

"Are we missing the point of pandemic planning?"

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Executive Summary

For the vast majority of this year management has been hearing and learning more and more about the Avian Flu (H5N1). Through the media we have been able to experience its march across Asia and into Europe. The mortality rate of this unique flu has been almost daily news. As if that was not enough, we have been advised to prepare for this deadly flu by everyone from government leaders, international & national health organizations and most recently the financial industry, which has been weighing in to the discussions suggesting that the impact on the global economy could be more serious than any other event in the past century.

As we have waited for H5N1 to mutate into a form that is capable of being transmitted from human to human, we see the emergence of a new group of forecasters. These forecasters point out that the flu is not currently dangerous to humans, and there is no evidence that it will mutate into a lethal form of flu in the near future. They go on to point out that we should be prepared, but not to panic.

Normally, the flu would not gain this kind of exposure in the press. However, H5N1 has an extraordinary characteristic, it could mutate into a pandemic form of flu. Now we see the entry of a seldom used word into the nightly news lexicon – "Pandemic". It did not take us long to look up the meaning of this word and find out that scientists were talking about a world wide epidemic – a pandemic. Clearly, this was not something to be taken lightly, not if the whole world could be impacted.

As we reflect on the generous amount of information that has been put forth regarding H5N1, we must note that the vast majority of the information is oriented to the mortality and morbidity rates associated with the projected spread of this flu. Even when there is a discussion of the business impact of this flu, the orientation starts with and ends with the illness' impact on staffing and output. Government reactions mirror this orientation and introduce the ideas of quarantine and isolation of infected areas. Always we look at this potential pandemic in terms of its medical complications and the stresses it will place on the medical industry to deal with it. While the rates of illness and death associated with this flu are not to be taken lightly, they are not the most critically dangerous characteristics.

There are two critical characteristics associated with this pandemic, and for that matter, any pandemic in today's business environment. The last time we experienced a disease of this magnitude was in 1918 when the Spanish Flu spread across the world. It struck approximately 30% of the world's population and resulted in 3% mortality of those ill or between 30 & 50 million deaths. This disease took approximately 6 months to spread across the world in 1918 and lasted for almost 2 years. Today, we are concerned that a real pandemic will spread around the world in 30 to 60 DAYS. Therefore, SPEED is the first critical characteristic. Recently, SARS spread from China and in a matter of weeks was in 8 countries around the world. Today's highly mobile society travels more frequently and at greater speed than in 1918, so any pandemic will be traveling quite literally at "jet speed". This presents governments, societies and businesses worldwide with the unsettling realization; that it is probable that infected individuals, who are not yet ill, could be traveling and innocently exposing other individuals to this virus. Therefore the strategies of quarantine and isolation can, at best, be only marginally effective.

The next concept that is important to understand, and is taken for granted is "Economic Inertia". Newton's first law of motion states that "...an object in motion will stay in motion & an object at rest will stay at rest unless acted on by an unbalanced force." The business environment of today is the product of decades of forces acting on it and resulting in a natural "inertia". Today's worldwide economy does not have to be started every day or every year, it is in motion and it stays in motion. Granted there are changes from time to time, but these changes are more evolutionary in nature and occur over extended periods of time. A pandemic with a time horizon of 18 – 24 months (roughly 500 – 800 days) could disrupt the inertia of the global economy such that restoring it to its pre-pandemic state could be an overwhelming task due to the structure and complexity of the global economy.

The business community relies on this "economic inertia" in its daily business activities. Without it, there could be no long term planning nor would investors have confidence to invest in the markets that supply the capital to fuel the business machine. It is not a concept that we spend a great deal of time thinking about, but we all rely on its viability and consistency of performance.

Thus, the second critical characteristic is the world economy's complexity and "economic inertia". It would be difficult to find a sector that is not in some way touched by or that does not rely on international markets in some manner for its operations. Businesses are either marketing internationally or rely on international sources for their supplies. For the most part this complexity is a source of strength in the market. It has resulted in increased revenue and a reduction in expenses for many companies. It also increases the alternatives available to companies ensuring a virtual unlimited supply of needed support or materials for many companies. In this "complex" economic business market it would be very difficult to slow or stop the "economic inertia".

However, the law of inertia applies equally to physical elements and economics. So, in the unlikely event that the global economy was to slow down or stop due to a pandemic, it could be an overwhelming challenge to restart it and restore its inertia. Yet this is a very real

possibility if H5N1 were to become a pandemic. A pandemic creates a whole new economic dynamic. Because of the widespread impact of the illness, both the consumption element, as well as the supply element, of the economy will be simultaneously impaired. This occurs on a global basis and is not confined to any specific area. Because pandemics by their very nature impact multiple countries, and because of the speed with which a pandemic will spread today, disruption occurs everywhere at the same time.

We have not experienced such economic disruption since the 1918 influenza (Spanish Flu) or possibly the Great Depression. Even World Wars I and II did not create economic disruptions of this magnitude. On December 8, 2005, the Bloomberg news service carried an article entitled, "*Bird Flu Pandemic May Cost U.S. Economy \$675 Billion.*" In the article Senate Majority Leader Bill Frist is quoted as saying, "A pandemic of bird flu in humans may cost the U.S. economy \$675 billion, including lost work time and disruptions in supply chains." Senator Frist was quoting from a pending report. In the same article, it cites the Congressional Budget Office estimate that direct and indirect costs would reduce U.S. economic production by 5%; stating that last year, the U.S. economy generated \$11.7 trillion in gross domestic product, the broadest measure of the economy.

In the United States revitalizing the economy after the Spanish Flu in 1919 and the Great Depression meant getting a "domestic" economy restarted. Today, we no longer have the luxury of restarting just one economy; economic recovery after a pandemic will be an international undertaking. For this reason the economic implications of a pandemic will last substantially longer than the medical and social implications. The pandemic will most likely subside within 18 – 24 months. However, economic implications will last for years after the pandemic. The only way to shorten this recovery cycle will be to rethink how we are doing business. This may require that we establish new processes and procedures to take advantage of the intermittent recovery opportunities that will arise during the span of the pandemic. With the passage of time, there will be lulls in the intensity of the pandemic that may allow sectors of the global economy to partially recover. To wait for a full economic recovery (all sectors returning to pre-pandemic state) will be a very risky strategy. Intermittent recovery will provide some measure of financial relief and at the same time establish market share for those companies able to effect recovery while other companies are absent as a result of not planning or as a result of plans that have focused on the wrong recovery strategy. This will require a whole new operational response strategy. Thinking and reacting to a new planning paradigm will have to become common place if economic recovery is to materialize.

The implications associated with a pandemic are admittedly both extensive and far-reaching. They are equally unpredictable, and consequently can be easily overlooked when developing strategic plans and in developing business continuity plans. With today's businesses focusing on maximizing the effectiveness of scarce resources it may appear frivolous to dedicate time to planning for an unpredictable event such as a pandemic. This logic could lead to ramifications resulting in the total failure of the enterprise. Because of the speed which a pandemic could spread globally, reaction time (i.e., reactive planning) will be almost non-existent.

A virologist recently stated that, if the flu is identified in San Francisco on Monday, it will be in New York by Saturday and every city in between. The currently anticipated morbidity and mortality rates will be well beyond anyone's experience; thus generating fear, panic and potentially chaos throughout our global society. As we enter the initial phase of a pandemic trying to develop plans to address the immediate problems will prove ineffective and as such, will not be the time to devise strategies for business future operations when the future is shrouded in uncertainty. Be advised, more people will survive the pandemic than will perish (estimates are that 90% will survive).

While H5N1 may never materialize in pandemic form, there is little doubt that the world is having to deal pandemics such as AIDS and will, sooner or later, have to deal with a pandemic that due to its transmission capability will expose more of society to its effects. There is also little doubt that the international business community is inadequately prepared for the unique problems that will arise from such a wide spread illness. By examining the implications associated with the Avian Flu as a pandemic we will have established the needed orientation to deal with the immediate medical impact of a pandemic and at the same time prepared a company to survive the long recovery period associated with an international economic collapse.

Introduction

The business community is "not adequately prepared" for a possible avian flu pandemic, says Secretary of Health & Human Services Michael Leavitt. As of November 25, 2005, there have been 132 confirmed cases in humans resulting in 68 deaths (a mortality rate of 51%). The virus has spread outside of Southeast Asia through wild migratory birds that have now infected domestic poultry in Russia, Central Asia, and Eastern Europe (U.S. Agency for International Development (USAID)).

December 1, 2005 marks World AIDS Day, a global pandemic that has already taken more than 25 million lives and infected 40 million people albeit mostly in the developing world. An influenza pandemic could sideline 40% of your workforce, shut down foreign trade, and degrade public services. Here are public-health experts' tips for companies (Data: *Trust for America's Health, U.S. Health & Human Services Dept.*):

Public Health Experts Tips	Our Assessment
Leave Hot Zones: Make plans to pull people out of countries where the epidemic strikes first, while ensuring that crucial jobs are covered.	When are you going to know that you are in a "hot zone"? Second, quarantines may preclude moving people.
Limit Travel: Steer clear of hot zones, and limit overall travel. Airports will be incubators for the pandemic.	This may be a given in that we hear about border closures, quarantine, etc. The real issue is if you are traveling and get stranded in a location, not limiting travel.
Focus on Essentials: Identify your company's irreplaceable functions, and figure out how to keep them going with 25% to 40% of staff out sick.	What is essential? Food, water, medicines, fuel? Irreplaceable functions? What functions are not irreplaceable – just ask anyone in your organization if they are dispensable if they say yes you may wish to consider eliminating the position now.
Stock Up: Consider building up inventories in case foreign or domestic suppliers and transport services are paralyzed and "just-in-time" production is threatened.	Sure go ahead and make a business case for changing "just in time delivery/manufacture, etc." to your management, board and stakeholders. Not as easy as it sounded is it?
Go It Alone: Anticipate and prepare for breakdowns in government services, like sanitation, water, and power.	What happened to "core business" concepts, outsourcing, etc.? Can you really go it alone? How are you going to create a business case for no customers, suppliers and as for government services, utilities, etc. you may find that going it alone sets you up for having your resources commandeered for the great good.
Isolate the Sick: Try to limit the flu's spread in the workplace by improving air circulation and filtration. Stock up on masks and sanitizers, and consider staggering work hours to limit the size of gatherings.	How do you know what they are sick with? Could be the common cold and not the pandemic flu. When will the pandemic strike? Stocking up means "from now until forever" as you will have to maintain these stockpiles until the pandemic materializes.
Spread Out: Supply employees the equipment and support they need to telecommute if their jobs allow.	As you make your business case for some of the above items, consider that local infrastructure will in most cases not support the environment that your employees have in their offices today.
Roll Up Your Sleeves: Help employees get flu shots, but don't count on medicine to stop the pandemic -- there's no vaccine for H5N1.	As this tip already points out there is no vaccine for H5N1. Sanofi Pasteur vaccine seems to be effective only in large doses (evidently, six times the normal dose of flu vaccine). Can you really "roll up your sleeves" and think that you are protected?
Beef Up Job Security: Make sure your sick-leave and pay policies don't discourage workers from staying home when they're ill.	This requires a potential change in policies that could have legal ramifications beyond the unknown and undetermined strike date of the pandemic. Remember – "from now until forever" when you begin to look at policy creation and change.
Keep Talking: Let your employees know what you're doing -- and what they should do -- to limit the pandemic's impact.	This is perhaps the best tip of all. Communication will be a key to diffusing panic, chaos and fear during this and/or any other "crisis" event. Trained people are more likely to act as you want them to act based on the training to act.

While there is merit to the above suggestions for steps that your organization can take, the concern should not be about responding to the pandemic itself (we are missing the point) the concern should be for the speed of its spread throughout the worldwide population and the economic consequences that will result as the complex global economy is shaken to its foundation. The cumulative number of confirmed human cases of Avian Influenza A/(H5N1) reported to WHO as of 7 December 2005 are depicted in the table below. Should we worry? After all, there are less than 75 deaths to date and the virus was first reported in 2003. International SOS, a leading provider of medical assistance, international healthcare, security services and outsourced customer care conducted a survey on the issue. Of 200 Fortune 500 companies and other large organizations surveyed; 91% consider preparedness for Avian Flu 'Important, Very Important or Critical'; yet only 26 percent of firms have begun to implement a pandemic preparedness plan and just 1% have completed a plan, according to the survey of 200 Fortune 500 companies and other large organizations (Source *International SOS*).

Date of onset	Cambodia		China		Indonesia		Thailand		Viet Nam		Total	
	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths
26.12.03-10.03.04	0	0	0	0	0	0	12	8	23	16	35	24
19.07.04-08.10.04	0	0	0	0	0	0	5	4	4	4	9	8
16.12.04- to date	4	4	4	2	13	8	4	1	66	22	91	37
Total	4	4	4	2	13	8	21	13	93	42	135	69

Total number of cases includes number of deaths. WHO reports only laboratory-confirmed cases.

Among other highlights of the International SOS survey:

- 72% of organizations are "investigating options" for implementing a pandemic preparedness plan
- 26% have "begun to implement" a plan
- 1% have "completed" their plan
- 2% said they "do not believe pandemic will be an issue."

Organizations were asked to identify which of the following measures they are currently implementing, selecting all measures that apply. Their responses:

- Employee training: 53%
- Travel restrictions: 17%
- Stockpiling antiviral drugs: 6%
- None: 43%

Organizations were asked to identify which of the following measures they are considering implementing, selecting all measures that apply. Their responses:

- Employee training: 87%
- Travel restrictions: 74%
- Stockpiling antiviral drugs: 28%
- None: 8%

The speed of migration of the pandemic coupled with the fear of its lethal nature mandates that we take steps to deal with it. We should also be taking steps to deal with the economic consequences of the pandemic. This event will not follow a set time schedule and is therefore going to be a challenge to plan for and respond to. History shows us that previous pandemics have lasted from eighteen to twenty-four months.

- Spanish Flu 1918 – 1919
- Asian Flu 1957 – 1958
- Hong Kong Flu 1968 – 1969

Although the influenza pandemic of 1918 – 1919 stretched over two years, it is estimated that approximately 66% (two-thirds) of the deaths occurred in a period of 24 weeks (approximately 168 days) and more than 50% occurred in even less time, from mid-September to early December 1918. This influenza killed more people in a year than the Black Death of the Middle Ages; it killed more people in 24 weeks than AIDS has killed to date.

Three key variables that were not present in previous pandemics, at least not to the extent that they are today are:

- ❑ **Mobility:** Today's global society is highly mobile. Air travel specifically could rapidly spread the virus across the world.
- ❑ **Food Supplies:** While populations in developed countries have a more nutritious diet today, it is highly dependent on imports of food that make up a significant portion of the global economy. Disruption of food supplies could exacerbate malnutrition in some developing countries and have a significant impact on developed nations.
- ❑ **Medication:** Currently there is no vaccine for H5N1. Modern medicine, while far more advanced, has yet to develop single course of treatment antibiotics, antivirals and vaccines for this virus.

Influenza viruses are notable for their resilience and adaptability. As a result, and despite annual vaccinations, the U.S. faces a burden of influenza that results in approximately 36,000 deaths and more than 200,000 hospitalizations each year. In addition to this human toll, influenza is annually responsible for a total cost of over \$10 billion in the U.S. (President George W. Bush, The White House, November 1, 2005, speech on National Strategy for Pandemic Influenza).

It is extremely important to keep in mind that 95-98% of us will survive this pandemic. It will then become painfully apparent that one of the major issues associated with the pandemic event is its broad economic impact worldwide. Newton's first law of motion states that "*An object at rest tends to stay at rest and an object in motion tends to stay in motion with the same speed and in the same direction unless acted upon by an unbalanced force.*"

Objects "tend to keep on doing what they're doing." In fact, it is the natural tendency of objects to resist changes in their state of motion. This tendency to resist changes in their state of motion is described as inertia.

Inertia = the resistance an object has to a change in its state of motion.

Newton's Law, "a body in motion tends to stay in motion" and that "a body at rest tends to stay at rest" will never be truer as it reflects the pre- and post-pandemic economic timeframes.

Complexity – Criticality

In his book, "*The Collapse of Complex Societies*", Joseph A. Tainter states, "Human societies and political organizations, like all living systems, are maintained by a continuous flow of energy." He further states, "More complex societies are more costly to maintain than simpler ones, requiring greater support levels per capita."

Individuals and collectives in the form of economic agents, create through the exchange of natural or artificial entities - goods, services and money, economic interactions. These economic interactions, once conducted on a much localized basis, are today conducted worldwide in a myriad of combinations and with a speed that is almost hard to conceive. We have created a worldwide economy so interdependent that an event the magnitude of this pandemic will send shockwaves reverberating throughout it. Restarting the world economy will be an undertaking of unparalleled dimensions.

While it is important to prepare ourselves for the inevitable, it is clearly as important to plan for the recovery and restoration of the global economy. The closest thing that we have to compare the planning necessary was the reconstruction of post-war Germany and Europe in the late 1940's and 50's. There we were dealing primarily with a regional phenomenon that of getting the European nations' economies back on track. Today we are faced with the potential of having to get a worldwide economy of a complexity never before seen in history, back on track.

The economic concepts of *average product*, the output per unit of input, and *marginal product*, the increase in total output resulting from the input, will have to be reassessed against the complexity and criticality of the product and/or service being rendered.

Should a pandemic materialize, it will bring troubled and uncertain times for a fragile world economy. In the recent past we have seen twenty of the world's biggest economies in some phase of recession. These economies account for 60% of the world's output. World trade growth, which held up throughout both the world recessions of the early 1980's and 1990's, fell twelve percentage points in 2001. Consider the impact of Hurricane Katrina on the city of New Orleans healthcare capabilities:

- 2: Number of hospitals currently functioning
- 8: Number of hospitals functioning before Katrina
- 1,053: Latest Louisiana death toll

The unfolding H5N1 pandemic could easily overshadow the devastation (in human lives and impact to businesses) from the combined hurricanes of 2005, events in Iraq, the impact of oil prices, concerns about corporate governance, problems in the IT industry and current account imbalances that have led to falls in investment around the world.

When the Pandemic is Declared

How long will the pandemic be underway before it is declared a pandemic? Experts at the World Health Organization (WHO) and elsewhere believe that the world is now closer to another influenza pandemic than at any time since 1968, when the last of the 20th century's three pandemics occurred. Currently it takes four – five days for the symptoms of H5N1 to manifest such that the patient goes to the hospital. In that time the virus is highly contagious and can spread rapidly. Sampling, testing and diagnosis also take time. Currently a window of ten – fourteen days exists for intervention. A spokesperson for WHO said, "We're not going to know how lethal the next pandemic is going to be until the pandemic begins." How does one begin to plan for the pandemic? The answer involves more than planning to respond to the medical aspects of the pandemic; one's methodology matters as much as the question itself. As businesses identify their planning focus it will be important to choose the proper methodology and correct focus of the planning effort. Indeed methodology will matter more than anything else.

The WHO utilizes a six phase pandemic alert system to inform the world of the seriousness of the threat and actions that should be undertaken. The designation of phases, including decisions on when to move from one phase to another, is made by the Director-General of WHO. Each phase of alert coincides with a series of recommended activities to be undertaken by WHO, the international community, governments and industry. The WHO sets out the following criteria for declaring a pandemic:

Phase	Description
Interpandemic Period	
Phase 1	No new influenza virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection may be present in animals. If present in animals, the risk ^a of human infection or disease is considered to be low.
Phase 2	No new influenza virus subtypes have been detected in humans. However, a circulating animal influenza virus subtype poses a substantial risk ^a of human disease.
Pandemic Alert Period	
Phase 3	Human infection(s) with a new subtype, but no human-to-human spread, or at most rare instances of spread to a close contact ^b .
Phase 4	Small clusters of human-to-human transmission but spread is highly localized, suggesting that the virus is not well adapted to humans ^b .
Phase 5	Larger cluster(s) but human-to-human spread still localized, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (substantial pandemic risk).
Pandemic Period	
Phase 6	Pandemic increased and sustained transmission in general population ^b .

^a The distinction between phase 1 and phase 2 is based on the risk of human infection from circulating strains in animals. The distinction is based on various factors and their relative importance according to current scientific knowledge. Factors may include pathogenicity in animals and humans, occurrence in domesticated animals and livestock or only in wildlife, whether the virus is enzootic or epizootic, geographically localized or widespread, and/or other scientific parameters.

^b The distinction between phase 3, phase 4 and phase 5 is based on an assessment of the risk of a pandemic. Various factors and their relative importance according to current scientific knowledge may be considered. Factors may include rate of transmission, geographic location and spread, severity of illness, presence of genes from human strains (if derived from an animal strain), and/or other scientific parameters.

The world is presently in phase 3: a new influenza virus subtype is causing disease in humans, but is not yet spreading efficiently and sustainably among humans.

There are three elements to a pandemic. First, a virus emerges from the pool of animal life that has never infected human beings, meaning no person has antibodies to fight it. Second, the virus has to make us seriously ill. Third, the virus must be capable of moving swiftly from human to human through coughing, sneezing or just a handshake.

For avian flu, the first two elements are already with us. Well over half the people who have contracted it have died. The question now is whether the virus will meet the third condition: mutating so that it can spread rapidly from human to human.

A Possible, Plausible, Pandemic Economic Scenario?

The following hypothetical scenario is presented to highlight potential economic consequences associated with a pandemic and to illustrate, as well as, stress the need for cooperation between public and private sector entities; and cooperation between and among private sector entities, not only in responding to the pandemic (the tactical level), but in addressing the economic consequences of the pandemic (the grand tactical level) and its aftermath (the strategic level). Our scenario unfolds over a period of 500 – 800 days, the relative time that previous pandemics have been seen to run their course. Time, as with all else associated with H5N1, will be an unknown that will have to be addressed as the pandemic begins to exhibit its characteristics and courses throughout the global population.

Phase # 1: Shock and Awe – Reactive (60 – 180 days)

The WHO declares Phase 6 and the world sets out to minimize the impact of the pandemic (tactical response). Mobilization of assets by WHO, the international community, governments and industry begin. This may be too late for effective response as the pandemic has already spread and now defensive actions are the only and very limited option. In this scenario a reactive fear based response is the overriding driver.

When the pandemic is declared some countries react by closing their borders. This action while purely a defensive reaction has many implications from an economic perspective. Other countries begin to close their borders in reaction to the spate of border crossings further exacerbating the situation. As borders are closed international trade is brought to a standstill or is carried out on a very, very limited basis. If the H5N1 pandemic in any way parallels the influenza of 1918 – 1919, it is estimated that approximately 66% (two-thirds) of the deaths will occur in a period of 24 weeks (approximately 168 days) and more than 50% will occur in even less time, roughly within the first 90 days. The potentially staggering death toll and the reactive response to the pandemic will lead to slowdowns of already fragile economies leading to accelerations of workforce layoffs worldwide as markets react, rapidly shrink and/or completely cease to exist.

Faced with suddenly idled workers worldwide and the need to provide medical aid to populations that are succumbing to a global pandemic, governments are thrown into chaos. How will they deal with this? Keep in mind that governments are generally funded through the collection of taxes (individual and corporate). Without its revenue base (taxes) a government's ability to assist will be restricted. Government assistance will be further restricted as government will be faced with the same problem that non-government entities are faced with: a workforce that is stricken with the virus.

Traditional services of government, such as, military, police, fire, emergency medical services, administrative and tax functions are soon strained to the point of breaking. Governments worldwide begin to organize military forces to keep order internally and to supplement police, fire and emergency medical services. The situation is soon exacerbated by many of the government's own falling victim to the influenza.

Soon, the world economy screeches to a halt as the wheels of commerce grind to a stop creating a state of stagnant economic inertia. Once this state is reached, the real problems related to the pandemic start to surface. In trying to keep their economies growing over time governments worldwide, through organizations such as the Federal Reserve

Board, try to steer an economic course between too rapid growth that leads to inflation and too slow growth that leads to recession. Steering an economy in any direction is a very difficult job. Steering an economy during a pandemic will be almost impossible. First, it will be difficult to determine which sectors are hit hardest by the pandemic. Second, the speed of the pandemic's spread will cause economies to become more reactive. Third, and by far the biggest problem, is that economies are really the sum total of the actions of hundreds of millions of individual decision-makers all over the world all making decisions on buying and selling. The pandemic will have an immediate influence on these decision makers' actions. Because the pandemic will be a rapid and uncertain event, no government will have the power to actually control all these decision-makers as they will not have the economic strength to revitalize their economies through government spending. Government will not be able to spend its way out of the stagnation created by the pandemic. Business will not be able to spend its way out of the stagnation created by the pandemic either.

As the pandemic runs its course in the ensuing months (18 – 24) (approximately 600 – 800 days) the worldwide economy begins to experience severe pains as the world population is faced with shortages due to curtailments by governments in an attempt to contain the pandemic, on international and domestic travel, transportation and trading. Commerce moves to a cash basis and becomes localized – meaning, if you cannot get it locally, and you cannot pay in cash, you are probably not going to get it. Worldwide society moves to "barter in isolation" as a way of life as the normal flow of goods and services are disrupted.

Sector Analysis – (60 – 180 days)

The financial sector having experienced runs on banks is faced with solvency issues. Institutions such as the World Bank, International Monetary Fund and Asian Development Bank see donor nations suspend their commitments of funds and see recipient nations petition for restructuring of their loans.

The manufacturing sector is impacted as factories are forced to close either due to quarantine or from lack of raw materials availability and curtailment of imports and exports due to border closures. Firms dependent on outsourcing and parts made overseas are forced to curtail operations.

The service sector, comprised of volume driven firms, sees volume dwindle and the forced layoff of many workers. Severe strains on the financial health of the service sector begin to appear as credit and debit card firms see defaults on payments due. Fraud becomes an increasingly significant issue for this sector.

The telecommunications sector is under intense pressure as workers attempt to telecommute. The utility sector, also under intense pressure, begins experiencing brownouts and blackouts in many areas as fuel supplies are curtailed and system maintenance becomes more difficult due to a lack of experienced workers.

The insurance sector sees an upsurge in claims for medical benefits, causing a slowdown due to volume impact. This in turn affects the healthcare providers who depend on insurance payments to continue operations.

The healthcare sector is overwhelmed by patient volume as the pandemic takes hold and more people fall victim to the influenza. This is complicated by the surge of people who think they have exhibited the symptoms of the influenza and seek medical aid. In addition, this sector is impacted by limited supply availability due to border closures.

The energy sector sees a decline in demand as well as a spike in prices for raw materials. Demand declines are due to a shift in the need for fuel as curtailments of international and national transportation systems beget less demand. The shift from occupied offices in cities to stay at home workers also reduces the demand for fuel. However, due to the curtailment of international trade there is a spike in commodity prices due to the lack of raw materials getting into countries.

The utility sector sees a spike in residential demand as more and more workers are forced to stay at home due to quarantine, facility closures, lack of work and fear of exposure take hold. A fragile infrastructure, the utility sector begins to experience brownouts and blackouts, in part due to the age of the system, lack of fuel supplies and

distribution issues, but also in part due to people defaulting on their payments and as a result of illegal connections being made by people who do not have the resources to continue to pay for the services that they require.

The agriculture sector sees a demand for food products that cannot be met as transportation sector assets are idled by quarantine and border closure restrictions. As a major importer of foodstuffs the U.S. suffers regional spot outages as grocery stores are forced to close due to lack of inventory. Government food warehouses are unable to alleviate the shortages due to the impact of fuel distribution problems affecting the transportation sector, shortages of personnel and transportation system closures due to quarantine and border closures. Spoilage becomes a factor in planning for this sector.

The education sector shuts down as students and teachers are furloughed when schools close due to health concerns, quarantine and transportation system impacts that preclude travel to and from school for health reasons.

The high-technology sector sees demand for access and support related to the Internet grow, but is faced with a workforce that has the same exposure, in some instances great exposure, as the other sectors. As many call center operations are located overseas the issue of exposure to the flu could become a major issue for companies that are dependent on these call centers for their operations.

By the time that we enter the sixth month (180 days) of the pandemic most sectors will have either scaled back operations such that they are operating with minimal staff or they will voluntarily shutdown due to lack of staff and/or resources, or they may be forced to shutdown due to quarantine by the government. We may indeed see rationing of critical resources and limited distribution capabilities creating duress on societies worldwide. For those societies, like the U.S., with a population that is used to getting what is needed to sustain day-to-day living; this may be quite a shock. There could be outbreaks of violence (New Orleans after Katrina is an example) that will require force to quell.

Countries with low levels of preparedness may resort to even more repressive actions in order to control their populations. And, there will always be the specter that a country will fear an attack by a neighbor while they are in a weakened state. Speculation and fear could rule the day during this timeframe.

While this picture of the first phase of the pandemic is pretty bleak it is not without precedent in recent history. We have experienced violence and looting after hurricanes, earthquakes and other natural disasters. The world, unfortunately, is still not as civilized as we would like it to be.

Phase # 2: Dynamic Consistency Problems – Paralysis (180 – 320 days)

As the world settles in to the reality of the pandemic, adjustments are made. The UN, WHO and other entities (CDC) set out to contain the outbreaks that continue to materialize. Businesses readjust to the realities of a changed and changing operating model. It is no longer business as usual. Supply chain adjustments are being made, albeit slowly and sporadically due to disruption of transportation systems. Service center operations (call centers, etc.) are being reconfigured to adjust to the need to focus on geographical areas currently less affected by the pandemic.

Assets mobilized by WHO, the international community, governments and industry after reassessing their status and effectiveness; begin to adjust their efforts. Death tolls show signs of leveling off and even declining in some areas. This may be a false positive in that pandemics have been shown, in the past, to be cyclical in the rise and fall of death tolls. In this phase a paralysis begins to take effect as economies, affected by the reaction of governments (border closures, quarantine, etc.) become bodies at rest, not bodies in motion.

The world begins to realize that the energy required to regenerate global economic motion will be massive.

Some countries reopen their borders. This action does not instantaneously restart stagnant economies as many hope. Unlike a light switch being turned on, merely reopening borders will not generate pre-pandemic levels of commerce. Much like the loss of power during an electrical outage restarting an economy cannot be accomplished

instantaneously. One of the things that we are told to do when power goes out is to turn off electric appliances. Why? The simple fact is that when power is restored, if all appliances are on the stress on the system may cause an overload surge creating a more severe outage than the initial incident created. The global economy will be faced with answering a significant question: "How to restart an intricate and complex system that has evolved over time such that it can manage the stresses associated with its functioning?"

Sector Analysis – (180 – 320 days)

The financial sector is faced with regaining the confidence of the investing public. Banks and other financial institutions still face solvency issues, some of them terminal to the institutions most severely affected. Institutions such as the World Bank, International Monetary Fund and Asian Development Bank may be forced to suspend normal operations until donor nations are economically viable. This is a complex issue as many donor nations are dependent on developing nations to support their economic engines. Developing nations cannot fuel their own economic engines because of the debilitating effect of the pandemic on their populations. Stock, commodity and finished goods prices could fluctuate dramatically as access to commodities and transportation of commodities is disrupted, as well as the activities of publicly traded companies. The financial sector will require large infusions of cash from central banks that have no revenue base due to expenditures and loss of tax base support. Markets could enter a recessionary period.

The manufacturing sector is faced with attempting to restart without access to normal streams of raw materials that are imported and/or are dependent on transportation systems that are potentially still impacted by local outbreaks of the flu. Firms once dependent on outsourcing and parts made overseas are now forced to seek local sources. This requires that cottage industries be started. While creating a localized economy, the inception of cottage industries could further delay the recovery of the global economy due to the limitations of local resources, workforce and goods and services demands.

The service sector is faced with much the same situation that the financial sector is faced with. How does this sector create volume demand?

The telecommunications sector is faced with loss of connectivity issues due to loss of and or sporadic disruption of support infrastructure (electrical power). Telecommuting once a panacea for business continuity planning, is proving to be more difficult than imagined due to the lack of ability to replicate the office environment in the home setting. Additional strains on the telecommunication system continue as stress on residential infrastructure increases.

The insurance sector faces the overwhelming task of claims processing with limited human resources. This continues to affect healthcare providers dependent on insurance payments to continue operations.

The healthcare sector faces less patient volume, however, there is the issue of healthcare supplies becoming increasingly difficult to acquire due to transportation system impacts and the production facilities overseas being unable to ship supplies.

The energy sector faces supply issues (raw materials), transformation (refining raw materials into useable energy) and transportation issues. The key question to answer for this sector: "How will production centers get finished products to users; while replenishing depleted reserves and a depleted workforce?" Commodity prices will fluctuate due to demand for basic raw materials that now have to be generated locally.

The utility sector faces infrastructure strains due to an aging infrastructure that is not designed to meet the types of demand placed on it. More brownouts and blackouts occur as utilities are forced off the grid in order to meet local demand with limited local supplies of fuel.

The agriculture sector faces localization due to transportation issues. Seasonal demands for food products change the market for food distribution and retail operations. A key question for this sector will be: "How to meet local demand when localization of production has not been accomplished?" The U.S. continues to suffer regional spot outages.

The education sector faces limited capability to reopen as teacher shortages and fearful parents may keep students away from educational institutions. Additionally, the government may commandeer facilities to house units that have been called to active duty in support of operations to mitigate the effects of the pandemic.

The high-technology sector faces continuing high demand for access and support related to the Internet. Support services could reach marginal levels due to continued workforce disruption.

By the time that we enter the tenth month (320 days) of the pandemic, the impact on the global economy will have reached all sectors. While disruption in the chaotic sense is possible, the gradual localization of economies is more likely to be the case. It should be noted that we have not factored in any naturally occurring phenomena such as, weather related and natural disaster situations, that are likely to exacerbate local economies difficulties.

Speculation and fear could be replaced by paralysis, despair and retrenchment during this timeframe.

Phase # 3: Worst Case – Collapse (320 – 600 days)

The world suddenly becomes larger as localization takes root. Realizing that surviving the pandemic will require a rethinking of business strategies many sectors see a reverse in trend as large, integrated companies are forced to downsize and localize. As the world settles in to this new reality more adjustments are made. The UN, WHO and other entities (CDC) while still combating outbreaks are less effective due to local constraints put in place. Governments, businesses and consumers readjust to the realities of changes in economic models. Goods and services revert more and more to reflect the localization brought upon by disruptions to transportation channels. While it is no longer business as usual, some local economies begin to revitalize as access to raw materials or changes in demand are compensated for by readily available products. Supply chain adjustments continue to be made as countries dependent on external resources are seeing the balance of power shift. Consumer societies are being forced to face sobering realities.

Death tolls may again begin to rise as local efforts to stem the continued pandemic and deal with normal medical issues are faced with lack of materials (vaccine, medicines, etc.) due to the impact of the past 320 days of the pandemic.

In this phase paralysis gives way to collapse as localization changes the economic model. Collapse is not to be viewed as a return to the "stone age" rather it is a collapse of global trading systems and a refocusing of these systems to address a more local and/or regional marketplace. The economies (bodies at rest) begin to slowly create localized inertia (bodies in motion). This inertia is limited due to the impact of the pandemic, local restrictions and the localization of good and services that may lead to a change in consumer mentality.

The world begins to realize that the energy being expended on localization could form the basis for the regeneration of the global economy.

Trade talks between consumer and supplier nations dominate the day. Financial concerns in the transportation industry are of major focus as the trade routes are dependent on getting national and international transportation systems recovered. This action begins to revive and expand local economies, but does not instantaneously return us to the pre-pandemic days.

The global economy is still faced with answering the significant question: "How to restart an intricate and complex system that has evolved over time such that it can manage the stresses associated with its functioning?" And the global economy may begin to question which country should lead and manage this undertaking.

Sector Analysis – (320 – 600 days)

The financial sector may shrink as international conglomerates are forced to divest and localize. This sector is still faced with regaining the confidence of the investing public. Banks and other financial institutions still face solvency issues. Governments and institutions such as the World Bank, International Monetary Fund, etc. are faced with controlling inflationary trends. The recessionary period could have an extended life due to reluctance on the part of consumers.

The manufacturing sector is still faced with access to normal streams of raw materials issues and dependency on transportation systems that remain impacted by local outbreaks of the flu. Cottage industries begin to grow in strength and vitality. Localized economies reflect some of the robustness of the global economy but are still limited due to resources, workforce, goods and services demands.

The service sector may dwindle as the workforce is assimilated into the manufacturing sector in order to survive. Volume demand is still the major issue.

The telecommunications sector begins to recover as it localizes much as the utility sector. Cellular communications are in high demand as fixed infrastructure is still faced with loss of connectivity issues due to loss of and or sporadic disruption of support infrastructure (electrical power). Telecommuting begins to adjust to the realities of the infrastructure availability.

The insurance sector continues to be buffeted by the overwhelming task of claims processing with limited human resources. This continues to affect healthcare providers dependent on insurance payments to continue operations.

The healthcare sector faces sporadic jumps in patient volume as the pandemic hits a second wave of outbreaks. Healthcare supplies become increasingly difficult to acquire due mainly to production constraints.

The energy sector continues to face supply issues (raw materials), transformation (refining raw materials into useable energy) and transportation issues. Commodity prices continue to fluctuate based on spot demand.

The utility sector continues to face infrastructure strains as demand begins to increase as workforces begin to return to some office functions. Brownouts and blackouts are a regular occurrence and are now viewed as part of life versus a crisis situation.

The agriculture sector sees localization develop unique markets for products. Seasonal demands for food products are unchanged. The U.S. continues to suffer regional spot outages.

The education sector faces limited capability to reopen as teacher shortages and fearful parents may keep students away from educational institutions. Government use of commandeered facilities continues.

The high-technology sector faces continuing high demand for access and support related to the Internet. Support services could reach marginal levels due to continued workforce disruption.

By the time that we enter the twentieth month (600 days) of the pandemic, the impact on the global economy will have changed the operations of all sectors. Localization of economies has become the norm and is creating a baseline of inertia that could propel the recovery of the global economy. Again we remind the reader that we have not factored in any naturally occurring phenomena such as, weather related and natural disaster situations, that are likely to exacerbate local economies difficulties.

Paralysis, despair and retrenchment are replaced with local revitalization and rediscovery during this timeframe.

Phase # 4: Recovery – Every Time History Repeats Itself the Price Goes Up (600 – 800 days)

The pandemic will gradually subside relieving healthcare systems that are, by this time gasping for survival. The world enters a very slow and potentially torturous recovery mode.

Tainter in his book, "*The Collapse of Complex Societies*," cites four concepts that would lead to an understanding of collapse:

- Human societies are problem-solving organizations
- Sociopolitical systems require energy for their maintenance
- Increased complexity carries with it increased costs per capita
- Investment in sociopolitical complexity as a problem-solving response often reaches a point of declining returns

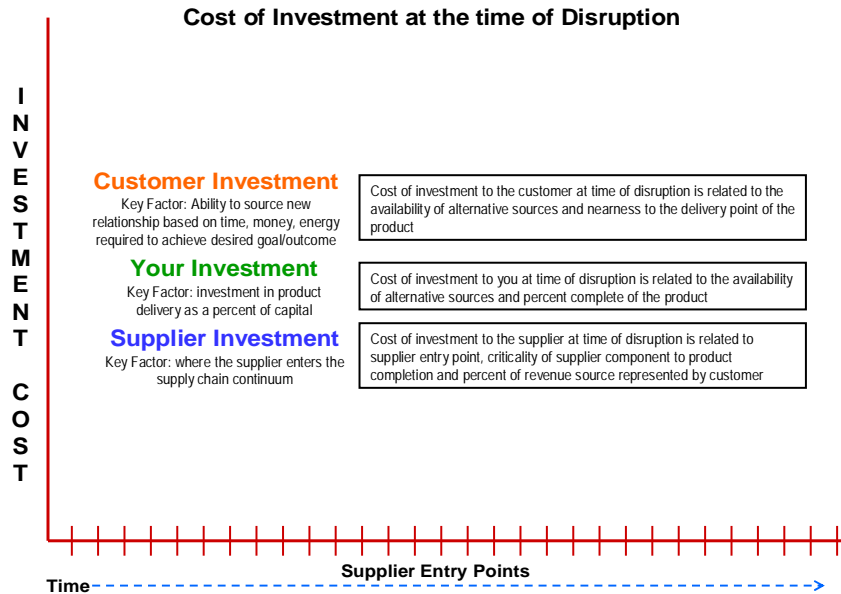
Taking these four concepts and projecting them into the pandemic scenario, we see that societies that increase in complexity do so as a system. The interlinked parts are forced in a direction of growth and the touchpoints (not directly linked) are required to adjust accordingly.

If we consider the last point made by Tainter, that increasing complexity often reaches a point of declining returns, we can project that at this stage of the pandemic that attempting to maintain the status quo regarding our complex global economy may actually exacerbate the recovery from the pandemic.

The economic stakes at this stage are going to be very high. Governments, businesses and consumers will have to work hand-in-hand to realize the revival of the global economy. While localization has provided a basis for a surviving the pandemic, new growth on a global scale will be slow in coming. This may partially be due to fear that a return to the "norm" might just invite a recurrence of the pandemic to areas that are considered virus free.

If the pandemic does indeed cost the U.S. the staggering sum of \$675 billion, as cited by Senator Frist, what will be the impact on the global economy? If the Congressional Budget Office estimate is correct, that direct and indirect costs would reduce U.S. economic production by 5%; what will that mean on a global basis?

The U.S. economy is part of a complex global economy. And, as Tainter points out, increasing complexity often reaches a point of declining returns. Will we have the wherewithal, as nations, to fight off the temptation to "go it alone"? Each cog (nation states) in the global economy are like the links in a gigantic supply chain. Where a country fits into that chain is of critical importance to the recovery process. While the U.S. economy generated \$11.7 trillion in gross domestic product, will it be at the head of, middle of, or at the end of the chain? An illustrative example is provided in figure 1, entitled, "Cost of Investment at the time of Disruption".



The cost of investment is predicated on where you are in the chain. If you are a consumer (an importing country) much like the U.S. is (e.g., trade balance) then the cost of investment is related to the availability of alternate sources and nearness to the delivery point that you are to the finished product. However, being a consumer in the post-pandemic economy may be a difficult situation if the consuming nation does not have a strong financial standing and/or readily acceptable trade alternative (i.e., monetized commodities).

If you are a supplier (an exporting country) much like the countries rich in natural resources, you have to determine where along the supply chain your entry point is. However, being a supplier in the post-pandemic economy may be as difficult as being a consumer if other suppliers (i.e., shippers, etc.) have breakdowns due to financial woes brought on during the pandemic.

Your investment (your country's economy) is going to reflect the degree of damage that the pandemic does to your population and the economic infrastructure that that population supports. Therefore as Senator Frist points out as excerpted below from an article entitled, "*Frist: Safeguard economy against pandemic's devastation*"; Des Moines Register December 9, 2005:

"A severe pandemic, CBO [*Congressional Budget Office*] says, would lead to an 80 percent drop in economic activity for the entertainment, arts and dining sectors, the disappearance of a quarter of all retail sales and a severe curtailing of travel. Agriculture and manufacturing would take heavy hits as well. Pandemics dry up world trade."

BILL FRIST, R-Tennessee, majority leader of the U.S. Senate

Restarting a complex global economy may initially create a cost benefit curve that looks very promising at first, for the easiest, most general, most accessible and least expensive solutions will be the ones that are attempted first. As these solutions realize maximum value and essentially are exhausted, continued economic stresses will require further investments in complexity. The question will be: "Where do the governments, peoples, businesses of the world come up with the money to pay for investments in complexity that return the global economy to the status quo?" Realize that in the 500 – 800 day timeframe that we envision a lot of the cash reserves of the world's economies will have been spent fighting the pandemic.

Sector Analysis – (600 – 800 days)

The financial sector may face solvency issues as a result of people choosing alternative savings methodologies and/or just not having any income to save. Governments and institutions such as the World Bank, International Monetary Fund, etc. could face extinction, severe restructuring and/or loss of power with regard to controlling the flow of capital.

The manufacturing sector is now faced with raising capital to expand beyond the local markets, as access to raw materials and transportation systems will require capital to be expended in order to grow.

The service sector may continue to wither as the lack of workforce, assimilated into the manufacturing sector, is no longer available and demand volume remains low.

The telecommunications sector recovery could be the most robust if the infrastructure that supports it (i.e., the utility sector) can provide needed support. Again capital, or lack of it, will be a key factor. Telecommuting may become the norm as adjustment soon creates a viable resource base to support telecommuters. However, it should be pointed out that information processing may take a back seat to agriculture and manufacturing.

The insurance sector will have to be deconstructed and reconstructed in a different model. Social Security, Medicare, Medicaid, other government sponsored entitlement programs could be faced with extinction as a result of the expenditure of funds during the pandemic's phases and the now readily apparent loss of a significant portion of the working population due to death, illness, loss of employment and loss of employment sectors.

The healthcare sector will have to be deconstructed and reconstructed much the same as the insurance sector. Expect government intervention and possibly a national healthcare system being created.

The energy sector will continue to face supply issues (raw materials), transformation (refining raw materials into useable energy) and transportation issues. Commodity prices continue to fluctuate based on spot demand.

The utility sector will continue to face infrastructure strains as demand begins to increase as workforces begin to return to some office functions. Brownouts and blackouts are a regular occurrence and are now viewed as part of life versus a crisis situation.

The agriculture sector faces a transformation from localization to globalization, however, transportation will play a defining role in the re-growth of complexity in this sector. Seasonal demands for food products are unchanged. The U.S. continues to suffer regional spot outages.

The education sector continues to have to address limited capability to operate as teacher shortages and fearful parents keep students away from educational institutions. Government use of commandeered facilities continues.

The high-technology sector may see a drop in demand as the pace of innovation is altered and/or permanently slowed. Support services could reach marginal levels due to continued workforce and support infrastructure (utility and telecommunications sectors) disruption.

By the time that we enter the twenty-fourth month (800 days) of the pandemic, the recovery will be well underway albeit reflective of the altered operations within all sectors. Localized economies may limit expansion by virtue of finding that they do not wish to participate in a global economy that has become fraught with vulnerabilities.

We remind the reader that we have not factored in any naturally occurring phenomena such as, weather related and natural disaster situations that are likely to exacerbate local economies difficulties in any of the discussion presented herein.

Concluding Thoughts – Beyond 800 days

Current research indicates a small portion (5%) of businesses today, have continuity plans, but virtually all realize they are at risk to the effects of a pandemic. The Center for Resilience at The Ohio State University defines a resilient enterprise as:

"A resilient enterprise has the capacity to overcome disruptions and continually transform itself to meet the changing needs and expectations of its customers, shareholders and other stakeholders."

Center for Resilience, Ohio State University

Government and business leaders have a responsibility to protect their organizations by facilitating continuity planning and preparedness efforts. Using their status as "leaders," senior officials, senior management and board members can and must deliver the message that survivability depends on being able to find the opportunity within the crisis. Today we cannot merely think about the plannable or plan for the unthinkable, but we must learn to think about the unplannable.

Humans by their very nature are resilient. We have managed to evolve through the ages and have survived ice ages, volcanic eruptions, wars, pandemics and other maladies. We will survive this challenge too. We may not, however, return to the status quo that we are accustomed to today. Will it be a better world? Will it be a more difficult world? That only time will tell.

The mortality rate of the pandemic will only be the tip of the iceberg, the speed with which it achieves global contamination and economic impact over time will be the major issues to contend with. Preparing yourself and your organization now is one of the key steps to effectively dealing with the disruption that may run rampant. We cannot afford to abdicate personal responsibility for our well being to entities that may not have the capability to ensure our well being. Being personally responsible engenders personal accountability, something that we need to instill now, not when the pandemic is upon us.

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Geary W. Sikich is the author of "*It Can't Happen Here: All Hazards Crisis Management Planning*" (Tulsa, Oklahoma: PennWell Books, 1993). His second book, "*Emergency Management Planning Handbook*" (New York: McGraw-Hill, 1995) is available in English and Spanish-language versions. His third book, "*Integrated Business Continuity: Maintaining Resilience in Uncertain Times*," (PennWell 2003) is available on www.Amazon.com. Mr. Sikich is the founder and a principal with Logical Management Systems, Corp. (www.logicalmanagement.com), based in Munster, IN. He has extensive experience in management consulting in a variety of fields. Sikich consults on a regular basis with companies worldwide on business-continuity and crisis management issues. He has a Bachelor of Science degree in criminology from Indiana State University and Master of Education in counseling and guidance from the University of Texas, El Paso. Geary can be reached at (219) 922-7718.

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