that for potential, the quadrant is dark-green representing an uncertainty that should be exploited by the firm, but the embedded likelihood/exposure graph indicates trouble (red color) because of the exposure faced from this uncertainty.

INSERT FIGURE 3 HERE

Uncertainty Management Strategies

So what does this analysis indicate management should do to manage the various types of uncertainty? As Baldoni (2004) indicates, many companies have identified the uncertainties their company face, but do not have policies for mitigating the exposures or capturing the potential. The bottom graph in Figure 4 contains the integrated heat map with one or more of the

six generic strategies for managing the uncertainty identified for each of the 16 quadrants. The generic strategies are retain, share, transfer, reduce, avoid, and aware. These generic strategies serve as a filter for concentrating the firm's effort on choosing a specific action or set of actions to manage the uncertainty -- to simultaneously capture the potential and mitigate the exposure. Specific strategies are beyond the scope of this paper but are important for a companies strategic decisions; see Trigeorgis (1995, 1996, 1999), Luehrman (1997, 1998a, 1998b), Courtney (2001), Mun (2003), and McGrath and MacMillan (2001) for a discussion of these choices and options.

INSERT FIGURE 4 HERE

The retain strategy applies to an uncertainty that has desirable potential with minimal exposure, i.e. *high potential + high likelihood of potential* and *low exposure + low likelihood of exposure*. Retaining this uncertainty creates opportunities to generate economic profit.

In contrast, for an uncertainty, that has *low potential + low likelihood of potential* and *high exposure + high likelihood of exposure*; the strategy that should be employed is avoidance. In essence, the consequences in this case warrant immediate exploration of actions to eliminate the uncertainty through some type of avoidance or exiting strategy.

Most strategic uncertainties are not easily managed with a retain or avoid strategy and present the greatest dilemma in strategic uncertainty management. A firm might want to share an uncertainty that has a desirable potential, yet creates adverse consequences. To mitigate these consequences, sharing the potential and exposure through joint ventures and strategic alliances is a possible strategy. Uncertainties where this type of strategy is most appropriate exhibit *high potential + high or low likelihood of potential* and *high exposure + high likelihood of exposure*.

Uncertainties which exhibit *low potential + high or low likelihood of potential* and *high exposure + low likelihood of exposure* should be managed with a transfer strategy. The transfer strategy is used because there are other institutions or firms that have better risk management capabilities for this strategic uncertainty. By outsourcing the exposure portion of the uncertainty to another entity, perhaps for example through the purchasing of insurance, the firm is able to retain the potential while truncating their exposures or losses.

The reduction strategy is preferred when exposure is very likely but the consequence is minimal; here, outsourcing is often difficult. For example, insurance firms may refuse to cover drivers who have a history of multiple auto accidents or who frequently file claims. The reduction strategy is focused on decreasing the likelihood of exposure. For example, a firm might rely upon sequential decision-making - -making incremental investments as opposed to a full-scale investment - - which allows the firm to reserve the right to play if the market develops but protects the firm if the market fails to materialize. This strategy is appropriate for uncertainties exhibiting *high or low potential + high or low likelihood of potential* and *low exposure + high likelihood of exposure*.

Aware, the final strategy is used to manage those uncertainties with *low potential + high or low likelihood of potential* and *low exposure + low likelihood of exposure*. This type of uncertainty warrants monitoring to be aware of changes in the dimensions of the uncertainty, but management efforts should be focused elsewhere, since impact on profit is minimal.

Let us return to the earlier example concerning technology to illustrate the application of these concepts and (see Figure 4). The generic strategy appropriate to manage the technology uncertainty is the retain/share strategy. The retain strategy indicates that the firm wants to capture the potential of the uncertainty if possible, but the heat map indicates that the firm should

consider transferring at least part of the uncertainty to another entity. A possible share strategy would be acquiring licensing agreements with several smaller independent R&D firms to access their technology platforms while maintaining their own platform. This allows the firm to maintain their technology potential while minimizing the tunnel vision and obsolescence problem that could arise if they relied solely on their own technology. In essence, if one of the contracted firms develops a platform that the market desires, the licensing agreement enables access to that platform, thus mitigating the exposure from technological obsolescence.

Application of the Scorecard and Heat Map

To test the applicability of the aforementioned methods for assessing and communicating the challenges and opportunities of strategic uncertainty, the concepts and tools were presented and discussed with participants at the 2005 American Seed Trade Association Advanced Management (ASTAAM) Forum - - an advanced management forum sponsored by Purdue University's Center for Food and Agribusiness in conjunction with the American Seed Trade Association's Management Skills Committee. Participants in this forum ranged from a Contract Business Development Manager to the President/CEO of a seed company. In addition, the size of the companies varied from privately held firms to publicly traded multi-national firms. This diversity led to a rich discussion of the assessment tools and concepts and their usefulness as an integral part of a company's strategic planning process.

The assessment concepts and tools were presented to the participants in a classroom teaching session in conjunction with three vignettes (hypothetical seed companies) to assist in the learning and application of the concepts. Figure 5 provides the vignettes used for the application activity. The initial workshop session introduced the sources of uncertainty and the scorecarding concepts, and then the participants were assigned one of the three case vignettes

and asked to complete a scorecard for that vignette. Upon completion of the individual assessment, participants were grouped by vignette and asked to develop a consensus or group scorecard. Each group then provided a synopsis of their completed assessment and reasons for scorecarding the strategic uncertainties for their group's vignette.

INSERT FIGURE 5 HERE

Upon completion of the group presentations and discussion of their consensus scorecards, the participants were introduced to the heat map and the six generic management strategies. The participants then used the consensus scorecard they had developed in the prior session to develop a heat map for their vignette. After viewing the heat map, each group was asked to choose the two uncertainties on which their case firm should concentrate their management efforts, and suggest and justify specific actions or activities to manage these uncertainties.

Application to the Regional Midwestern Seed Company

To illustrate the application of the concepts and the discussion and dialogue of the group from the educational session, we will highlight the group discussion of the Regional Midwestern Seed Company vignette. The group assigned to this vignette noted that when they began initial discussions there were large discrepancies in how each of them individually scorecarded the uncertainties. For example, one individual in the group argued that the financial uncertainty exhibited a high exposure with low potential because of the high debt-to-asset ratio; a second individual with experience in finance indicated that if the firm's debt cost them only 4% and they were generating an 8-10% Return on Equity (ROE), then the financial position had high potential and low exposure, especially given the information concerning market share. After extensive

discussion among the members in the group and the utilization of the group's collective body of knowledge, they were able to reach the consensus scorecard found in Figure 6.

INSERT FIGURE 6 HERE

The group used the consensus scorecard to develop a heat map (Figure 7) and determine the two most pressing exposures facing the Regional Midwestern Seed Company. They began this exercise by working with the likelihood/potential and likelihood/exposure graphs (Figures 1 and 2). The group plotted each uncertainty into the appropriate quadrant based on the consensus scores. They noted that almost immediately the colors and hand signals in this graph generated conflicting messages about key uncertainties facing this firm. For example, the policy & regulation uncertainty is mapped in the lower left quadrant of the potential/likelihood graph (red color/ thumbs down). However, it is also mapped into the lower left quadrant of the exposure likelihood graph (green color/ thumbs up). Thus, the heat mapping indicates that as to exposure, this uncertainty presents no risk to the firm, but on the potential side the uncertainty is unlikely to generate any profit. The market conditions uncertainty was placed in the dark green/thumbs up quadrant for both the exposure and potential measures. Thus, an obvious choice for this uncertainty is to find a way for the firm to maintain their current position. Ultimately, the group agreed that technology uncertainty and business and operational uncertainty were the two most critical uncertainties to be managed.

Insert Figure 7 Here

Originally, the group thought that technology uncertainty could only have a negative impact on firm value; however, after the heat mapping process they realized technology uncertainty had an upside that could not be overlooked. To determine how to manage this uncertainty the group superimposed the generic strategies for each quadrant onto the heat map. The suggested generic strategy for technology was retain/share. This generated intense discussion about the specific actions the firm should implement to capture the potential of the technology uncertainty while limiting its downside. They suggested that the firm consider developing multiple licensing arrangements with their technology suppliers. In addition, they felt that since the company has strong customer relationships, they could leverage this knowledge with these technology suppliers; in essence, providing the technology firms with information on what attributes the farmer customer needs and wants in their seeds.

While the technology uncertainty had upside potential, the business and operational uncertainty had little or no upside potential and only generated detrimental consequences to the firm. The group concluded that the firm was not large enough to capitalize on the economies of scale available to larger seed companies who bagged and distributed multiple species of seeds. The generic strategy suggested by the heat map was avoidance for the business and operational uncertainty, i.e. there was high likelihood of a large exposure and low likelihood of a high potential. With the generic strategy serving as a guide, the group suggested selling off the assets associated with the bagging and distribution facilities and using some of the proceeds to pay down debt to achieve a debt-to-asset ratio between 35-45%. The company should then focus on being a market driven company that worked more closely with their customers and technology suppliers to develop seed varieties valued in the market. They concluded that for a small seed company, customer relationships along with reputation and image have great potential.

Meanwhile, the company could effectively contract with another firm to bag and ship the products at a cost level comparable to larger competitors on a per unit basis.

Participant Evaluations

The participants completed a workshop evaluation and provided additional written and verbal feedback on the assessment tools and concepts. Several of the participants indicated in their final evaluations that the strategic uncertainty assessment tools and concepts were useful helping them in understand and prioritize strategic uncertainty. These comments are reflected in the overall ranking for this workshop sessions, which was 4.5 on a scale of 1 to 5, with a one being not relevant and a 5 being extremely relevant.

The participants indicated that the taxonomy encompasses most all uncertainties faced by firms, and a company could tailor the scorecard to meet the needs of their firm by adding or removing uncertainty categories. They also noted that the individual assessments, followed by the group discussion to build a consensus scorecard proved invaluable in resolving the differences between viewpoints. This process was beneficial in obtaining a more complete understanding of the uncertainty facing the company in their vignette. One participant noted that after hearing the other members in his group discuss their scores, he changed his individual assessment of the uncertainty because his current functional responsibilities limit his ability to accurately assess properly the uncertainty in some areas.

The participants also valued the inclusion of potential and the likelihood of potential as dimensions in the scorecard. They indicated that it is very difficult to recognize the potential of an uncertainty when most of the past focus in managing uncertainty has emphasized exposure management. The inclusion of potential affected their prioritization in assessing and managing that uncertainty, i.e. when focusing only on the exposure measure many of the participants

indicated they would want to avoid some uncertainties at all cost, but with the inclusion of the potential this was not the case.

The workshop participants indicated that the heat map with the embedded generic strategies for managing uncertainties visually communicated not only how important the uncertainty is to the company but also gave them clear guidance on the strategy that should be taken to manage the uncertainty. One participant noted specifically that the six strategies focus efforts to a subset of the available options for managing the uncertainty. Our a priori expectations were that most groups would determine that uncertainties with avoidance or retain strategies would be the most vital to the company since these are the uncertainties that have the biggest impact on profitability. The presentations by the groups supported this expectation, with each group indicating that these uncertainties should be managed first. However, participants also indicated that without the guidance of the generic strategies they would have struggled in addressing the strategic risks that did not have an avoid or retain as the generic strategy. In essence, the other four generic strategies gave them direction in determining how they should manage uncertainty. Without these additional strategies the participants stated that their firm would often choose between the two extremes of an avoid or a retain strategy. Doing so limits the firm's ability to create value.

One of the participants summarized his perspective as follows:

“The uncertainty scorecard and heat map provides a framework that guides the business through the strategic planning process in a sequential manner as opposed to the more traditional brute force methods we have been using in our strategic planning sessions. In addition, I found this method more succinct and time effective than the traditional strategy tools.”

A Final Comment

Agribusiness firms are increasingly facing more uncertainty, not just from changes in prices, costs, and productivity/efficiency, but also from dramatic changes in market conditions, competitor behavior, and government policy and regulations. Analyzing these new uncertainties is difficult and strategies to manage them are complex. Furthermore, these uncertainties provide opportunities to create value and enhance profits as well as expose the firm to significant losses.

A mental model for assisting in the assessment, management, and communication of these strategic uncertainties has been presented in this discussion. The concepts and tools use scorecarding and heat mapping to bring both structure and specificity to the subjective assessment of a firm's strategic uncertainties. A primary focus of the tools is an explicit recognition of both the potential and exposure of the firm's strategic uncertainty. A beta test of these concepts was completed at the ASTAAM Forum. The participants in the Forum found that by focusing on the potential of the uncertainty and the likelihood of this potential as well as the exposure and the likelihoods of exposure, they better understood the true impact uncertainty could have on their firm's value. In addition, their perspective was that the methodology was not only an effective way to facilitate understanding of strategic uncertainty, but it also provided useful assessment tools that management can easily incorporate into their company's strategic planning processes. In essence, the scorecard and heat mapping tools provided a time efficient and systematic method for analyzing as well as communicating the strategic uncertainties faced by the firm. Further development and testing is necessary and underway, but preliminary results suggest that the methodology is useful in understanding, analyzing, and communicating the potential as well as the exposure of strategic uncertainty.

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Table 1. Dimensions of Uncertainty and Uncertainty in Agribusiness¹

| Categories of Strategic Uncertainty | | Sources of Strategic Uncertainty |
|-------------------------------------|---------------------------------------|--|
| Business /Operational | Operations and Business Practices | Contractual uncertainty, internal processes and controls, management transitions |
| | People and Human Resources | Recruiting, training, retention, organizational culture |
| | Strategic Positioning and Flexibility | Mergers and acquisitions, joint ventures, resource allocation and planning, organizational agility, information access |
| Financial | Financing and Financial Structure | Debt structure, non-equity financing |
| | Financial Markets | Portfolio misalignment |
| Market Conditions | Market Prices and Terms of Trade | Contract terms, market outlets, market access |
| | Competitors and Competition | Antitrust, industrial espionage |
| | Customer Relationships | Poor market timing, inadequate customer support |
| | Reputation and Image | Corporate image, brand image, reputation of key employees, community relationships |
| Technology | Technological | Complexity, obsolescence, workforce skill-sets, adoption rate, diffusion rate |
| Business Relationships | Business Partners and Partnerships | Interdependency, confidentiality, cultural conflict, information sharing |
| | Distribution Systems and Channels | Access, dependence on distributors |
| Policy & Regulation | Political | Enforcement of intellectual property rights, change in leadership, revised economic policies, budget shortfalls |
| | Regulatory and Legislative | Government trade negotiations, government farm subsidies |

Table 2. Examples of potentials and exposures for the strategic uncertainties

| Categories of Strategic Uncertainty | Examples of | |
|-------------------------------------|--|--|
| | Potentials | Exposures |
| Business /Operational | Superior cost control/operational efficiency, Superior workforce, Creating synergies through scope | Business interruption, Loss of key employees |
| Financial | Strong financial position, Access to equity funds/investors, Attractive financing terms (amounts and terms), Financial reserves (pursue unanticipated opportunities, weather financial shocks, etc.) | Rising interest rates, Loss of lender, Highly leveraged |
| Market Conditions | Strong brand, Strong complementary products and bundling potential, First mover advantages, Create high switching costs (create loyalty) | Pricing pressure/discounting by competitors, Loss of market share, Consolidation of customer industry, Hyper-competition |
| Technology | Speed of innovation and commercialization, Niches not attractive to others, Enhanced learning capacity | Limited acceptance of biotechnology, Slow to commercialize new products, Competitor has preferred standards/platform |
| Business Relationships | Strong market position of distributors, Strong relationship with processors, Enhanced learning, Access to future opportunities | Dependence on distributors, Not a preferred supplier to processor, Not a key account to suppliers |
| Policy & Regulation | Increasing market from more open trade, Patent protection, Speed of approval | Changes in intellectual property law, Changes in farm income support, Local limits on technology adoption |

Table 3. Strategic Uncertainty Scorecards

Strategic Uncertainty Assessment Scorecard for Potential

| Categories of Strategic Uncertainty | Potential | | | | | Likelihood | | | | |
|-------------------------------------|------------|---|---|---|-------------|------------|---|---|---|-------------|
| | <i>Low</i> | | | | <i>High</i> | <i>Low</i> | | | | <i>High</i> |
| Business/Operational | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| Financial | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| Market Conditions | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| Technology | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| Business Relationships | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| Policy & Regulation | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

Strategic Uncertainty Assessment Scorecard for Exposure

| Categories of Strategic Uncertainty | Exposure | | | | | Likelihood | | | | |
|-------------------------------------|------------|---|---|---|-------------|------------|---|---|---|-------------|
| | <i>Low</i> | | | | <i>High</i> | <i>Low</i> | | | | <i>High</i> |
| Business/Operational | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| Financial | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| Market Conditions | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| Technology | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| Business Relationships | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| Policy & Regulation | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

Figure 1. Likelihood/Potential Graph

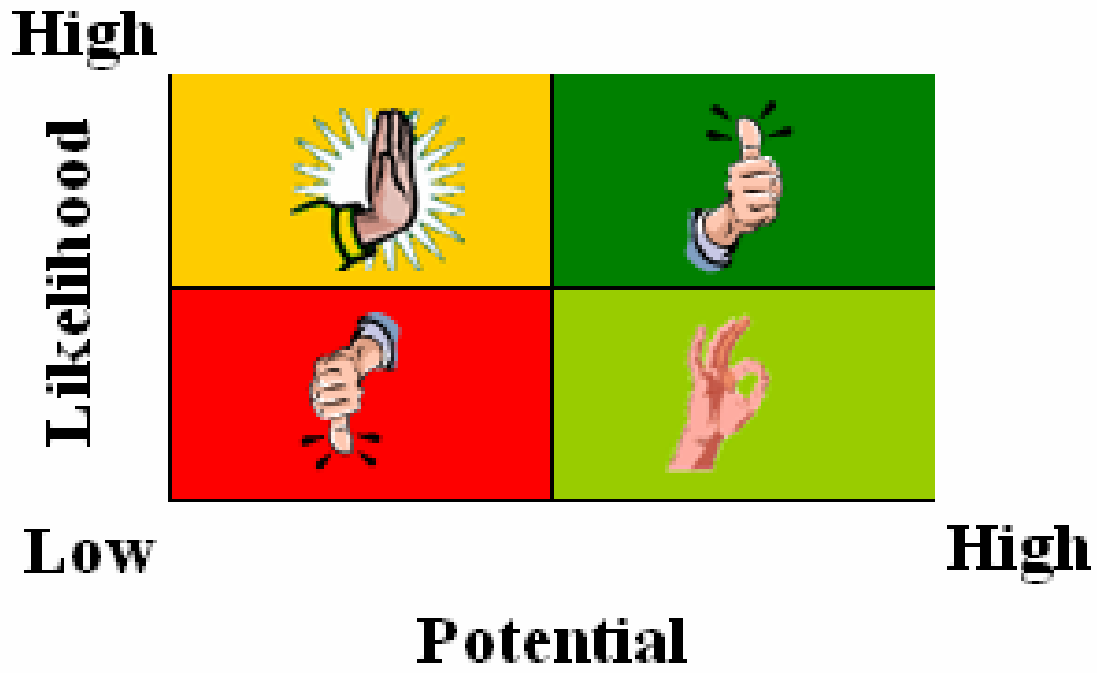


Figure 2. Likelihood/Exposure Graph



Figure 3. Integrated Likelihood/Potential and Likelihood/Exposure Graph

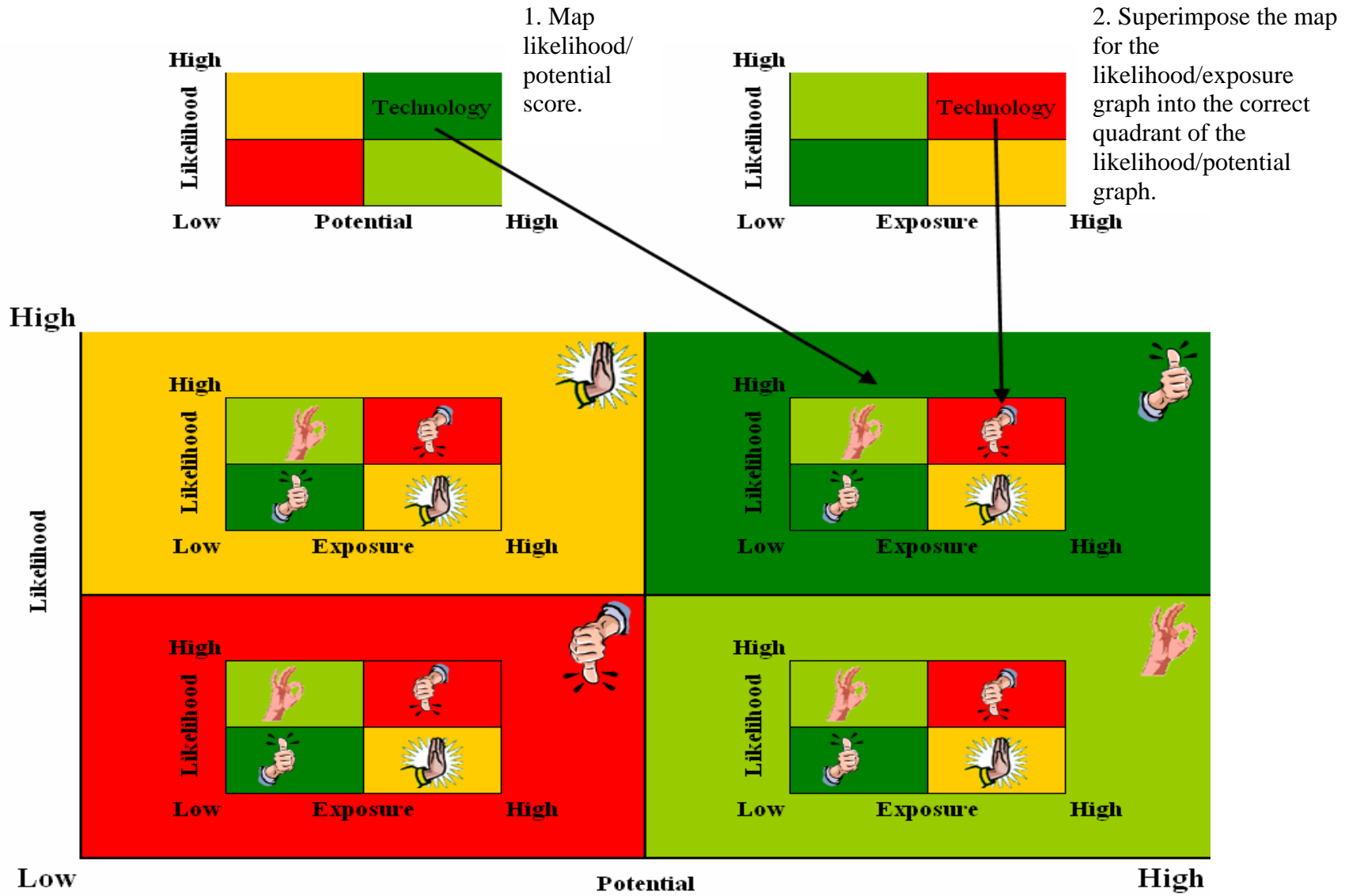


Figure 4. Generic strategies for the quadrants of the integrated Likelihood/Potential and Likelihood/Exposure Graph with a technology uncertainty example

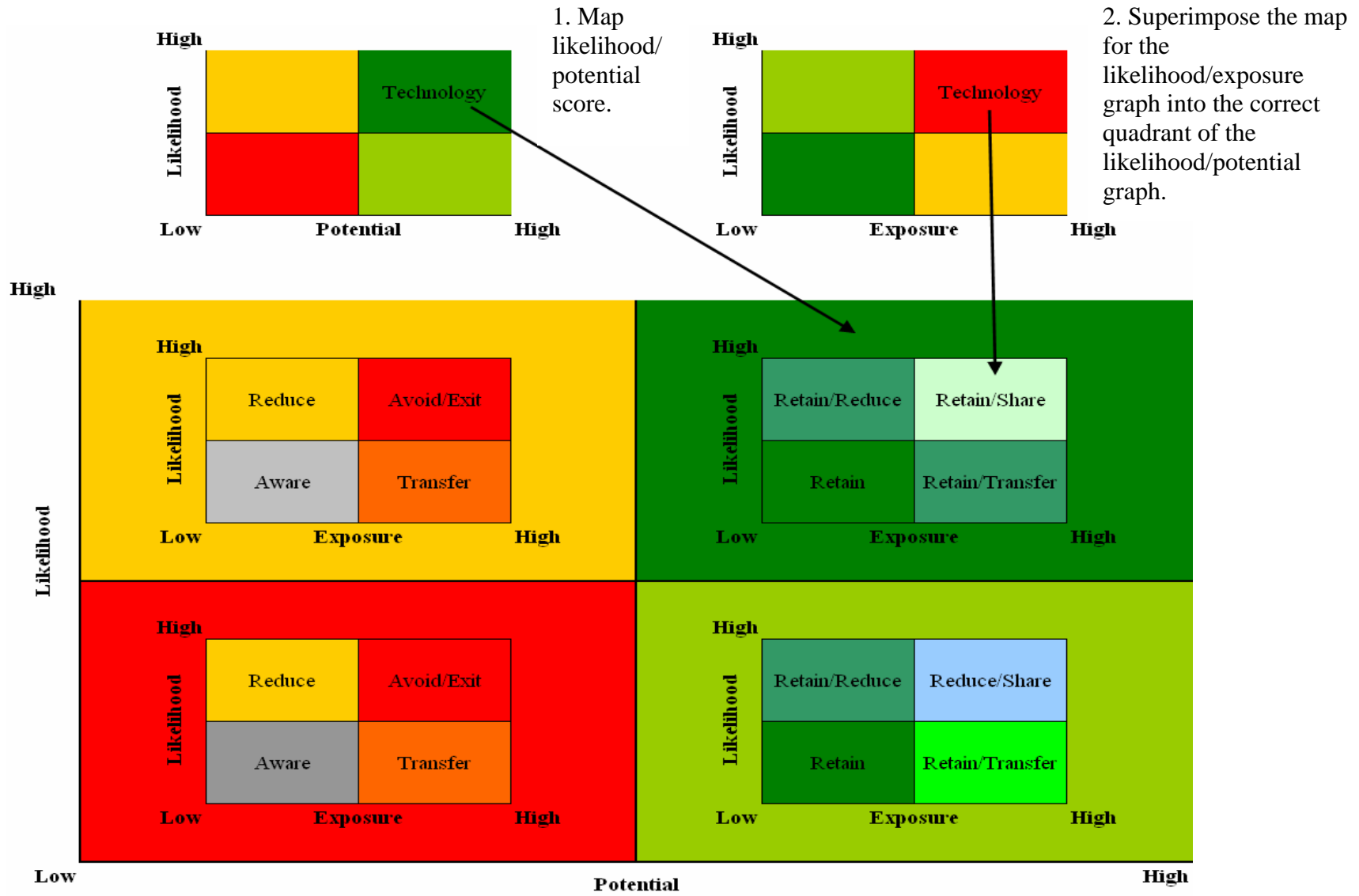


Figure 5. Vignette descriptions

Company #1 – Regional Midwestern Seed Company

- Corn and Soybean products with latest technology
- 3 states (Illinois, Indiana, Ohio)
- Direct sales to customers
- Market share hovering around 8 percent
- Technology purchased from others under license agreements
- Family owned business
- \$10,000,000 in Assets
- Debt-to-Asset Ratio of 50%
- Return on Equity averaging 8-10% last 5 years

Company #2 – National (US) Vegetable Seed Company

- Large selection of vegetable seeds with latest technology
- Independent dealerships in all major growing areas
- Market share near 30 percent
- Technology acquired through JV with R&D company
- Currently engaged in a JV with a vegetable processor to develop new varieties specific niche markets
- Closely held LLC
- \$100,000,000 in Assets
- Debt-to-Asset Ratio of 65%
- Return on Equity average 12-15% last 5 years

Company #3 – Multinational Seed Company

- Division of large Chemical Company
- All major types of seed (corn, beans, cotton, rice, wheat, vegetables, forages, etc.)
- Multiple distribution channels
- Market share in North America is strong in commodities (near 30% in corn, beans, cotton)
- Market share in North America is about 15% in vegetables and forages
- R&D activities for commodities is done in-house
- R&D activities for vegetables and forages are purchased from either their wholly owned subsidiary or others depending on the need.
- Public traded company
- \$1 Billion in assets
- \$300 Million in Debt
- Stockholder returns averaging 10 percent over the last 5 years

Figure 6. Consensus scorecard: Regional Midwestern Seed Company

Strategic Uncertainty Assessment Scorecard

| Categories of Strategic Uncertainty | Potential | Likelihood |
|-------------------------------------|-----------|------------|
| Business/Operational | 2.7 | 2.5 |
| Financial | 4.1 | 2.6 |
| Market Conditions | 4.8 | 4.3 |
| Technology | 4.3 | 3.9 |
| Business Relationships | 4 | 3 |
| Policy & Regulation | 2.3 | 1.6 |

Strategic Uncertainty Assessment Scorecard

| Categories of Strategic Uncertainty | Exposure | Likelihood |
|-------------------------------------|----------|------------|
| Business/Operational | 4.6 | 4.1 |
| Financial | 2.9 | 4.2 |
| Market Conditions | 1.3 | 2.4 |
| Technology | 4.6 | 3.1 |
| Business Relationships | 4.1 | 3.8 |
| Policy & Regulation | 1.8 | 2.4 |

Figure 7. Suggested generic strategies for Regional Midwestern Seed Company

