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Chapter 1 : Strategic Leader Performance Requirements

A trade-off (or tradeoff) is a situational decision that involves diminishing or losing one quality, quantity or property of a set or design in return for gains in other aspects. In simple terms, a tradeoff is where one thing increases and another must decrease.

It is easier to detect the nondominated points corresponding to efficient solutions in the decision space in the criterion space. The north-east region of the feasible space constitutes the set of nondominated points for maximization problems. Generating nondominated solutions[edit] There are several ways to generate nondominated solutions. We will discuss two of these. The first approach can generate a special class of nondominated solutions whereas the second approach can generate any nondominated solution. These special efficient solutions appear at corner points of the set of available solutions. Efficient solutions that are not at corner points have special characteristics and this method is not capable of finding such points. Mathematically, we can represent this situation as $\max wT$. Achievement scalarizing function Wierzbicki, [17] Figure 3. Projecting points onto the nondominated set with an Achievement Scalarizing Function Achievement scalarizing functions also combine multiple criteria into a single criterion by weighting them in a very special way. They create rectangular contours going away from a reference point towards the available efficient solutions. This special structure empower achievement scalarizing functions to reach any efficient solution. This is a powerful property that makes these functions very useful for MCDM problems. Any point supported or not can be reached. The second term in the objective function is required to avoid generating inefficient solutions. Figure 3 demonstrates how a feasible point, g_1 , and an infeasible point, g_2 , are projected onto the nondominated points, q_1 and q_2 , respectively, along the direction w using an achievement scalarizing function. The dashed and solid contours correspond to the objective function contours with and without the second term of the objective function, respectively. For a bibliometric study showing their development over time, see Bragge, Korhonen, H. The purpose of vector maximization is to approximate the nondominated set; originally developed for Multiple Objective Linear Programming problems Evans and Steuer, ; [19] Yu and Zeleny, [20]. Phases of computation alternate with phases of decision-making Benayoun et al. The purpose is to set apriori target values for goals, and to minimize weighted deviations from these goals. Both importance weights as well as lexicographic pre-emptive weights have been used Charnes and Cooper, [25]. Fuzzy-set theorists Fuzzy sets were introduced by Zadeh [26] as an extension of the classical notion of sets. This idea is used in many MCDM algorithms to model and solve fuzzy problems. Multi-attribute utility theorists Multi-attribute utility or value functions are elicited and used to identify the most preferred alternative or to rank order the alternatives. Elaborate interview techniques, which exist for eliciting linear additive utility functions and multiplicative nonlinear utility functions, are used Keeney and Raiffa, [27]. The method was first proposed by Bernard Roy Roy, [28]. Evolutionary multiobjective optimization school EMO EMO algorithms start with an initial population, and update it by using processes designed to mimic natural survival-of-the-fittest principles and genetic variation operators to improve the average population from one generation to the next. The goal is to converge to a population of solutions which represent the nondominated set Schaffer, ; [29] Srinivas and Deb, [30]. Then the decision-maker evaluates the relative importance of its various elements by pairwise comparisons. The AHP converts these evaluations to numerical values weights or priorities , which are used to calculate a score for each alternative Saaty, [32]. A consistency index measures the extent to which the decision-maker has been consistent in her responses. AHP is one of the more controversial techniques listed here, with some researchers in the MCDA community believing it to be flawed. The underlying mathematics is also more complicated, though it has gained some popularity as a result of commercially available software.

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Chapter 2 : Strategy as Trade-Offs, Discipline, and Focus

Although the SDM process often delivers "win-wins" most decisions will still involve trade-offs of some kind; hence, the next step involves evaluating these trade-offs and making value-based choices.

Examples[edit] The concept of a trade-off is often used to describe situations in everyday life. Similarly, trash cans that are used inside and then taken out to the street and emptied into a Dumpster can be small or large. A large trash can does not need to be taken out to the Dumpster so often, but it may become so heavy when full that the user risks strain or back injury when moving it. The choice of waste receptacle is a trade-off between the frequency of needing to take the trash out for the Dumpster versus the ease and safety of use. In the case of food waste, a second trade-off presents itself as large trash cans are more likely to sit for a long time in the kitchen, leading to higher levels of decomposing food indoors and a potential pest attraction. With a small trash can, the can will be taken out to the Dumpster more often, thus eliminating the persist rot that attracts pests. Of course, a user of a large trashcan could carry the can outside frequently anyway, but the heavier can would weigh more and the user would have to think more about when to take the can out, or confine themselves to a schedule, compared to a smaller can which is evidently full when it takes taking out. In cold climates, mittens in which all the fingers are in the same compartment serve well to keep the hands warm, but this arrangement also confines finger movement and prevents the full range of hand function; gloves, with their separate fingers, do not have this drawback, but they do not keep the fingers as warm as mittens do. As such, with mittens and gloves, warmth versus dexterity is the trade-off. In a like fashion, warm coats are often bulky and hence they impede freedom of movement for the wearer. Thin coats, such as those worn by winter sports athletes, give the wearer more freedom of movement, but they are not as warm. When copying music from compact discs to a computer, lossy compression formats, such as MP3 , are used routinely to save hard disk space, but information is "thrown away" to the detriment of sound quality. Lossless compression schemes, such as FLAC or ALAC take much more disc space, but do not affect the sound quality as much, thus providing better sound. Large cars can carry many people five or more , and since they have larger crumple zones, they may be safer in an accident. However they also tend to be heavy and often not very aerodynamic and hence have relatively poor fuel economy. Small cars like the Smart Car can only carry two people, and their light weight means they are very fuel efficient. At the same time, the smaller size and weight of small cars means that they have smaller crumple zones, which means occupants are less protected in case of an accident. In addition, if a small car has an accident with a larger, heavier car, the occupants of the smaller car will fare more poorly. Thus car size large versus small involves multiple tradeoffs regarding passenger capacity, accident safety and fuel economy. In athletics, sprint running demands different physical attributes from running a marathon. As such, the two contests have distinct events in competitions such as the Olympics , and each pursuit features distinct teams of athletes. The meaning of trade off quite similar to that of Opportunity cost In economics[edit] In economics a trade-off is expressed in terms of the opportunity cost of a particular choice, which is the loss of the most preferred alternative given up. A tradeoff, then, involves a sacrifice that must be made to obtain a certain product, service or experience, rather than others that could be made or obtained using the same required resources. For example, for a person going to a basketball game, their opportunity cost is the loss of the alternative of watching a particular television program at home. Many factors affect the tradeoff environment within a particular country, including availability of raw materials, a skilled labor force, machinery for producing a product, technology and capital, market rate to produce that product on reasonable time scale, and so forth. A trade-off in economics is often illustrated graphically by a Pareto frontier named after the economist Vilfredo Pareto , which shows the greatest or least amount of one thing that can be attained for each of various given amounts of the other. As an example, in production theory the trade-off between output of one good and output of another is illustrated graphically by the production possibilities frontier. The Pareto frontier is also used in multi-objective optimization. In finance , the capital

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asset pricing model includes an efficient frontier that shows the highest level of expected return that any portfolio could have given any particular level of risk, as measured by the variance of portfolio return. In other specific fields[edit] In biology and microbiology , tradeoffs occur when a beneficial change in one trait is linked to a detrimental change in another trait. For example, the higher the fecundity number of offspring , the lower the parental care that each offspring will receive. Parental care as a function of fecundity would show a negative sloped linear graph. A related phenomenon, known as demographic compensation, arises when the different components of species life cycles survival, growth, fecundity, etc show negative correlations across the distribution ranges [7] [8]. For example, survival may be higher towards the northern edge of the distribution, while fecundity or growth increases towards the south, leading to a compensation that allows the species to persist along an environmental gradient. Contrasting trends in life cycle components may arise through tradeoffs in resource allocation , but also through independent but opposite responses to environmental conditions. Tradeoffs are important in engineering. Similarly, tradeoffs are used to maximise power efficiency in medical devices whilst guaranteeing the required measurement quality [9]. In computer science , tradeoffs are viewed as a tool of the trade. A program can often run faster if it uses more memory a spaceâ€”time tradeoff. Consider the following examples: Depending on the compression method, this may also involve the tradeoff of a loss in image quality. By using a lookup table , you may be able to reduce CPU time at the expense of space to hold the table, e. For some situations e. Strategy board games often involve tradeoffs: In a worst-case scenario, a chess player might even tradeoff the loss of a valuable piece even the Queen to protect the King. In Go , you might trade thickness for influence. Ethics often involves competing interests that must be traded off against each other, such as the interests of different people, or different principles e. In medicine , patients and physicians are often faced with difficult decisions involving tradeoffs. One example is localized prostate cancer where patients need to weigh the possibility of a prolonged life expectancy against possible stressful or unpleasant treatment side-effects patient trade-off. Governmental tradeoffs are among the most controversial political and social difficulties of any time. All of politics can be viewed as a series of tradeoffs based upon which core values are most core to the most people or politicians. Political campaigns also involve tradeoffs, as when attack ads may energize the political base but alienate undecided voters.

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Chapter 3 : Trade-off - Wikipedia

Learn about trade-offs in economics and why they are important to understand when making good decisions about your time, money and energy. Read about some trade-offs that you make every day.

Strategy as trade-offs Porter. Strategy as discipline Treacy and Wiersema. Strategy is ultimately about choice—what the organization does and does not do. Strategy is about choices, and that eventually means making trade-offs such that the strategy and the firm are distinctive in the eyes of stakeholders. In this section, you will learn about strategic focus—that is, how trade-offs are reconciled—as well as two frameworks for thinking about what such focus might entail. What Is Strategic Focus? While there are different schools of thought about how strategy comes about, researchers generally agree that strategic focus When an organization is clear about its mission and vision and has a coherent, well-articulated strategy for achieving those. Strategic focus is seen when an organization is very clear about its mission and vision and has a coherent, well-articulated strategy for achieving those. However, during the mids, Dell started branching out into other products such as digital cameras, DVD players, and flat-screen televisions. As a result, it lost focus on its core sales and manufacturing business, and its performance flagged. As recently as mid, however, Dell has realized a tremendous turnaround: Through a continued focus, we expect to continue growing faster than the industry and increase our revenue, profitability and cash flow for greater shareholder value. Retrieved November 3, , from <http://> Dell provides an excellent example of what is meant by strategic focus. This spirit of focus is echoed in the following two parts of this section where we introduce you to the complementary notions of strategy as trade-offs and strategy as discipline. Creating and sustaining superior performance. Free Press; Porter, M. Competitive advantage of nations. Techniques for analyzing industries and companies. Free Press, ; Porter, M. Strategy and the Internet. Harvard Business Review, pp. Academy of Management Executive 16 2 , 40— In his various books, Porter developed three generic strategies that, he argues, can be used singly or in combination to create a defensible position and to outperform competitors, whether they are within an industry or across nations. The strategies are 1 overall cost leadership, 2 differentiation, and 3 focus on a particular market niche. Cost Leadership, Differentiation, and Scope These strategies are termed generic because they can be applied to any size or form of business. We refer to them as trade-off strategies because Porter argues that a firm must choose to embrace one strategy or risk not having a strategy at all. Overall lower cost or cost leadership A strategy in which an organization attempts to gain a competitive advantage by reducing its costs below the costs of competing firms. Differentiation The strategy where competitive advantage is based on superior products or service. Superiority arises from factors other than low cost, such as customer service, product quality, or unique style. To put these strategies into context, you might think about Wal-Mart as pursuing a cost-leadership strategy and Harley Davidson as pursuing a differentiation strategy A strategy in which an organization seeks to distinguish itself from competitors through the perceived quality of its products or services. A company can have a broad mass market competitive scope or a narrow niche market competitive scope. A firm following the focus strategy A strategy in which an organization concentrates on a specific regional market, product line, or group of buyers in combination with its pursuit of either an overall cost leadership or differentiation strategy. Products and services can be designed to meet the needs of buyers. One approach to focusing is to service either industrial buyers or consumers but not both. Martin-Brower, the third-largest food distributor in the United States, serves only the eight leading fast-food chains. With its limited customer list, Martin-Brower need only stock a limited product line; its ordering procedures are adjusted to match those of its customers; and its warehouses are located so as to be convenient to customers. Firms using a narrow focus strategy can also tailor advertising and promotional efforts to a particular market niche. Many automobile dealers advertise that they are the largest volume dealer for a specific geographic area. Other car dealers advertise that they have the highest customer satisfaction scores within their defined market or the most awards for their service department. Another differentiation strategy is to design products

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specifically for a customer. Such customization may range from individually designing a product for a single customer to offering a menu from which customers can select options for the finished product. Tailor-made clothing and custom-built houses include the customer in all aspects of production, from product design to final acceptance, and involve customer input in all key decisions. However, providing such individualized attention to customers may not be feasible for firms with an industry-wide orientation. At the other end of the customization scale, customers buying a new car, even in the budget price category, can often choose not only the exterior and interior colors but also accessories such as CD players, rooftop racks, and upgraded tires. By positioning itself in either broad scope or narrow scope and a low-cost strategy or differentiation strategy, an organization will fall into one of the following generic competitive strategies: Firms pursuing this type of strategy must be particularly efficient in engineering tasks, production operations, and physical distribution. A low-cost leader can gain significant market share enabling it to procure a more powerful position relative to both suppliers and competitors. This strategy is particularly effective for organizations in industries where there is limited possibility of product differentiation and where buyers are very price sensitive. Overall cost leadership is not without potential problems. Two or more firms competing for cost leadership may engage in price wars that drive profits to very low levels. Ideally, a firm using a cost-leader strategy will develop an advantage that others cannot easily copy. Cost leaders also must maintain their investment in state-of-the-art equipment or face the possible entry of more cost-effective competitors. Major changes in technology may drastically change production processes so that previous investments in production technology are no longer advantageous. Finally, firms may become so concerned with maintaining low costs that they overlook needed changes in production or marketing. The cost-leadership strategy may be more difficult in a dynamic environment because some of the expenses that firms may seek to minimize are research and development costs or marketing research costs—expenses the firm may need to incur to remain competitive. Focused Low-Cost A cost-focus strategy is a low-cost, narrowly focused market strategy. Firms employing this strategy may focus on a particular buyer segment or a particular geographic segment and must locate a niche market that wants or needs an efficient product and is willing to forgo extras to pay a lower price for the product. Differentiation A differentiation strategy involves marketing a unique product to a broad-based market. Because this type of strategy involves a unique product, price is not the significant factor. In fact, consumers may be willing to pay a high price for a product that they perceive as different. The product difference may be based on product design, method of distribution, or any aspect of the product other than price that is significant to a broad group of consumers. Several studies have shown that a differentiation strategy is more likely to generate higher profits than a cost-leadership strategy, because differentiation creates stronger entry barriers. However, a cost-leadership strategy is more likely to generate increases in market share. Focused Differentiation A differentiation-focus strategy is the marketing of a differentiated product to a narrow market, often involving a unique product and a unique market. This strategy is viable for a company that can convince consumers that its narrow focus allows it to provide better goods and services than its competitors. Differentiation can be achieved through real product features or through advertising that causes the customer to perceive that the product is unique. Differentiation may lead to customer brand loyalty and result in reduced price elasticity. Differentiation may also lead to higher profit margins and reduce the need to be a low-cost producer. Since customers see the product as different from competing products and they like the product features, customers are willing to pay a premium for these features. As long as the firm can increase the selling price by more than the marginal cost of adding the features, the profit margin is increased. Firms must be able to charge more for their differentiated product than it costs them to make it distinct, or else they may be better off making generic, undifferentiated products. Firms must remain sensitive to cost differences. They must carefully monitor the incremental costs of differentiating their product and make certain the difference is reflected in the price. Firms pursuing a differentiation strategy are vulnerable to different competitive threats than firms pursuing a cost-leader strategy. Customers may sacrifice features, service, or image for cost savings. Price-sensitive customers may be willing to forgo desirable features in

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favor of a less costly alternative. This can be seen in the growth in popularity of store brands and private labels. Often, the same firms that produce name-brand products produce the private-label products. The two products may be physically identical, but stores are able to sell the private-label products for a lower price because very little money was put into advertising to differentiate the private-label product. Imitation may also reduce the perceived differences between products when competitors copy product features. A final risk for firms pursuing a differentiation strategy is changing consumer tastes. The feature that customers like and find attractive about a product this year may not make the product popular next year. Changes in customer tastes are especially obvious in the fashion industry. For a variety of reasons, including the differences between intended versus realized strategies discussed in an earlier section, none of these competitive strategies is guaranteed to achieve success. Several risks associated with these strategies are based on evolved market conditions buyer perceptions, competitors, etc. Straddling Positions or Stuck in the Middle? Can forms of competitive advantage be combined? That is, can a firm straddle strategies so that it is simultaneously the low-cost leader and a differentiator? Porter asserts that a successful strategy requires a firm to stake out a market position aggressively and that different strategies involve distinctly different approaches to competing and operating the business. Some research suggests that straddling strategies is a recipe for below-average profitability compared to the industry. A straddling strategy may be especially dangerous for narrow scope firms that have been successful in the past, but then start neglecting their focus. An organization pursuing a differentiation strategy seeks competitive advantage by offering products or services that are unique from those offered by rivals, either through design, brand image, technology, features, or customer service. Alternatively, an organization pursuing a cost-leadership strategy attempts to gain competitive advantage based on being the overall low-cost provider of a product or service. Although Porter describes the dangers of not being successful in either cost control or differentiation, some firms have been able to succeed using combination strategies. Research suggests that, in some cases, it is possible to be a cost leader while maintaining a differentiated product. Southwest Airlines has combined cost-cutting measures with differentiation. The company has been able to reduce costs by not assigning seating and by eliminating meals on its planes. It has also been able to promote in its advertising that its fares are so low that checked bags fly free, in contrast to the fees that competitors such as American and United charge for checked luggage.

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Chapter 4 : Trade Offs and Opportunity Cost - Foundation For Teaching Economics

Decision Consequences and Trade-Offs. Following the development of a suite of alternatives, it becomes necessary for decision participants to develop a complete understanding of the impacts of those alternatives and then to begin the process of determining which set of alternatives provides the best solution that is supportable at some level by all decision participants.

Students will understand that: Productive resources are limited. Therefore, people cannot have all the goods and services they want; as a result, they must choose some things and give up others. Scarcity is the condition of not being able to have all of the goods and services one wants. It exists because human wants for goods and services exceed the quantity of goods and services that can be produced using all available resources. Like individual, governments and societies experience scarcity. Choices involve trading off the expected value of one opportunity against the expected value of its best alternative. The evaluation of choices and opportunity costs is subjective; such evaluations differ across individuals and societies. Effective decision making requires comparing the additional costs of alternatives with the additional benefits. Most choices involve doing a little more or a little less of something; few choices are all-or-nothing decisions. Marginal benefit is the change in total benefit resulting from an action. Marginal cost is the change in total cost resulting from an action. As long as the marginal benefit of an activity exceeds the marginal cost, people are better off doing more of it; when the marginal cost exceeds the marginal benefit, they are better off doing less of it. Different methods can be used to allocate goods and services. People, acting individually or collectively through government, must choose which methods to use to allocate different kinds of goods and services. Students will be able to use this knowledge to: Evaluate different methods of allocating goods and services by comparing the benefits and costs of each method. Scarcity requires the use of some distribution method, whether the method is selected explicitly or not. Comparing the benefits and costs of different allocation methods in order to choose the method that is most appropriate for some specific problem can result in more effective allocations and a more effective overall allocation. Define scarcity as the fundamental economic condition, and provide examples of the importance and implications of relative scarcity. Develop the logic that leads from scarcity to the necessity of choice. Illustrate how the economic condition forces everyone “consumers and producers” to make choices. Discuss how societies devise different systems of allocation to systematically address the necessity of choice. Demonstrate the subjectivity of distinctions between needs and wants. Discuss how allocation systems help people make choices. Illustrate the concepts of trade offs and opportunity cost. Introduce and practice the production possibility frontier model of trade-off and opportunity cost. Introduce marginal decision making. Illustrate and explain how economists distinguish between good choices and poor choices. Ask and answer the question: We live in a world of relative scarcity. Scarcity exists when resources have more than one valuable use. Scarcity exists even in the midst of abundance. Scarcity forces people to choose between alternatives. People choose purposefully from the alternatives they perceive. Scarcity is dealt with more effectively by recognizing that the distinction between needs and wants is subjective. Societies have adopted a variety of allocation systems to deal with scarcity. The opportunity cost of choosing one alternative is the value given up by not taking advantage of the next best alternative. To choose is to refuse: Good decision-making occurs at the margin. We seldom make all-or-nothing decisions; everyday life is an exercise in marginal decision-making. Decisions to continue or discontinue an activity are made by weighing the additional expected benefits against the additional expected costs. The PPF Production Possibility Frontier models the trade-offs and opportunity costs that necessarily accompany decision-making in the face of scarcity. Scarcity is more of a problem for the poor. People face scarcity; governments do not. Producers make choices differently than consumers. We can have more without giving up anything. Good decision-making means being able to distinguish between good and bad alternatives. Sometimes, you just have no choice. Once a choice is made people must stick to it. The value of an education is an exclusive personal benefit. Economic

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choice making principles work better for western societies. How can something be scarce and not in short supply at the same time? How can it be that rich people face as much scarcity as poor people do? Does finding more productive resources make things less scarce? Why, in economic terms, is the price of a good or service different than its cost? How can you give up something you never had in the first place? Is the production possibility curve ever a straight line? Classroom Activity Options

Distribute and discuss the article entitled Scarcity. Bring in an item to use for the simulation – a large cinnamon roll for a morning class, or a gourmet chocolate bar for an afternoon class – something you know many students will want. Give them 5 minutes to work in groups of 2 or 3 to brainstorm and list as many ways to distribute the item as possible. Re-convene the large group and, in round-robin fashion, list distribution methods on the overhead or whiteboard, until no new ways are proposed. Do not allow discussion during this time, only the listing of the distribution types. Group the list items into standard categories of allocation systems: Once this exercise is completed, tell students they now have the knowledge they need to make an informed decision and that they will get one vote each to determine how the item will be distributed. Distribute the item as selected by the class. Then, tell the class that what they just did is reflective of economies throughout the world. Assign the students with the task of identifying the cost to them of each of the following choices: For each choice, identify the next-best alternative. First choice of the morning: Get up when the alarm goes off. Turn off the alarm and go back to sleep. Second choice of the morning: Go back to bed. Emphasize that the value of the next-best alternative is the opportunity cost of each decision. Ask students if they will stay in school until graduation. Ask them what could make them change their minds – either from yes to no, or from no to yes. Emphasize that deciding whether or not to keep coming to school is a marginal decision. Each day, students weight the expected additional costs and expected additional benefits of going to school again, and if those expected additional costs or benefits change, then their decision about staying in school until graduation may change. Display the big pencil and discuss all of the choices that must be made and by whom in order to produce it. Identify the productive resource categories and why these are scarce. Introduce the incentives that cause the pencil to be produced. Obtain a two pan balance and use this prop to visually reinforce the decision-making process of weighing expected costs with expected benefits. Distribute practice PPF problems for students to work on individually or in small groups. Ask students to generate original PPF examples demonstrating trade-offs and opportunity costs from their own lives. Ask students to discuss the question of how an understanding of opportunity cost could change their own lives. The Tampa Tribune, April 7,

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Chapter 5 : Cyber Resilience - Reports - World Economic Forum

Trade-offs create opportunity costs, one of the most important concepts in economics. Whenever you make a trade-off, the thing that you do not choose is your opportunity cost. To butcher the poet Robert Frost, opportunity cost is the path not taken (and that makes all the difference).

Viewpoints from the Negotiation Table Posted on April 26, - 9: The essence of natural resource management is making decisions about trade-offs. At the most basic level, there are the trade-offs between managing for short-term benefits now or foregoing them for greater benefits later. Then there are trade-offs between different types of benefit: There is a maximum amount of fish an ecosystem can supply for human consumption, for instance. Or there is a particular amount of space a wind farm can take up before it impacts local fisheries. This means that trade-offs need to be made among different services, including the requirements for sustainability of the ecosystem itself. How best to evaluate trade-offs is a challenging question. Clear, relevant, and well-presented information is essential - on ecology and economics, on threats and impacts, on the consequences of various potential policies. Software tools can help analyze these factors. Ultimately, however, it comes down to individuals. What incentives and disincentives do they face? And what is their willingness, and opportunity, to compromise? In this issue, MEAM asks several people with experience in trade-off negotiations, or who have advised such processes, for their views: To aid comparison, they each draw lessons from the fisheries management realm. Nici Gibbs is the owner of Fathom Consulting Ltd. She has provided policy advice from the fishing industry perspective for multiple trade-off negotiation processes - from MPA planning, to catch allocation, to space allocation between fishing and other industries, and more. Kevin Stokes is owner of stokes. Gibbs and Stokes are also partners in Shoal Ltd. Negotiate only with those who have something to bring to the table By Nici Gibbs nici [at] fathom. Where the allocation tradeoffs are made between two commercial users of ocean resources such as fisheries and undersea cables , government should not be involved in the negotiations. Instead, the appropriate role of government is to put in place the legislative framework including any necessary environmental bottom lines that enables the parties to reach an efficient and agreed allocation themselves. Where allocation tradeoffs are required between commercial and non-commercial users, government should seek to maximize direct involvement of the affected parties and minimize its own role. Inappropriate government intervention e. I would add that many parties are not experienced in negotiations, and there is a potential role for government to help parties understand negotiation processes and perhaps to frame positions and identify bottom lines. To the extent that it is helpful, government could play a useful facilitation role, helping to expose bargaining ranges and looking for suggestions to expand the benefits of compromise. On tips for multi-party allocation processes Gibbs: Multi-party allocation processes should: Government-run negotiation processes should be designed to remove any incentives for parties to "opt out" and seek to run an "end game" directly with government rather than deal directly with other users. For example, any party that withdraws from the process and seeks to lobby the government should be rebuffed. Government should also avoid changing the rules or the goal posts during a negotiation process. Many jurisdictions have clear legislation and policies on consultation but it is often hard to believe that consultation is carried out with an open mind and in good faith due to constant examples of late-run influences or clear political moving of goal posts during processes. I would recommend the use of neutral facilitators for negotiations: This does not engender confidence. Most importantly, do not pretend that a resource allocation decision is a negotiation if it is not. For example, three years ago a new NZ government asked the inshore fishing industry to give up large areas of coastal waters as exclusive "recreational fishing havens". The industry was prepared to discuss this, but only in the context of a true negotiation i. Government was not prepared to come to the table, so from the industry perspective there was nothing to negotiate. On negotiation advice for stakeholders Gibbs: Negotiate only with those who have an ability to commit to negotiated outcomes: Negotiate only with those who have something to bring to the table i. Where possible,

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negotiate directly with other affected parties and present an agreed solution to government. Use the best available information, and seek agreement on the quality of available information e. In March , private negotiations between bottom trawl fishermen and environmental groups in British Columbia, Canada, reached a breakthrough agreement. The pact, designed to protect certain seafloor habitats from trawl gear, effectively ended years of disagreement between industry and environmentalists. It also required trade-offs from both sides. How bottom trawlers and environmentalists found common ground By Scott Wallace swallace [at] davidsuzuki. This collaboration was focused on the common goal of making sure the industry was not impacting highly sensitive habitats for deepwater corals and sponges, as well as systems deeper than meters characterized by slow growth and low productivity. To get to that, we sat down and developed measures that we thought could achieve this end goal. The first measure was to define the boundary of where the fishery could operate. This was to ensure that no further expansion could ever take place, as science shows that the bulk of the damage occurs with the first few passes of a bottom trawl. To operationalize the boundary we removed "low effort areas" as this allowed for the most important areas for trawling to be identified. This process involved a lot of negotiation. However, industry also gave up some large amounts of previously fished area to make this threshold for several of the ecosystem types, particularly the deep sea. In addition, some known areas of highly sensitive habitat were also removed from the boundaries at this stage. Within the defined boundaries we knew there would still be areas of sensitive habitat types for coral and sponges. If we had waited for government to identify these areas, it could take decades. We developed a highly restrictive individual bycatch quota to essentially put the onus on industry to avoid coral and sponge areas. If a vessel exceeds its individual bycatch quota, it is either taken off the water or it needs to purchase quota from other vessels. However, given that the quota is so low, no one will readily give up their quota. This Habitat Conservation Bycatch Limit will essentially provide a tow-by-tow incentive to change behavior. On the trade-offs each side made Turriss: The industry had to give up current fishing ground to protect corals and sponges and to protect a percentage of different substrate types by depth strata. We also surrendered the opportunity to bottom-trawl historical fishing ground not fished since , and the opportunity to bottom-trawl new ground outside of the footprint. And we gave up unrestricted catches of coral and sponges within traditional bottom-trawl fishing locations. Furthermore, industry allowed the environmental community to have meaningful input into the management of the groundfish bottom trawl fishery. In return, the environmental community has to work cooperatively with the groundfish trawl industry on achieving recognition in the market for improved management measures. These measures will help to ensure the sustainability of the groundfish resources and the ecosystem. The environmental community has also agreed to refrain from publicly criticizing the British Columbia groundfish bottom trawl fishery regarding habitat issues addressed in the agreement. Rather, issues are to be addressed through a newly established Habitat Review Committee that includes industry, the environmental community, and the federal Department of Fisheries and Oceans. On advice for trade-off negotiations elsewhere Turriss: Keep the big picture in sight, and find stepwise solutions that move you in the right direction. Compromising generally results in shared benefits and constructive change. It moves you closer to your goals and objectives, and makes future change more realistic and achievable. The main tip to others is to have a clear set of mutually agreed-to conservation objectives. If this is in place, then the solution can be flexible, creative, and innovative. Kevern Cochrane is a consultant on fisheries and sustainable development, based in Cape Town, South Africa. Over the course of his career, he has engaged in processes worldwide involving many types and scales of trade-offs, usually in the role of providing scientific advice to facilitate planning and decision-making. The drive for trade-offs should come from stakeholders themselves By Kevern Cochrane kevern. In most cases the conflict predates the search for a solution, whether between short- and long-term interests of a single user or competition between different stakeholders. As a result, the stakeholders will often already know that they have a problem and will be looking for a solution before the government negotiator brings them together. They will recognize that compromise will be necessary, even if they choose to adopt an apparently short-sighted and intransigent

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position at the start of the negotiations. In contrast, government negotiators are already in trouble if they have to convince stakeholders that there is a problem and they must make trade-offs. Unless the stakeholders are aware of the problem - and that they are part of both the problem and the solution - successfully negotiating a voluntary agreement is very unlikely, no matter how good the scientific advice or the decision-making tools that are thrown at the problem. The conflict here is between two groups of countries that can be summarized, with some oversimplification, as: Those that see a CITES listing as being an important conservation symbol, a means of raising awareness, and a core component of fixing the problems being experienced in managing many fisheries for species involved in international trade; and Those that hold the view that a listing would not strengthen fisheries management and that CITES has no place, or at most a very restricted place, in fisheries management. This is not least because of concerns about the difficulty of getting agreement to remove a species from an Appendix once it has been imposed, even when the species has recovered. Experience over the last eight years suggests that both groups see the status quo, which is effectively an impasse, as suiting their own goals better than any compromise approach. Their views are reinforced by a very low level of trust between the two groups. Therefore at present there seems to be little hope of finding a solution that would enable CITES to be used effectively for species and fisheries where it could play a useful role, although I would like to be proven wrong on this view. Fortunately, I have also experienced many more positive cases that have ended with improved management to meet multiple, potentially conflicting criteria. Examples include the progress being made in several countries and regions toward implementing an ecosystem approach to fisheries EAF. In these cases, a number of factors have created an awareness in the fishing industry of the need to take a broader view of management. Those factors have included their own observations of problems in the ecosystem around them, public and consumer pressure, and awareness-building by government authorities, conservation NGOs, and global bodies such as FAO. On the other side of the negotiations in these successful cases, the conservation and non-consumptive stakeholders pushing for implementation of EAF have also recognized the place of fisheries and other legitimate resource users within the ecosystem and the importance of accommodating their needs as far as possible. This environment of mutual acceptance creates fertile ground for successful negotiations. On the need to respect stakeholders Most importantly, it is vital for government negotiators to understand and have respect for the perspectives, needs, and hopes of all the different, legitimate stakeholders. Truly cynical and predatory stakeholders are, fortunately, the exception and can usually be identified quickly. The majority of stakeholders bring to the table sincere and important fears and hopes.

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Chapter 6 : Multiple-criteria decision analysis - Wikipedia

** The Financial Trade-Offs study was created by Ameriprise Financial utilizing survey responses from 3, employed Americans with access to an employer sponsored retirement plan (or Americans with an employed spouse with access to an employer-sponsored retirement plan) ages.*

Page Share Cite Suggested Citation: The National Academies Press. As noted earlier, a common mistake in collaborative decision making is to prioritize objectives too early in the process. Attempts to do so before decision objectives and their metrics are clarified and consequences are calculated will result in discussion at a level that is too high to uncover and resolve differences. Some management interventions may look different over shorter time frames but similar over longer time frames. This list is illustrative only, put here to demonstrate the type of trade-offs that could surface at this point of the decision process. An effective decision process is based on the recognition that people develop their decision objectives and priorities as they deliberate and learn in a complicated, novel context. Slovic, People do not know at the outset how their values interact with what can be changed on the system nor how changing the system leads to intended and unintended impacts to the things they care about. The trade-off step is about exploring that decision space; looking for insights into how values are affected by the way in which the system reacts to changes; and looking for mutually advantageous solutions or, at least, solutions where important gains for some decision participants can be found without too much sacrifice of the interests of other participants. Developing consequence tables was discussed in the previous sections. The next sections describe practical steps through which decision participants may be led to ultimately highlight the important trade-offs among a small number of alternatives so that a decision may ultimately be made. Eliminating Dominated Alternatives Pairwise comparisons of all the alternatives can show how they perform against each other. If an alternative is dominated—that is, not better than any other alternative with respect to all metrics, and worse with respect to at least one metric—it can be eliminated from further consideration. The application of this principle highlights the importance of including all relevant and significant metrics in the consequence table, lest an alternative be dropped prematurely. Refining Consequence Metrics Entries in a consequence table should reflect the best available knowledge and science. Early in the process, before substantial investigation into all the performance metrics and consequences, some metrics will likely be based on judgment. If there are comparisons between alternatives where most consequences point to a dominant relationship except for one or a few judgmental entries, then the possibility of refining those entries must be considered. If so, there may be no reason to seek further refinement of the ordinal scale. Otherwise, the process must iterate back to the development of more substantive and quantified metrics to better inform what is being gained or given up in the trade-off. Even well-researched and quantified metrics may need to be refined if deeper questions regarding those metrics surface during trade-off discussions. Again, this would lead the group to iterate back to refining the metrics and reestimating the consequences. It is important that any revision of metrics and consequences be entirely transparent and based on either newly available data or a more intensive analysis of existing data. Revision of prior judgmental metrics is generally to be avoided, as it may be viewed as self-serving or strategic on the part of the agency or the individual responsible for the judgment. This can quickly lead to an erosion of trust among the participants. Eliminating Uninfluential Criteria Some consequences brought forward by the decision participants may turn out to be of little importance for the decision at hand. The MSIC value defined earlier may be an indication of whether a particular metric can be ignored in decision making. Note the important process implications here: A careful consideration of the underlying impacts, however, could reveal that those factors, while still Page Share Cite Suggested Citation: An example of this is in the colored consequence table see Table 8. Because the consequences for power generation are roughly equivalent across all alternatives in that table, the group can conclude that this factor is not relevant to the decision. It must be emphasized that this is not a value judgment, but rather a technical one.

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Yet this technical judgment can reframe the problem in a powerful way, perhaps even helping to unlock a potentially deadlocked set of deliberations. There is also an important communication element here. If this issue was important to the decision participants, then it is likely that it will be important to those outside the process as well. Communications regarding the process and its conclusions will need to include a careful justification for excluding the metric: Monetizing Metrics If after eliminating alternatives through the steps above it is still not possible to unambiguously rank alternatives, the next step could be to monetize certain impacts. In the example consequence table see Table 8. Some metrics in the table may not be amenable to monetization, but this is not always the case. For example, there are well-established methods for monetizing flood damage or recreation experience, and doing so may be a helpful way to simplify the consequence table and to clarify the comparison of alternatives to allow ranking. Monetization methods include market-based valuation e. Yet, any valuation of this type should be performed carefully using the best available methods and data. Valuation techniques inject uncertainty into a process that is already characterized by considerable uncertainty. The analyst must be aware of the trade-off between additional information and increased uncertainty. Retaining the consequences in their natural units as long as possible is important in a decision process such as PrOACT for two reasons. First, monetization of consequences can be controversial, and doing so before mutual trust has developed may undermine the legitimacy of the decision process. This can lead to the development of new and creative alternatives. Aggregating consequences into a monetized sum of costs or benefits too early may derail this learning opportunity Gregory et al. Comparing and Combining Objectives Recall that the goal of this exercise is not to find a single best solution but a solution that is widely acceptable to the decision participants. A collaborative participatory process that includes building a consequence table and applies a structured approach to explore value trade-offs can often identify such a solution. Some have likened this final step to multiparty negotiation Bourget, New insights may be used to refine alternatives and generate large gains to one set of interests with only small losses to other interests. Presumably, participants will agree to an outcome if there are greater benefits to doing so than not agreeing. Successful application of these ranking and weighting methods can occur only when a high level of trust exists—whether present at the outset of the process or as a result of the process. In certain cases, it is possible that a thorough qualitative examination of trade-offs does not generate an obvious mutually acceptable solution. There still may remain a large number of alternatives or trade-offs across a large number of objectives with no single dominant alternative. In these cases, a more structured method may allow participants to think more rigorously about the relationships between their objectives and the alternatives. A structured elicitation and application of decision weights built on a multiple attribute utility theory MAUT—for example, swing Page Share Cite Suggested Citation: While the swing weighting approach is built on and consistent with the theory of consumer choice as found in any microeconomics textbook, it is not an optimization process that generates the best answer based on objectively defined decision weights. Based on these, the search for a commonly supported alternative can continue. Presented with the information in this way, a decision participant may move from a positional approach for comparing alternatives and instead may focus on their underlying interests. As an example, the participants can see that the effect of the various alternatives is that flooding in the lower Bridge River may range from zero to one day per year. This information could make it easier to prioritize among their decision objectives. Guidance can help people construct their values around these difficult and novel considerations. For instance, when considering how to trade off X million dollars against some benefit say, reduction of flood risk, or improvement of riparian habitat, a useful threshold question to ask is whether similar benefits can be achieved at a lesser cost through action in other parts of the system. A useful comparison question to ask is how other people value similar trade-offs. Following a process of normalization and determination of the relative value of the swings, weights are assigned to the objectives, where the objective with the potential to produce the greatest increase in overall value receives the largest weight Belton and Stewart, If uncertainty is an important component of understanding trade-offs, it will also need to be addressed in this. This could be done by translating uncertain consequences into their certainty equivalents: A unique set of consequence

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tables like Table 8. As with all these tools, it is necessary to maintain communications with all decision participants to explicitly test whether the extra process burden is worth the resulting insights it could reveal. It is important for participants to know that these valuation tools do not supplant decision making; rather, they help participants gain additional insights into their decision objectives that otherwise might be obscured by the multiple-objective decision making in a complex management system. Building this exploratory step into the process could enhance the legitimacy of surprising swing weighting outcomes should they occur. While the decision framework is described in a linear way, it can be iterative when insights gained at one step lead to revisiting previous steps. The need to revisit previous steps might be recognized when participants recognize data gaps as they try to balance consequences across management alternatives, when they recognize certain metrics need to be refined before consequences can be prioritized, or when they conclude that more creative thinking needs to be put into developing alternatives. Being able to answer the questions found in Box 8. Given that the decision processes have to be completed in a finite time, however, it is important to have a common understanding of when deliberation can continue and when a final drive for Page Share Cite Suggested Citation:

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Chapter 7 : Ecosystem services of the Southern Ocean: trade-offs in decision-making

graphical representation of the process underlying decisions and it shows the resulting consequences of making various choices Decision Tree Model Ethical decision making frequently involves trade-offs, and a decision tree helps managers navigate through them.

Normative trade-offs framework Share Developed by the System Initiative on Shaping the Future of Digital Economy and Society as a tool for removing the veil of ambiguity from difficult decisions. In a number of contexts, from business to politics to the social sector, leaders have to make decisions and prioritize one set of values over another – a policy-maker may be forced to choose between allocating a national budget towards education versus healthcare; a business leader may be forced to choose between capturing market share versus profitability. To make these decisions, leaders often seek out data to inform their choices. For example, policy-makers have reams of budget analyses and business leaders have granular visibility into customer segments. While this decision-making environment is rich in facts that may support any decision, the process itself is often divorced from the core values leaders are attempting to promote and prioritize. However, these hard-to-quantify values often implicitly frame the terms of the debate through which policy is made. The objective of this framework is to surface the values that underlie decision-making and offer a transparent and collaborative process by which leaders can make and explain policy decisions with normative implications. This framework is comprised of three steps: Articulate the option space Isolate the most important values Quantitatively rank feasible choices

1. A full set of options, unconstrained by the limitations of present circumstance, helps push the boundaries of thinking. This exercise allows for later attribution of values or norms to be clearer and more explicit. These vulnerabilities and exploits which take advantage of them can be catalogued and stockpiled by national defence organizations and deployed offensively. These zero-days can also be shared with the software vendors whose product is vulnerable, so they can develop measures to mitigate and patch these vulnerabilities. After all, they reasoned, a software vulnerability first has to be coded before a debate can arise about how to share knowledge of that vulnerability to promote competing valid national interests. In brief, in articulating the full set of areas where policy-makers could contribute, it became obvious that much of the debate – while valid – did not adequately consider other important elements. It is meant to be a list of all the values that might be held by a given constituency with respect to a policy area. The list is not meant to be exhaustive, but should include a sufficient number of values to ensure that the most important or most likely to give rise to a values conflict are represented. Depending on the context, care should be taken to ensure that the values described are relevant to the various political, cultural and personal differences among stakeholders liable to be affected by the decisions in question. For the Playbook for Public-Private Collaboration, the Forum convened a group to outline the key values that policy-makers should weigh in making choices between different cybersecurity policy options. Again, taking the example of a recent discussion on cybersecurity policy, the more than 20 values that were initially identified as significant were eventually pared down to a list of five key values animating policy debate: Security – the protection of assets tangible and intangible from damage. Assets may be anything of value, including the well-being of individuals. Damage may comprise the loss of availability, integrity and, where applicable, confidentiality of assets resulting in a diminution of value for the rightful owners of the asset. Privacy – the ability of an individual, group or organization e. The boundaries of privacy vary by context and by country. The domain of privacy partially overlaps with security confidentiality , which can include the notion of appropriate use as well as protecting information. Fairness – the extent to which entities within a given nation-state will be impacted symmetrically or with otherwise perceived appropriateness by policy, including due process. Perceptions of appropriateness will vary by context and by country. Economic value – the amount of monetary and common wealth, and commerce statically e. Lower costs from cyberincidents may also contribute to greater economic value. Accountability – the extent to which an entity individual, group,

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organization can be held responsible or even liable for consequences arising out of its action or inaction. Public- and private-sector accountability have been separately delineated to demonstrate how burden shifts in particular policy models. In addition to analytical tractability, the forcing function of shaping values is itself informative about how to think about value-based decisions: Not all values are equally relevant or important for a given policy discussion. For example, security is qualitatively more important as a dimension to evaluate cybersecurity policy than interoperability. Some values subsume others in their scope. For example, innovation is a subset of economic value. Some values enable others but are not fundamentally important in themselves. For example, transparency has little intrinsic importance but is enormously empowering to greater accountability. Beginning consideration of values for cybersecurity policy

3. Quantitatively rank feasible choices

After defining the policy and business choices a leader can make on a given topic and the values that should be considered in making those decisions, one can begin confining the option-space; certain choices simply cannot be made by virtue of a fundamental constraint. For example, while it is important to consider a world in which many entities can fully monitor internet traffic, in practice the cost of capturing and effectively analysing such a massive volume of data will be prohibitive for most governments. Having pared down the option-space into a set of feasible choices, it is important to explicitly enumerate the risks and benefits associated with a given choice. Next, to ensure that subjective values are thoroughly debated and understood, it is valuable to numerically rank how much each value is promoted. Assigning a numerical estimate to how much a value is promoted or prioritized serves another important forcing function. By assigning a number to a given value, organizations are forced to make a more granular and nuanced judgement as to the impact of a given choice. Such quantification even if only for illustrative purposes also avoids absolutist justifications of preferred policy options and false binaries. For example, in the context of cybersecurity and the values that different policy choices embody, a persistent problem is stakeholders grasping for rhetorical simplicity. For example, defence ministries will often argue that absent security, no other liberties can be secured. But the rhetorical simplicity of such an argument is undercut by being forced to articulate numerically the relative difference of different policies on security. If a policy is indeed able to provide significantly enhanced security, it should be easy to articulate either through anecdotal evidence or, better yet, numerical evidence. The choice of numerical ranking is also important. A numerical scale with too many degrees of gradation will be intellectually taxing. Choosing a numerical scale that is odd numbered e. Just as exploitable differentiation is key to statistical inference, differentiation draws into high relief the trade-offs decisions require. Another important benefit of forcing a numerical thinking for decision-making is its ability to illuminate inconsistencies or themes across different questions that a leader in a given organization will confront. For example, in the course of defining the numerical impact of policy choices, the World Economic Forum cyber resilience project found that the normative impact of insisting on weak encryption for companies in the private sector is similar to the normative impact of allowing employers to monitor the internet traffic of their employees. For most participants, the intellectual resemblance between these policies was not evident until this exercise was completed. When to use a decision framework on values

A decision framework for normative questions is useful

it helps force relevant conversations quickly and, in imposing rigour on a typically circuitous process, helps ensure that there is forward movement on the outcome: However, the use of a decision framework implicitly prioritizes deliberation. Discussions of values are cognitively taxing and take time. In some contexts, the ability to rapidly make a decision may obviate the need for a well-considered framework, particularly if those decisions are easily reversible.

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Chapter 8 : Trade-off: A Glossary of Political Economy Terms - Dr. Paul M. Johnson

The PPF (Production Possibility Frontier) models the trade-offs and opportunity costs that necessarily accompany decision-making in the face of scarcity. Mythconceptions: Scarcity is more of a problem for the poor.

The lower levels are more concerned with hands-on operations. There are rules and procedures that make tasks clear and unambiguous. The midlevel of the organization is where procedures and practices used by the lower levels are generated. Leaders no longer deal "hands-on" with weapons systems; they deal indirectly with organizational systems, and thus must deal conceptually, using analytic procedures, because they are allocating finite resources to competing demands. Their thinking skills must be rational, critical, and discerning. At the topmost levels, there are more conceptual requirements. Analytic skills alone are not enough because of long-time horizons and the massive scope and scale of resources being committed. To build long-term vision of where an organization must move over the next 15 to 30 years, leaders must be creative. Creative thinking is very different from critical thinking. The creative process demands synthesis skills, a willingness to take moderate risks, and a degree of personal comfort and confidence in decision making when exploring the uncertain and unknown. The functions of higher levels require increasingly long time frames for their execution. There are three reasons why this is so. The first is that the resources committed by consequential decisions are much greater. All organizations have "sunk" costs. They exist in research and development, equipment, training, and operational procedures. The cost of an aircraft carrier, for example, must be amortized throughout a life-cycle covering decades; the concepts giving rise to this type of system must have arisen out of strategic vision extending over 35 to 40 years or more. A second reason is that the uncertainties of implementing strategic vision are very great. Research and development on a new system may extend more than a decade. For example, the F will have been in development for perhaps a dozen years when the first aircraft flies. Will it be needed? If so, in what quantity? Finally, every organization has both a culture and a well-established set of operating practices and functional roles. They are based on extended training of organization members and long periods of operational experience, incurring both human and dollar costs. Any change in practices and procedures, if necessary, not only creates resistance from members who, by nature, do not like change, but also increases the financial cost of both re-training and subsequent operations. The effectiveness of long-term vision is crucial to the long-term health of any organization. At all levels, leaders must make trade-off decisions, generally with the use of resources. Critical trade-offs reflect a choice between current effectiveness and projected future effectiveness, whether to do more research and development on a future, qualitatively superior weapons system, or to buy more of the available system; whether to make the investment in current technology or wait for the next quantum step. Each decision is surrounded by risk, imposed by cost and the uncertainty of future developments. Strategic leadership is a balancing act, a thin line between maximizing present effectiveness, and maximizing future effectiveness, decisions that, to some extent, are mutually exclusive. Resources expended today in the wrong direction become a loss. This is why strategic vision is crucially important to organizations and to the national interest. Strategic leadership is a risky business. Strategic decisions are rarely clear-cut. There will always be uncertainties and often ambiguities. Contributing to the uncertainty is the fact that decisions must be made with some set of presumably valid assumptions in mind. However, strategic decisions may play out over long time spans: It is almost certain that very long time frames will see change in some or many of the assumptions on which such decisions were based. The decisions themselves may thus become flawed over time- overtaken by events through no fault of the original decision maker. Another uncertainty is that the support of constituencies for the decision may change with changing circumstances. And the risk is compounded by the fact that strategic decisions almost always call for major commitment of scarce resources. Consequential strategic decisions- those committing very large resources to very long term courses of action- may also prevent reconsideration of other options. A risky business indeed. An additional source of strategic risk is that top-level decisions will

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almost always have both direct and indirect effects. Where decisions impact globally, even the direct effects may be uncertain. And there may be missing information. In the Cuban missile crisis during the Kennedy administration, the Executive Committee members were quite uncertain what the response of the Russians would be to the various options discussed. It is now known the Soviets had over nuclear warheads in Cuba, including tactical nuclear weapons that might have been triggered by any direct assault on the island. However, direct uncertainties may be minimal compared to indirect outcomes of decisions that involve long-term, irretrievable commitment of mammoth resources. An indirect effect occurs when a decision creates a direct effect that produces additional ripple effects. In complex systems, second-, third-, fourth-order effects are common. And the further removed they are, the harder they are to anticipate. The results of these system changes will play out over a to year time frame, intermixed with changes resulting from other decisions. For all these reasons, strategic decisions need to be systematic, rational to the extent possible, based on well understood and articulated assumptions, and broadly supported by those involved in their implementation. Consensus team decision making is a process that can produce decisions of this nature; however, not all decisions at the top require this process. First, not all decisions are resource intensive. Those, by their very nature, are less risky because they do not create "opportunity costs. However, if the leader is adding value to the organization, even short-term decisions will be considered within the context of strategic objectives. And, finally, not all top-level decisions are complex. The time and resource costs of consensus-team decision making may not be warranted. Sometimes, one choice commits resources that cannot later be allocated to another. This is "opportunity cost. Then there is no later opportunity for another choice. Trade-offs between a course of action that will pay off maximally in the short term, and one that will pay off maximally-if it pays off at all-in the long term contribute to the complexity of strategic decisions. Differences in needs and expectations must be assessed and balanced among the various constituencies that have a critical interest in decisions. This has substantial implications for making strategic decisions and constructing strategic plans. For example, each service has its own concept of its strategic mission, and how it should contribute to joint operations. These expectations may be at odds. Effective strategic leadership required understanding these different expectations, and an ability to balance them in creative and non-destructive ways. Desert Storm provides an illustrative example. Political considerations governed selection of the ground forces to "liberate" Kuwait City, and determined the selection of forces that were to cross the Iraqi borders. Decisions are required on the number and types of subordinate and lateral organizations that must be brought together around a single set of understandings and purposes in order to achieve unified action. This issue derives from different cultural understandings, even among the services. Language used and understood by one might not have the same meaning to another. Frames of reference will differ enough to require tradeoffs between what is optimum as a course of action, and what is feasible, based on current skill levels, training, concepts of employment, etc. Desert Storm provides an example here also. Coordinating the action of multi-national forces was daunting. There were enormous differences in equipment and languages. The anticipation was that communication problems would be massive. However, a staff member suggested that Special Forces soldiers trained in the language and customs of the multi-national combatant forces, but equipped with U. There is an influence of forces external to the organization which the executive may or may not be able to anticipate or control. For example, in the current media-dominated world, actions that might appear straightforward in the absence of public scrutiny may become untenable. Regardless of the merits of any public event today, there can be no doubt that its outcome will be influenced by public opinion. Its importance may be media generated, and its eventual defusing will require delicate decision-making by top officials. Other force influences, both internal and external to the organization, for one reason or another, cannot be fully known. If greater clarity cannot be obtained on these forces, the executive may have to "live with them. The complexity created by the requirement to interface outside single service boundaries is twofold. First, communication is complicated by the need to understand the different cultures and languages of the other participants, including the members of other U. Other leaders, and the forces they command, might be nominally under your command. Nonetheless,

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they retain at least some of their allegiances and lines of authority to their own-service commanders, reducing the likelihood that your command influence alone will produce committed, unified action. Strategic leaders must also be skillful at working in a collegial, but, at the same time, competitive environment where each member bids for a share of limited resources. Although they compete with one another, they also rely on each other to reduce uncertainty, and to build consensus and shared vision in these complex environments. Leaders responsible for developing and sustaining the coalitions and alliances central to our national defense strategy must have an in-depth understanding of the other cultures involved. This is an essential part of the strategic frame of reference to make clear the meaning of actions taken, words spoken, and, perhaps more important, words and expectations unspoken. Lacking this, negotiation will encounter obstacles that impede progress. A past Supreme Allied Commander, Europe, explained some of his decision processes. His position demanded that he have a profound understanding of the national cultures, proclivities, and interests of all the NATO nations. First, a decision taken by NATO had to be unanimous, so patience was a valuable attribute for decision makers. Second, he had had to make decisions contrary to the interests of the United States when U. An equally profound national perspective is required for testimony to Congress, and interactions with executives of federal agencies, state and local authorities, the media, and other leaders of political and social opinion who influence national attitudes toward the military.