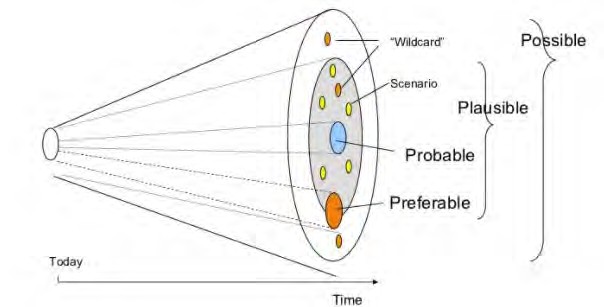
# Workgroup Scenario Development Guidelines

### Background - This document includes: 1) a brief overview of scenario planning, 2) step-by-step instructions for working groups on how to develop scenarios as part of their responsibilities, and 3) summary examples of scenarios developed by other groups provided as illustrations for the workgroups.

**Scenario Planning Overview**

Scenario planning uses information about the projected direction of various ‘driving forces’ as building blocks for a set of distinct stories that distill voluminous data into a digestible set of plausible directions the future might take. Scenario planning “capture(s) a whole range of possibilities in rich detail.”[1](#_bookmark0)

**Why Use Scenario Planning?**

* **Make sense from complexity and uncertainty –** The world is different from when our transportation agencies were created; today we face new pressures and need new ways to respond effectively. By definition, we don’t know what will happen in the future, so it makes sense to plan for different eventualities.
* **Influence our future -** Decisions made now will have effects decades from now; we create our future by what we do or don’t do today; we need ways to make good choices.
* **Shake-up prevailing mindset –** Overconfidence and tunnel vision in decision-making often lead to consideration of a narrow range of futures that leave us inadequately prepared for unanticipated outcomes. (See figure below)

1 Scenario Planning: A Tool for Strategic Thinking, P. Schoemaker, *Sloan Management Review.* 36.2 (1995)

## What are Driving Forces?

Driving forces are issues that we expect to play a large role in shaping the future for the topic we are examining. They usually contain a blend of two components:

1. **Predictable Trends–** Trends are the elements of driving forces that possess considerable momentum and continuity and therefore are known and certain, at least for a particular period.
2. **Uncertainties –** Uncertainties are the elements of driving forces that may emerge in the future, but could follow different trajectories and therefore are unknown and hard to predict.

For transportation, probable driving forces include:

* **Climate change:** including predictable trends or significant uncertainties like sea level rise, flooding, extreme weather, global instability triggered by rise in natural disasters, etc.
* **The economy:** including predictable trends and significant uncertainties like boom/bust cycles,

societal prosperity levels, living standards, structural shifts in major economic engines, labor force patterns, capital investment models, economic policy paradigms, domestic and international trade trends, etc.

* **Politics:** including predictable trends or significant uncertainties like international affairs, personal privacy, governance models (e.g. devolution to state and local control), regulatory climate, and social equity, etc.
* **Demographics:** including predictable trends or significant uncertainties like population change, immigration patterns, age characteristics, and geographic disparities, etc.
* **Land use:** including predictable trends or significant uncertainties like density, and development patterns, etc.
* **Technology:** including predictable trends or significant uncertainties like electrification, artificial intelligence, 5G+ wireless, hyper loop travel, drones, TaaS, and CAVs, etc.
* **Virtual lifestyles:** including predictable trends or significant uncertainties like preferences for telecommuting versus traditional offices, online retail versus brick and mortar shopping, and ‘virtual’ services, etc.

## How to Make Well-Crafted Scenarios?

One of the most difficult questions related to the scenario creation process is how to evaluate the quality of scenarios created by the process. The NCHRP’s Foresight 750 Series

provides some pointers on desired attributes of good scenario sets and qualities of good individual scenarios:

## Good Attributes for Scenario Sets

* **Number of Scenarios—**Two to four
* **Challenging—** Scenarios should challenge conventional wisdom about the future. If they only reflect the current thinking then the resulting brainstorming will not uncover new insights. This is typically achieved by having multiple, diverse scenarios in a scenario set.
* **Differentiated—**The scenarios should present stark and dramatically different future environments. If the scenarios are too similar to each other, the exercise will be limited and will tend to stay in the commonly accepted bounds of the projected future.
* **Contain Alternatives—**There should not be a favorite or preferred scenario. Avoid perfect “heaven or hell on earth” scenarios. Also, avoid creating scenarios that reflect either the organization’s established vision or the current forecast of the future. These “unofficial–official” scenarios tend to attract and anchor stakeholders.

## Good Attributes for Individual Scenarios

* **Centered on the Focal Issue—**A scenario should capture the question at hand.
* **Plausible—**Users must believe that a scenario can “grow logically from the past and the present.” Having a scenario with “save the world” technology, for example, can be unrealistic.
* **Internally Consistent—**The logic in a scenario should be consistent. One aspect of the scenario cannot contradict others. This also helps improve plausibility.
* **Memorable—**The scenarios should be easy to recall after an event. The names, for example, should be descriptive, evocative, and catchy. The names of the scenarios will ultimately become touchstones for future conversations.
* **Doesn’t Answer Focal Question Directly—**The material developed for the scenario should not overtly answer the focal question. The purpose of using scenarios is to provide decision makers an alternate vision of the future and to let them apply their knowledge to devise creative solutions suitable for that vision.

# Four Step Instructions

### Each working group will develop their own take on basic concepts for a set of scenarios. These scenarios will be combined and rolled up into a single set of draft scenarios for everyone to react to.

**Following is a set of four tasks to guide the working groups in this effort.**

1. **Task - Define Time Horizon and Scope**

The first step in any scenario planning effort is to set a time horizon and the scope for which your work will apply.

***Product: Working group’s tailored scoping statement*** *(1 or 2 sentences)*

1. **Task - Describe Key Driving Force Trends**

Our world possesses considerable momentum and continuity – a.k.a predictable trends

– which will influence driving forces that shape the future. In this task, you will explore the predictable trends inside the driving forces of climate, the economy, politics, demographics, land use, technology, virtual lifestyles or other areas that you are sure will affect the scope you identified in task one.

***Working Group Discussion Guidance:*** For 3 or 4 critical trends (or more if you like), discuss how and why they exert influence on the scope you identified in task one.

Everyone participating in the workgroup must agree that these trends will continue; any trend on which there is disagreement belongs in the next step (uncertainty). Based

on the conversation, outline important trends. Think about any data / research requests that result from the discussion.

***Products: Working group’s 3-4 key trends and their influence*** *(provide a few bullets up to 1 to 2 paragraphs per trend)*

## Identify Possible Trajectories for Key Uncertainties

Alongside key trends, hard-to-predict uncertainties will also affect the driving forces that shape the future. In this task, you will explore the uncertainties inside the driving forces that could affect the scope you identified in step one and what trajectory(s) they might follow.

***Working Group Discussion Guidance:*** Again, consider the driving forces of climate, the economy, politics, demographics, land use, technology, virtual lifestyles or other areas. For uncertainties you think are most important, outline a few distinct and plausible trajectories. Keep these trajectories simple, with a few possibilities at most. You may also want to identify relationships among these uncertainties, since not all combinations may occur; for example, growth of ‘green’ technologies is unlikely to coincide with a rise in global political instability. Identify data / research requests that result from the discussion.

***Product: Working group’s key uncertainties and their potential trajectories*** *(provide a few bullets up to 2 to 3 paragraphs per uncertainty)*

## Construct Scenarios

Once you identify trends and uncertainties for driving forces, you have the main ingredients for constructing scenarios. If your work group has time, you can begin to construct some scenarios.

***Working Group Discussion Guidance:*** Using a combination of the key trends and different trajectories for uncertainties your work group has agreed on, develop 3 or 4 scenarios. Try to answer these three questions for each scenario, based on the trends and uncertainties affecting driving forces under each one:

* 1. How are you getting from place to place in 2040?
  2. How are others in the Commonwealth moving (identify who ‘others’ are in this scenario - those who are older/younger than you? different location in the Commonwealth? different socioeconomic group?)
  3. How do you get your stuff?

Be careful to make them plausible, avoid internal inconsistencies and to develop a compelling story line. Keep a running list of possible names that describe your scenarios.

***Product: Working group’s 3-4 scenarios*** *(1-page narrative per scenario)*

# Scenario Examples

## Advertising Industry Scenarios (Developed in the Early 1990s)

### Scenario 1 - Total Globalization

The mega-shops dominate the world marketing scene in Europe, China, Japan, Korea, and beyond. The issue of agency account conflicts disappears. Advanced communication technology speeds up the homogenization of the world's cultures as global marketers expand. Attempts to create regional trading blocks fail, and global brand names flourish Cars, electronic products, packaged foods, clothing, and many other products compete in a global marketplace with global competitors. Although media are fragmented locally, the information highway permits he transmission of targeted messages to increasingly smaller segments (i.e., mass customization). Agencies provide a broad range of services in view of the external complexities facing clients. As agencies and advertising grow together, they become inextricably linked in terms of profits and information. The world marketing front becomes a battleground of Titans. The profits are enormous, since the barriers to entry are substantial. Fee and performance compensation structures are common, with long-term relationships being the norm. The mega-agencies thrive in part because of their more professional approach to business, with better-trained account executives and office managers. Many mega-agencies invest heavily in managerial training and development, via "in house universities," which give them a strong edge.

### Scenario 2 - Polarization Is "Hot"

Globalization and localization flourish side by side, due to the emergence of strong regional trade blocks (NAFTA, the European Community, Pacific Blocks, etc.). Negative reactions to the export of U S. pop culture is on the rise (e.g., Disney's theme park in France). Mega-shops serve global marketers of consumer products, providing a broad range of services and developing close relationships. Global marketers consolidate accounts among a few key agencies. The issue of account conflicts among the high rollers exists in some accounts, in part because of a few well-reported leaks.

Compensation structure varies depending on billings and client/agency relationships.

Localized, specialized, or "boutique" agencies also flourish as the mega-shops cannot maintain profitable relationships with specialized industries, small regional advertisers, or controversial products (e.g., condoms). Specialized support services such as marketing research firms continue to flourish. Some big, disillusioned clients turn increasingly toward nontraditional sources for creative ideas, notably film producers.

The mega-agencies are unable to compete for new advertising, and attempts at strategic alliances with Hollywood studios fail due to culture and ego clashes. Also, the increasing fragmentation of media (with more than 500 cable channels, CDROMs, radio, print, etc.) favors more specialized players that understand selected niches better. In an attempt to boost their tax revenues, various governments institute percentage caps on the deductible ad expenses.

### Scenario 3 - Mega-Shop Dinosaurs

The mega-shops reign for a short time, just beyond the turn of the century. They are eventually crippled by their sheer size, central ownership, and the bureaucracy that often accompanies such structures. They are slow to adapt to media changes (especially interactive), relying instead on personal relationships through account executives. As a consequence, their flexibility and creativity suffers. Advertising by mega-agency is increasingly seen as a commodity and bought on price. The lumbering mega-shops gradually lose business to the smaller but "hotter" agencies, especially as clients restructure into networked entities with high personnel turnover. Military conflicts around the world (especially in Eastern Europe and the Middle East) lead to isolationism and nationalism and frustrate any attempts at the creation of truly global markets.

In addition, advertisers in many countries remain highly sensitive to agency account conflicts. Privately held start-ups emerge with revolutionary creative and management styles. Specialized media agencies and cooperatives develop, pooling client resources to profit from media-buying leverage. Creative compensation structures emerge as advertisers demand that agencies be financially accountable and as agencies' competition heats up. On top of this, the Democrats (in their quest to fund social programs) limit the tax deductions associated with advertising. This further undermines firms' investments in brand equity, which together with a poor economy puts an emphasis on value and price discounts. The premiums paid by mega-agencies in the 1970s and 1980s fail to deliver superior returns. The stock prices drop, and several mega-agencies are forced to divest themselves of the premium acquisitions of the 1980s and 1990s.

## Shell ‘New Lens on the Future’ Scenarios (Developed in about 2012)

What might lie ahead 50 years from now… or even in 2100? We consider two possible scenarios of the future, taking a number of pressing global trends and issues and using them as “lenses” through which to view the world. Called Mountains and Oceans, the scenarios provide a detailed analysis of current trends and their likely trajectory into the future. They dive into the implications for the pace of global economic development, the types of energy we use to power our lives and the growth in greenhouse gas emissions.

**Scenario 1 - Mountains -** This is the world with status quo power locked in and held tightly by the currently influential. Stability is the highest prize: those at the top align their interests to unlock resources steadily and cautiously, not solely dictated by immediate market forces. The resulting rigidity within the system dampens economic dynamism and stifles social mobility.

*Mountains* is a world in which those occupying commanding advantage (at the top) generally work to create stability in ways that promote the persistence of the status quo. There is a steady, self-reinforcing, lock-in of incumbent power and institutions. This lock-in constrains the economic potential of some sectors of society, but enables established sectors aligned with market forces to unlock resources that require

significant capital and new technology. As for the less fortunate, the thinness of social safety nets is not completely offset by the growth in philanthropy, characterized by an eruption of foundations endowed by increasing numbers of billionaires.

Latent opposition to the power of political, business and social elites is minimized through a combination of incentives and sanctions, and social mobility continues to decline. But supply-side investments are stimulated. Even with new investments, however, the absence of major structural and financial adjustments in developed countries begins to slow GDP and discourage trade.

Some fast-emerging economies fall into the ‘middle income trap’, where growth plateaus and stagnates after a significant proportion of the population reaches middle- income levels, largely because institutions cannot adapt to a more complex economy. This moderation of economic growth, however, alleviates some pressure for energy demand. Demand growth is slowed even further as progress is made with supply-side energy policies, such as the encouragement of compact city development.

Tight/shale gas and Coal Bed Methane (CBM) enjoy widespread success and grow to form a new ‘gas backbone’ to the global energy system. With slowing growth in demand for liquid fuels, oil prices remain moderate, and overall production growth limited.

Sluggish economic growth in the early period, the relative displacement of coal by gas over the longer term, and supply-side incentives for deploying carbon capture and storage (CCS) technology and renewable energy, all contribute to a moderation in greenhouse gas emissions. Nevertheless, the global average temperature rise overshoots the current 2°C goal.

**Scenario 2 - Oceans -** Influence stretches far and wide in the world of Oceans. Power is devolved, competing interests are accommodated and compromise is king. Economic productivity surges on a huge wave of reforms, yet social cohesion is sometimes eroded and politics destabilized. This causes much secondary policy development to stagnate, giving immediate market forces greater prominence.

Oceans is a world in which competing interests and the diffusion of influence are met with a rising tide of accommodation. This trajectory is driven by a growing global population with increasing economic empowerment, and a growing recognition by the currently advantaged that their continued success requires compromise. Steady reform of economic and financial structures keeps pace with the development of fast-emerging nations and progressively unlocks the productivity of broader sectors in society. But volatility and multiple constituencies impede policy developments in other areas, so tight resources are unlocked primarily by market forces.

At first, economic pressures strain social cohesion, forcing changes in economic and political structures. Reforms raise aspirations and, when they are successful, also raise expectations for further shifts in welfare, social structures, and significant international institutions.

Aspirations rise and expectations of continued improvements in quality of life become locked in. Globalization strengthens; developing countries sustain their catch-up growth trajectories; and the key fast-emerging economies move to more balanced growth.

Gradually increasing stresses around food, water, energy and other resources become a new focus for social and political tension. Political churn and the growth in empowered constituencies now hamper policy development, and resource scarcity is addressed almost completely through market forces acting within old policy frameworks that price externalities inadequately.

With emerging economies continuing to surge and boost energy demand, and without effective policy mechanisms in place, demand begins to squeeze supply. The noose is tightened further when tight/ shale gas and CBM production do not meet initial expectations, with relatively limited success outside North America – partly because of patchy policy support and partly because of geological and technological disappointments.

Growth in oil production from a few major resource holders is also initially constrained in Oceans as leadership transitions take their toll. But investment ultimately picks up once stability is restored. Periods of high oil prices unlock new resources and technology options and a long oil game ensues.

With gas volume growth more modest than anticipated, coal maintains a strong role in heat and power generation. Resource stresses become severe, and high prices plus crises eventually stimulate strong demand-side investment in utilization efficiency.

These measures are not sufficient to address environmental concerns, as greenhouse gas emissions follow a pathway towards a high degree of climate change and the need for significant adaptation.

## NCHRP ‘Future Freight Flows’ Scenarios (Developed in about 2009)

**Scenario 1 - Global Marketplace** (high global trade and high resource availability) is a highly competitive and volatile world. Open, vigorous trade between virtually all nations has led to market-based approaches to most contemporary challenges.

U.S. firms have established and maintain intense collaboration with companies across the world. The private sector has taken the lead in addressing the pressing issues of the day. Any attempt by governments to get involved in regulating business is seen as unnecessary intrusion. Citizens trust markets and they are more than willing to allow them to “work the magic.” So far, their patience and confidence in the market forces has paid off. Case in point is the now routine hassle-free immigration across most nations and the dramatic increase in global food production.

Traditional powerhouses such as Japan, Germany, and the United States no longer control the capabilities and resources needed to manufacture highly specialized, high- value products. Although developing countries are not on par with the advanced nations yet, they have found niches and are investing heavily in developing their industrial competencies. To exploit their comparative advantages, countries are specializing in producing what they do best and rely on other countries—halfway across the world in

some cases—for everything else they need. The interconnectedness and speed of this global market has a very clear downside as well: increased volatility. For example, a labor strike in South Korea can have huge ripple effects in a Madison, Wisconsin manufacturing plant. As a result, firms are taking extensive precautions to keep the flow of goods both smooth and secure. Affordable and seamless supply chains are encouraging companies to invest in global manufacturing capabilities with most large firms using a mix of offshore and near-shore plants to remain low-cost and flexible. The cost of moving goods anywhere in the world is very reasonable, primarily due to new and cheaper energy sources and technologies and non-obtrusive environmental regulations. Energy costs, although relatively low, remain extremely volatile because of the continual natural and man-made supply disruptions of oil-based fuels.

Raw materials and commodities are brought to the market from all over the world, as there are minimal trade barriers limiting their availability. The free flow of goods is, however, driving extreme volatility in commodity prices, which is a persistent problem for most firms. Therefore, price—rather than access—is the key criterion for choosing a commodity item. Postponement of final product customization until the very end has led to higher value density in products being moved within the United States. Retail sales are predominantly conducted online, even for grocery vendors. With a significant proportion of the U.S. population living in large and dense cities, individual delivery to residences is the norm in most retail transactions.

The collaboration between firms across national boundaries has further expanded the regional markets to the point that they have overlapped and blended into a single, global market, with a minimal set of regulations in place. It is said by cynics that, in this brave new world, “the only regulation is that there are no regulations.” Finally, a true global marketplace has emerged, where ideas, technology, labor, and goods are exchanged freely and quickly.

**Scenario 2 - One World Order** (high global trade and low or restricted resource availability) is a highly regulated and managed world. Facing global scarcity of key resources, nations establish international rules to ensure their fair and sustainable use. Global trade thrives, but the very visible hand of regulation, at times an iron fist in a velvet glove, shapes its course.

It has become clear that oil production has peaked. Renewable energy technologies have failed to live up to the heightened expectations of replacing coal and oil. The environmental crisis faced by the world’s population has taken on an urgent dimension, as looming scarcity increases social and political tensions within and across nations.

Policy avenues are aggressively pursued at a global level to ensure equitable access to clean air, drinkable water, and healthy food for vast populations across the world, as well as the raw materials and energy required to sustain their communities.

Fearing conflicts and war over the growing scarcity of vital resources, the governments of the most powerful countries come together to create a supranational entity, the World Sustainable Trade Organization (WSTO), to regulate the use of resources and resolve disputes among nations. While many see the WSTO as a replacement for the

World Trade Organization, it is in fact much stronger than the WTO ever was. The WSTO reaches far beyond trade and has been given real teeth for strict enforcement. Also, through monitoring and reporting, it dictates efficiency and penalizes waste, prioritizing usage according to global needs. All world powers and most other countries have signed the Charter of the WSTO, and are working towards full compliance with its regulatory framework.

Paradoxically, and despite the forecasts of detractors, global trade has not only remained strong, but it has actually continued to thrive in this heavily regulated world. The regulation-based system of balancing availability and needs did not replace the traditional market-based system of balancing supply and demand. Instead, it has redefined boundaries of the free market, therefore complementing it in unexpected ways. For example, grains are shipped from greener regions where they are produced in abundance to places where the land is not fertile. Metals are shipped in the opposite direction, from the arid yet mineral-rich countries toward the agricultural foci of the world. Technology and labor follow a similar pattern: less developed countries serve as providers of young labor for more technologically advanced countries, which in turn export their technology and knowledge back to the developing countries in the form of finished goods and services. Many analysts describe the new system as one of “global optima” for the long run, where the objective is sustainable use, not just short-term corporate profits.

What gives shape to trade flows is not the invisible hand of the market, but a very visible body of regulations. Many people view these regulations as a “green bureaucracy” and a necessary nuisance.

At the end of the day, while individual firms still get to make—for the most part—their own decisions as to what to produce and where, it is in the “how” that the influence of the WSTO’s global bureaucracy and its ever growing tapestry of regulations play an influential role, sending the right signals to the market: how much water can be used, how much CO2 can be emitted, how discards should be recycled, and so forth. As a result, the speed of global trade—once mercurial and chaotic in the days of globalization—has slowed down into an optimized order, more entangled in regulations and quotas, yet less volatile and, in consequence, more predictable.

Forged by the struggle for survival of globalized markets, firms have adapted relatively quickly to the new demands of a regulated world. Tracking and offsetting of greenhouse gases, even to the level of zero emissions, is now a prerequisite for doing business.

Manufacturers with similar needs have grouped together to create large-scale facilities, known as production clusters, where they find relief in numbers. They have found it is more cost effective to comply with tight regulations when the cost of required technology can be shared by many. Production clusters, coupled with ultra-efficient supply chains that make use of sensing and advanced computing, are emerging as the greenest solution.

Regulations for urban areas have also forced local governments to adapt. Through a series of stick-and-carrot regulations, the WSTO has sent municipalities a clear message:

cities must clean up their acts, too. Regulations promote a more efficient use of energy and water in urban areas, a reduction in transportation emissions, and a more effective treatment of waste and sewage.

The largest cities in the world now compete for subsidies, and try to avoid penalties, on the basis of improving their performance against a series of sustainability indexes. As a result, large cities have continued to grow even bigger, even as they strive to make their environmental footprint smaller and easier to offset.

Regulators have become aware that online purchasing has a much higher carbon footprint than shopping in person. In order to offset the higher per-pound emissions of home delivery, most states in the U.S. have mandated parcel carriers to charge customers a flat tax on all home deliveries. The effect of this tax is felt more on smaller, cheaper packages. Since for consumers it makes little sense to pay a $5 tax for the home delivery of a $10 book, most large cities have seen the appearance of consolidation centers, where goods from many retailers are consolidated and delivered to the final customer only when a certain amount of products have accumulated. This has radically changed “last mile” delivery of goods in metropolitan areas.

**Scenario 3 - Millions of Markets** (low global trade and high resource availability) is a world where advanced technological breakthroughs have enabled the United States (and other countries) to become highly self-reliant in terms of energy, agriculture, manufacturing, and other needs. There is increased migration toward smaller urban areas that are supported by nearby regional innovation hubs that can manufacture highly customized goods.

The past three decades have been witness to tremendous technological advances and social changes that have led to a high level of regional self-reliance in matters of energy, health, food production, and manufacturing. Not only has the United States as a whole become highly self-sufficient, individual regions and cities have also become much more self-sustaining. The primary drivers of these changes were technical breakthroughs that are collectively referred to now as the “Three Pillars.”

The first pillar is energy independence. Advances in drilling techniques and improved seismic testing enabled the economical location, capture, and production of tremendous quantities of natural gas from the massive shale formations along the Atlantic coastline. At the same time, improvements in the efficiency and safety of nuclear generators led to a “Nuclear Renaissance.”

Renewable energy sources, such as solar and wind power, while still being pursued, have had only minor impact on the total United States energy production. Natural gas and nuclear power have led to almost complete energy independence for the United States and have facilitated the widespread decentralization of affordable and stable electricity production. This contributed to the growing adoption of initially hybrid but eventually completely electronic vehicles.

The second pillar is the widespread use of intelligent manufacturing. These advances enabled the production of small to medium batches of a wide variety of products at

reasonable costs. Essentially, the cost advantages of leveraging economies of scale that dominated manufacturing throughout the past several decades of the 20th century were replaced by the ability to cheaply produce a wide range of highly customized products. While manufacturing has not advanced to the stage of “home replicators” that enthusiasts once envisioned, it has led to the development of regional manufacturing hubs across the country. These manufacturing facilities are close to consumption centers and are fueling the expectations of consumers for rapid creation and delivery of highly personalized goods. A key innovation that transformed the manufacturing industry was the separation of the digital design from the physical production process. This has in turn lead to the creation of a new industry sector of pure digital design firms that develop and sell small-run or custom designs.

The third technological advancement was the widespread adoption and use of virtualization. Working and shopping from home—or from any other location—has become the standard rather than the exception for many people. Most households order products and services directly from the home and receive them there as well. Online shopping with prompt delivery to residences has largely replaced physical stores.

People still go shopping in person—but the retail experience has evolved into an event rather than just a way to acquire physical products—similar to how movie theaters adapted when home entertainment systems were introduced. As goods and services have become more mobile than people, there is less physical commuting to work.

Ironically, the level of travel for pleasure has increased since a large percentage of the workforce can work from any location.

A social change that has emerged over the last several decades is the increase in social interaction— both virtually and in person. It appears that while people can now work and live totally isolated from other humans, very few actually do. Instead, there has been a groundswell migration towards “livable cities” of a moderate size where people can enjoy the benefits of interacting with others in an urban setting without the drawbacks of an impersonal mega-city.

In this widely fragmented, yet highly connected society, small and mid-sized cities are growing at a faster rate than the mega-cities. Local governments compete with each other to attract investments to create “innovation clusters” that feature a mix of technology, manufacturing, and distribution facilities.

Technological advancements and cheaper energy have ushered in a new age of affluence: average household income has increased, personal consumption has soared, and standards of living have improved. It is not a technology-utopia, however. The income gap has widened between the traditional “blue collar,” “white collar,” and the newly established “no collar” creative class. Many traditional jobs have been displaced and those workers struggle to find new vocations. This is especially true for older workers who are not as able to adapt to the newer technology. Also, while new agricultural techniques, mainly genetically modified fruits, vegetables, fish, and livestock, have significantly increased the quantity and variety of food products available to consumers; there has been a significant amount of resistance from some

sectors of the population. Food considered “100% Organic” is generally available, but at a much higher cost. In this fast-paced environment, the optimal production site is closer to consumption centers. The affluent and savvy buyers of this world demand products customized to their needs and tastes. While American consumers prefer locally produced goods, they are not inherently against foreign products, provided they meet their high expectations of personalization and delivery speed.

Trade between countries is still active, but for the first time in history, the value of imported and exported services exceeds that of goods. The United States is a net exporting country when considering services, such as digital designs. Physical trade still occurs, but at a lower level and in different forms. For example, global trade of raw materials has increased while transportation of finished goods has decreased. Raw materials and components are transformed into goods when and where demanded by the final consumer. Also, intellectual property that is used within most local manufacturing is traded freely across the globe although there are some risks concerning theft of these “recipes” and instructions in certain areas of the world.

**Scenario 4 - Naftástique!** (low global trade and low resource availability) is a world where trade has moved away from a single global market toward a number of emerging regional trading blocs. China, Europe, and South America form their own clusters. The United States leads an effort to make North America a self-sufficient economic community.

A lack of significant technological advances, coupled with continued growth of the world’s population has pushed the ability of most nations to provide for their citizens. Basic commodities have become scarce. Relationships among world powers are strained by prolonged and intense competition for raw materials and energy sources. Military and political tensions follow. Inward facing policies designed to protect dwindling resources have served to reduce and fragment global trade through tariffs and trade barriers. Regional trading blocs have emerged across the globe.

China, for example, has forged a particularly intense alliance with Africa. Many African nations, rich in natural resources and desperate for investments and new technology, found a natural partner in the resource-starved and over-populated China. Intense trade of materials, technology, and labor started taking place inside this Sino-African economic bloc, with the Yuan as the de facto currency. Other regional blocs have emerged over the past 30 years. The European bloc, trading almost exclusively with Russia and the Middle East, has adopted the Euro. Powerhouse Brazil led the Mercosur bloc; Japan, Korea, and Southeast Asian nations formed a Pacific bloc.

Smaller countries were forced to ally themselves with existing blocs to keep their economies alive. However, a few larger nations like India, Venezuela, and Australia decided to remain “unaligned” to any particular bloc and trade with all clusters.

The United States formed its own bloc along with Canada and Mexico, called the North American Economic Community (NAMEC). Complementing each other in natural resources, technological capabilities, and workforce availability, NAMEC has emerged as a strong economic

cluster. Commerce among NAMEC nations has increased tremendously. U.S. borders with Canada and Mexico are essentially seamless for freight and passenger movements. Widespread use of domestic natural gas and coal, and heavy investment in renewable sources, made the North American nations less dependent on foreign oil. While energy prices inside NAMEC tend to be higher than the historical averages, they are also significantly less volatile than in the past.

The United States undertook a re-domestication of manufacturing to NAMEC countries, with a clear emphasis on promoting processes that take advantage of local resources and talent. Migration among NAMEC nations has become fluid. U.S. work visas are issued for millions of young workers from both Canada and Mexico. Millions of aging Americans retire to Mexico and Canada. This influx of retirees has made some parts of the Mexican coastline the “New Florida,” creating new demand south of the border for higher-value goods.

Environmental regulations are driven from the bottom-up by activism of the consumers inside the blocs. Previously disparate environmental regulations in Mexico, the United States, and Canada have been uniformed into a stricter corpus of rules. Rising temperatures have increased the agricultural output of countries located in higher latitudes. In North America, Canada’s production of cereals and other agricultural produce has increased dramatically. So far, however, the global increase in temperatures has had no major impact on coastal cities and in the operation of maritime ports.

Fixed currency exchange rates are established within the blocs, which in turn has stabilized currency fluctuations across blocs. While the majority of global trade is conducted within regional trading blocs, there is still trade between the blocs. This inter-bloc trade is, however, mostly limited to supplementing technologies and materials that are not available in member nations.

Many are surprised that despite the lack of a true global market the regional clusters manage to operate as self-contained trade systems. Inside each of these blocs, trade links have led to stronger political links and a sense of shared purpose. Member nations take pride in working together towards self-sufficiency.