TLI – Asia Pacific White Papers Series

MEGATRENDS AND THEIR IMPACT ON LOGISTICS

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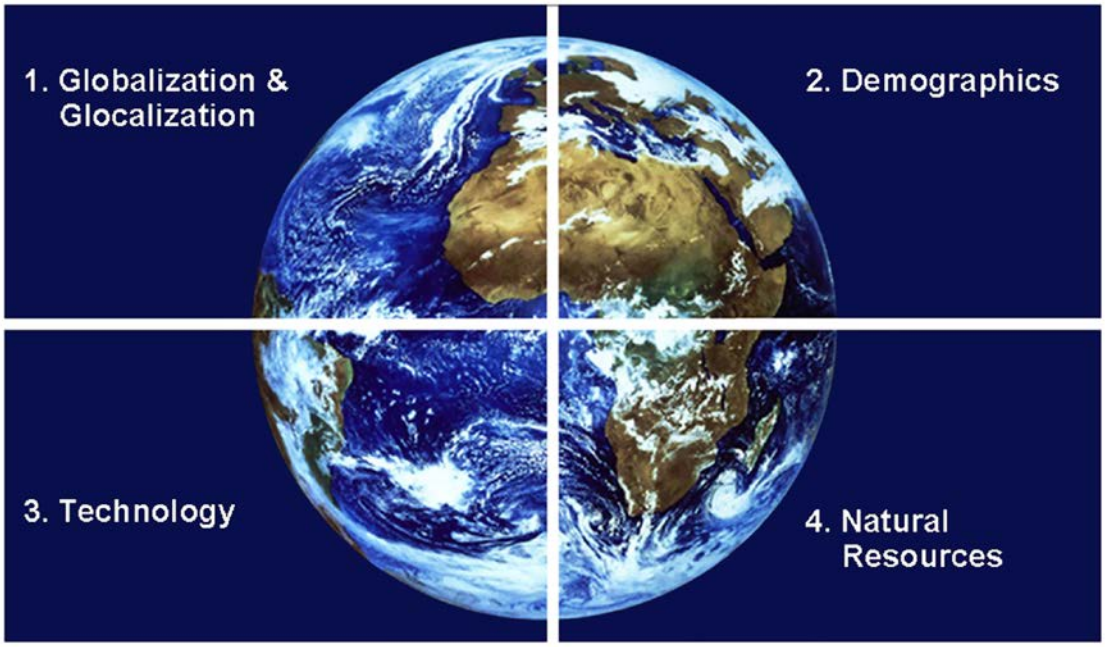

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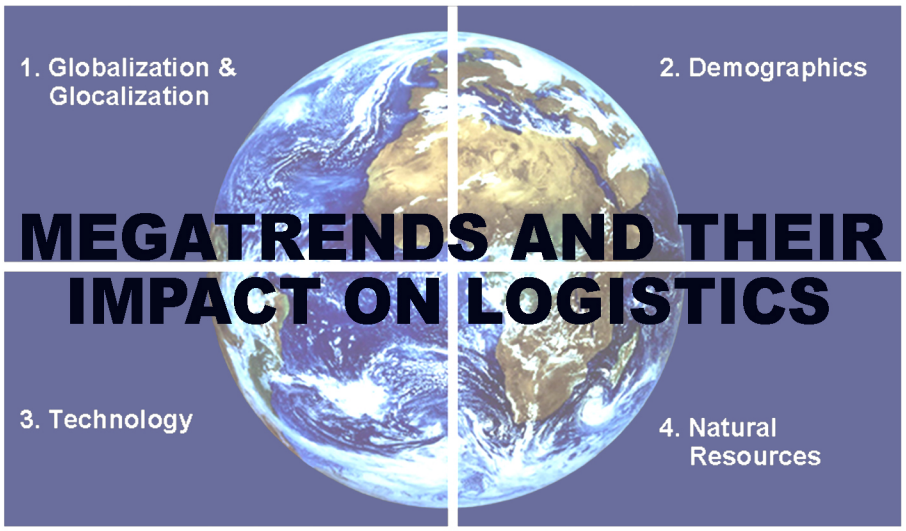

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THE IMPACT OF SEVERE DISRUPTIONS ON GLOBAL SUPPLY CHAINS

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FOREWORD BY THE EXECUTIVE DIRECTOR, TLI – ASIA PACIFIC

It is my great pleasure to write the preface to this white paper by Karl Gernandt, Chairman of Kuehne + Nagel International AG.

Karl Gernandt comfortably wears many hats as a Global Business Leader, a member of the Kühne Logistics University's Supervisory Board and as a member of the Board of Trustees of the Kühne Foundation.

It is our honor to have interacted and collaborated very closely with each of the organizations to which he contributes his leadership.

Our close collaborations is evidenced today with the release of this white paper laying the groundwork of "megatrends" and their impact on logistics, the formal launch of a joint Humanitarian Logistics Education Centre with NUS and the forging of academic collaborations in the sphere of logistics education and research with the Kuehne Foundation's network.

More significantly, Mr. Gernandt's varied roles bring forth his unique perspectives, unified in language familiar to practitioners, academics, government and non-governmental agencies and to the layman himself.

The theme of this year's annual meeting is "The Impact of Severe Disruptions on Global Supply Chains". Karl Gernandt as the opening keynote speaker elects to see disruption as a positive but significant change agent (not necessarily for the companies or products that have been disrupted) that business leaders must keenly observe on a global scale and not just myopically within their own companies and markets.

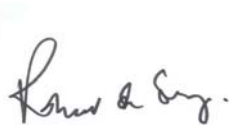
The lessons Karl Gernandt posits in the categories of Production and Value Creation, Development and Society, Technology and Sustainability will help managers avoid what he terms the "efficiency trap". Going further, he emphasizes the need to "identify and translate macro trends into their implication for logistics and strategic corporate decisions." He sets forth four key hypotheses on "how the trends will interact in forming forces that shape the future in the economy ahead. "

It is to our great benefit that Karl Gernandt has opted to deliver this paper personally at our THINK Logistics annual conference in Singapore this November and this sets us the challenge to act and navigate on his insights in the turbulent markets of today.

I sincerely hope that you will enjoy reading this paper as much as I did and that we at the Logistics Institute - Asia Pacific, through invited leaders such as Karl Gernandt, will continue to catalyze your learning, sharing and networking as professionals, managers and executives.

Thank you for your continued support and participation in our THINK series of meetings.

Dr. Robert de Souza



1. INTRODUCTION

On April 3rd, 1860, the Pony Express started its first transport of mail and other documents across the United States from Missouri to California. Travel time was ten days and thereby three times faster than a stagecoach. This was possible due to a sophisticated system of 184 stations providing fresh horses and/or riders. Custom made saddles and other measures further improved the efficiency of the system. The inauguration speech of Abraham Lincoln was even delivered in a record time of seven days and seventeen hours. For that time, a logistical masterstroke! However, on October 26th, 1861, only one and a half years after the service started, the Pony Express stopped operation completely.

28 years later, in 1889, George Eastman founded, in New York, a company named Kodak. The business model was simple yet successful. Cheap cameras were made available to the public thereby generating high-margin sales for consumables such as films, chemicals and paper. During the 20th century Kodak became the innovation and market leader in the photo sector. In 1976 Kodak held a 90% market share of photographic film sales in the United States. That was one year after Kodak developed the first digital camera. Its further development, however, was dropped out of fear of cannibalizing Kodak's then successful business model. In January 2012, Kodak filed for bankruptcy.

The question is: What do the failures of the Pony Express and Kodak have in common?

Their product quality and sophistication was outstanding. This means, that the reason for failure did not lie in each company's ability. What they did and what made them grow was consistently excellent.

So let's widen the scope from the companies to their respective markets: Kodak had in its core market only one significant competitor (Fuji Film); the Pony Express had for its particular service no competition. Therefore, competition was not the reason for failure.

Both, the Pony Express and Kodak were victims of a threat that came from outside their traditional focus on efficiency, productivity and competitiveness.

The Pony Express became obsolete as a result of the telegraph system that connected the east coast with the west coast of the United States. Information became digitalizable with no need for physical transportation. This same process, digitilization, came to pictures enabling photographs to be stored electronically without need for film or expensive printing papers. On the one hand supply changed (i.e. delivery of messages electronically), and on the other hand demand changed (i.e. sharing pictures electronically at almost no cost).

These examples show that a company, especially a global player, due to its geographic exposure, cannot look only within itself or its markets for long term success. It is rather a requirement that it pays attention to the fundamental shifts influencing supply and demand on a global scale.

The right focus on efficiency within your production and market is part of all success stories in business; however the lack of giving an answer to the aspect of effectiveness of the overall positioning is a reality as well. I call the management failure the “efficiency trap”. The missing link in leadership between doing the things right (optimization) and doing the right things (relevance in the market) has to be tackled constantly by the management.

There are many more examples of these types of changes forcing companies to adapt to the change in order to stay profitable such as:

- Copy machines → electronic documents (Xerox)
- Typewriters → computer (Adler, Triumph, Brother)
- Televisions → video communication integrated into smart phones and computers (Grundig, Philipps, Thompson, Sony)
- Video rentals → pay TV → on demand downloads (Blockbuster)
- Horse carriages → cars (Durant-Dort)
- General cargo vessels → pure ocean container ships (Lykes)
- And many more

These examples show the high relevance of maintaining an outside perspective, observing the world we live in and anticipating the developments therein. It is impossible to predict the future, but it is certainly worthwhile to think about it.

2. WHAT ARE MEGATRENDS?

When hearing the word "megatrend", some might suspect a marketing trick, and indeed this term is often used incorrectly in this context. The main differences between megatrends and regular trends, e.g. in fashion, are their persistence (several decades or longer) and their fundamental influence on the world by the shifting understanding or regularity of commonly accepted rules.

Various criteria are used to define megatrends. We will focus on four, namely:

Global Reach

Megatrends do not happen in isolated regions, but result from global causes as well as global effects. This does not necessarily mean that developments occur simultaneously in terms of speed and extent all over the world (e.g. wage increases). Nevertheless, the general development impacts people around the world.

Robustness

Crisis, wars or natural catastrophes might stop megatrends temporarily, or even turn them around for a short period of time. In the long term, however, megatrends prevail (e.g. increasing life expectancy).

Slowness

Changes caused by megatrends do not appear or disappear in a sudden manner. They rather deploy their changing effects over decades, or longer. In fact, many megatrends follow a 1%-rule: every year one percent more of the population live in cities or achieve a higher degree of education. It is quite common for many developments to take place in a slow but steady manner.

Paradox Effects

Megatrends often create countertrends as a direct consequence of their existence. Globalization, for example, leads to increasing relationships and, thereby, dependencies on other countries. As a reaction (especially following "catalyst events" such as the 2008 financial crisis) counteractions, such as protectionism and nationalism, arise.

3. WHY ARE MEGATRENDS RELEVANT FOR LOGISTICS?

Megatrends have an enormous impact on global society and continuously change the way people live, their necessities, desires and possibilities. Therefore, global demand shifts causing large scale effects for resources needed, production locations and supply chains.

So called "Billionaire Groups" demonstrate this development. This term describes groups of more than one billion people with similar demand patterns. Examples for "Billionaire Groups" by the year 2025 are the hungry (>1bn), students (>1bn), elderly (>2bn) or the "new" middle class (approx. 3bn). As a result of megatrends, these groups can increase or decrease in size consequently changing the structure of global demand for food, education, medicine or consumer goods.

One might describe the function of logistics as **"Logistics brings products from A to B"**. Although this is a very simplified way to describe logistics, it serves us well in describing the dynamic nature, and the complexity, of logistics.

Looking closely at this definition, an inevitable question arises as to, "Where is A and where is B?" The answer depends on the location of natural resources, production and storage facilities and, of course, the location of the final consumer. Every leg of a supply chain turns the former "B" into an "A" having a new "B" as the next destination. Each supply chain is different, and their designs are highly product specific.

Furthermore, regarding the initial question, one needs to clarify what "products" are. First of all a product will only be produced if there is a demand or the indication that demand can be generated. And partially some qualities of a product, may it be weight, volume, time sensitivity, etc., are highly relevant for logistics because the supply chain needs to address these factors to successfully bring the product to its final destination, and enabling the equilibrium of supply and demand in a physical dimension.

Therefore, within our simplified model, we have three elements that define a logistics operation: origin (A), destination (B) and product (P). Each of these elements are affected by many variables making logistics one of the main areas where trends, and especially megatrends, have a significant effect.

Logistics is a highly dynamic industry because a change in only one of these elements can fundamentally reshape the entire supply chain. However, it is a rare case in which only one of the elements changes – rather, all three are constantly changing and this compounds the effects on logistics.

Aside from this dynamic nature of logistics operations, there is also a very high level of complexity in supply chain operations. In a globalized world there are not only a few, but countless As and Bs with numerous Ps being moved between them every day. Logistics networks are more a spider web than a chain connecting numerous As and Bs.

And to even complicate the theoretical structure of this model one could think about the question whether logistics follows the needs or is enabling demand. But this question will not be tackled in this paper furthermore.

The purpose of this paper is to further understand the dynamic and complex processes that constantly shift the components of a supply chain. By gaining a better understanding of these processes we might be able to get an idea of where A and B are in the coordinate system of tomorrow and which P is being moved between them.

Due to their slow but continual progress, megatrends offer the possibility to derive possible future scenarios and hypotheses about how logistics might evolve based on developments happening today. This makes megatrends especially useful for developing forecasts about the future.

The purpose of this paper, however, is not to predict the future or to tell people how to successfully run a company. The target is rather a) to identify megatrends and b) to apply their change effects to logistics. With this knowledge we might be able to pose the right questions for our industry, for our business rules and for the further development of global trade.

4. MEGATRENDS

4.1 Production and Value Creation

4.1.1 *Globalization – Localization – Glocalization*

Globalization has been, and still is, the dominant economic phenomenon of the last decades. Due to a number of factors, such as lower trade barriers and more capable means of transportation, total global trade volume has multiplied since 1950 by a factor of 250 and currently has an annual volume of approximately 15 trillion US$.

Through globalization, industrial nations have benefitted from lower production costs, e.g. by producing in the Far East or Central Europe. Emerging nations, on the other hand, have gained wealth from this shift in production through the creation of jobs. This is why populations will increasingly have access to wealth regardless of where they live.

Globalization acts as an integrating process for physical goods as well as for financial markets. As a result of closer linkages, a highly complex, and thereby fragile, trade system has developed. Short term events like the SARS outbreak, the Fukushima nuclear disaster or the volcanic eruption in Iceland demonstrate this fragility. The financial crisis of 2008 showed the disadvantages of this high level of interdependency without appropriate security mechanisms: turbulences in the US financial markets dramatically weakened the global economy.

Protectionism in different forms is the reaction to disturbances caused by closer integration. The "Global Trade Database", for example, lists 380 trade barriers, such as customs duties or import quotas, against the USA; against Germany 370 trade barriers are registered. Increasing pressure for independence and balance of payments control through the reduction of imports are only two relevant factors. Consumers are increasingly willing to pay higher prices for local goods as an acceptable sacrifice in order to support the local economy, e.g. when preferring locally produced food over imported products.

In a world caught between more global exchange and protectionism, the proliferation of regional trade unions, or trade-clusters, like the European Union, Mercosur, Unasur or Celac present an alternative scenario to globalization. Within these clusters, trade barriers and other regulations such as cabotage disappear strengthening inner-union trade.

While membership in the European Union has been constantly growing, the rise of democracy in the Middle East/Northern Africa could become a catalyst for the development of a similar trade zone and for future growth in this area. Whatever trade barriers may currently exist between these

two regions, the rather short distance between and the increasing openness of the regions should lead to increased cross-Mediterranean trade.

It remains highly unlikely that large global economies will move away from trade-oriented policies since they will continue to create large portions of their GDP through international trade. SMEs offer large potential for increased trade as they currently are locally focused, purchasing 60%-80% of their procurement volume in local markets. This creates some potential for further internationalization of their respective value chains. Intra-regional trade, however, will experience higher growth than global trade as formerly low cost countries see the development of a middle class. The development of regional trade patterns like NAFTA, AFTA or EU is an indicator for this dynamic.

Another factor of relevance is the development of a middle class in countries such as China; it has been an important consequence of globalization. As wages have raised a massive shift in wealth and consumption has begun in Asia and other developing nations. The process of wage equalization that is occurring in these countries will continue and relative wage levels will gradually converge across the globe. It is not impossible that as a consequence of both, overspending and aging populations, today's richest countries may lose significant ground over the course of the next 50 years. In 2030, 23% of middle class household consumption will take place in India and 18% in China.

As a result, the demand for food, clothing and consumer durable goods will grow. In 2012, for example, China Telecom plans to sell 1.4 million iPhones in China alone – a device with silver writing on the back stating "Assembled in China". Another example is the Swiss company OC Oerlikon that moved its headquarters to Shanghai. This move occurred because 70% of its revenue is now generated in China. These examples underline the growing importance of emerging countries as consumer markets and not sources of production only. Slowing globalization may reduce an emerging country's growth, but these countries will continue to operate as engines of global GDP growth due to their increasing domestic consumption.

Effects on Logistics:

With respect to the equation, "P from A to B", the dominant design for the past decades has been A being in the Far East and B in Western Europe or the US. Today this equation is changing as producers in developed nations move production closer to their domestic markets in order to create securer and more flexible supply chains. Emerging nations now have to satisfy not only foreign, but also domestic demand.

Although global trade will generally stay intact, growth will be limited due to the shift towards regional markets. The logistics industry will face more intra-regional supply chain demands, and will, therefore, have to rely more on trucking and short-sea services.

If countries find the political will and financial wherewithal to set up efficient transcontinental networks, railways may see some high growth in the next decades. Growth can be expected in North America, Russia, India and China and to a much less extent in Europe unless an economic or ecological crisis in the EU positions rail at the center of an EU stimulation plan. Definitely we will experience an even tighter competition in Asia-Europe trade between the classical seafreight and emerging rail freight traffic from West China to Europe.

The question remains open as to whether rising wage levels in developing countries will lead companies to explore "new" low-cost locations, such as West and North Africa. Due to the short distances between Europe and the MEA region, trade and logistics volumes could experience high growth, especially in the northern African region. It can be expected that Turkey will highly benefit from this trend and develop into a more important logistics hub. A development, which has been already vital in Colombia, bridging Latin America with the US markets.

In a nutshell, there will be a new balance, a hybrid of globalization and localization – "glocalization".

4.1.2 Virtual Goods

Broadband Internet is becoming ubiquitous in most western nations. This makes it possible to substitute virtual goods for physical goods. Obvious examples of this type of substitution are music and video downloads replacing CDs and DVDs, and eBooks replacing physical books. The replacement of physical media by electronic downloads holds, even though some consumers may prefer to read a physical book, or listen to a record instead of an electronic counterpart.

Data volumes produced and stored by companies and consumers are exploding: the total data volume generated up until the year 2000 is currently created every 70 minutes. Growth in data volumes will continue to be exponentially driven as more cameras, sensors, digital devices, RFID chips, online transactions, etc. arise from the increasing digitalization of commerce.

The cycle of creative destruction continues as the digital data carrier who replaced the physical carrier is now being made obsolete through peer-to-peer computing and the "cloud." The "cloud" model of computing will allow every computer with an Internet connection to access the same pool of data as it lowers the cost of data storage.

Digitalization has even expanded into fields that were believed to be immune to the trend. With the development of 3D-printers individuals can now create physical goods out of digital data by laying down layers of plastic, metal or other materials. Bicycles and entire fashion collections have been created this way, and this technology could enable the consumer one day to shop online and then print their purchases directly at home.

As the technology evolves new materials will be used in this process and more products will lend themselves to creation by this technology. The fact that digital transmission takes place almost instantaneously and with negligible costs, the megatrend of digitalization will continue to push the frontier of which goods can, and will, be digitalized.

With more free time, people will spend an increasing amount in simulated digital worlds, be it for learning or pure leisure purposes. Physical vacation trips will nevertheless increase as the new middle classes use their increased leisure time, additional income and healthier retirement to travel.

Increasing digitalization also creates pressure on companies to invest in their digital capabilities. Such investments have historically been financed by increases in labor productivity. In the future, investment budgets for the digital world may more and more imply a reduction of investment into physical assets as companies and consumers pay a higher share of their wallet for digital ”assets”.

While digital investment and consumption will continue to grow, when it comes to value storage and private wealth conservation, material assets such as real estate, art or gold, will remain a hedge against the DotCom bubble and the financial crisis in 2008. Does that mean that the world of wealth management diverges from the trends of the actual life style?

Effects on Logistics:

Physical logistics is by definition analog, not digital. Digitalization usually means de-materialization, and thereby reduces needs for logistics services.

Using our model, the change in the nature of P has made it possible to transport goods virtually by using a new infrastructure (the Internet). While in the middle of the last century the records of Elvis Presley were shipped from record studios in the US to the world, iPods and iTunes now supply this service. TV sets with Internet connections allow users to rent movies electronically – the transport of the DVD to your local video store is not needed anymore. And if you once had to move carrying your 61.5 kg “Encyclopedia Britannica” you can see the advantages of having a 652g iPad in order to access Wikipedia.

The cloud reduces the need for digital data storage devices in the home or office; however, many will continue to rely on some physical backup strategy.

Digitalization will continue without a doubt. But online shopping and 3D printing will not completely substitute for window shopping in the town centre, or the desire to make an immediate purchase after you have touched and felt the product.

More travelling will produce air passenger growth that exceeds that of freight, and therefore aircraft freight capacity will outstrip demand – bad news for air freighters.

The shift of investment and value creation into the digital world will be a dominating trend for logistics services as well. The logistics market will continue to expand faster than trade growth only if we include a growing number of services around trade intelligence, supply chain intelligence and logistics intelligence, e.g., e-document handling, advanced event management with intelligent rerouting, Container/packaging/product RFID, self steering rail wagons, automated road cargo merging, etc.

A rush to hedging wealth by buying physical goods will have limited implications for logistics. Whereas transporting gold is of little significance, housing will remain a constant growth area for logistics with all the boom and bust cycles of this sector.

"To be there without being there" has its limits, most of which will not be overcome for the years to come. The reason lies in the nature of human beings: Just like logistics, human beings are, and will continue to be, analog.

4.2 The Development of Society

4.2.1 *The Demographic Change*

For more than a century, life expectancy has been increasing by eight to twelve weeks each year. People in an Indian slum today live longer than people in Berlin or London in the 19th century. The reasons for increasing life expectancy are manifold (hygiene, nutrition, peace, medicine, etc.). In addition, labor conditions and education regarding health risks such as smoking have improved significantly. The megatrend of an ageing society has numerous implications on various sectors.

One such phenomenon is being called "compressed morbidity". This describes the decreasing numbers of years the elderly population is in need of care, in spite of their higher age. They are active longer, and also actively consume longer.

From a product point of view, simplicity and stability are more important than innovation and novelty for this growing target group. The demographic change, therefore, will shift target groups for manufacturers with an impact on a number of products, such as electronic devices.

A much bigger effect could result from the fact that wealth is distributed mostly among the elder population. The cruise ship industry is a very good example for being specialized on customers with reduced mobility and high wealth. This group is, however, very conservative in their investment decisions. For companies, this would mean greater difficulty when attempting to raise equity capital

for risky ventures, and easier access to capital through, e.g., corporate bonds leading to higher leverage and less financial flexibility. Shorter economic cycles could result from these circumstances.

The aging population produces a negative net savings rate since they are consuming the savings they accumulated while working. So there is a question about who will take up the saver role and feed the world with fresh capital (provided governments learn not just to print more money). Wealthy countries with a healthy population growth rate may, in the long run, outfinance the other countries. For example, this may be playing out positively for North America.

Effects on Logistics:

It is to be expected that the consumer behavior of an older population will have an enormous impact on the economy. With prolonged physical activity comes active consumption. And even if mobility is reduced, online shopping and home delivery can prolong consumption. Combining online sales and home delivery to less mobile elderly consumers with the current growth trends in the online shopping sector should see this market continue to take an increasing share of shopping revenue. This means that large deliveries by logistics companies to stores should decline.

As the need for pharmaceutical products for the individual increase with age, the demand for transportation of these products, which often have special handling requirements for cleanliness, temperature, etc., should heavily increase. This growth in demand will require specialized supply chains that are able to provide the standards requested.

Looking at this megatrend with respect to A, B and P, the shipment (P) will experience significant change. Due to the fact that there is not one B (a shop) but many (households) P is getting smaller. Last mile delivery will move away from forwarders towards parcel delivery service providers. An entire step in the value chain from producer's regional warehouse to the retailer's regional warehouse may be taken out of supply chains.

The new small parcel shipment model will require large shipments from manufacturers to be repacked for final delivery. Forwarders will need to extend their value-added-service offerings, especially repacking, and also manage interfaces to parcel delivery providers.

4.2.2 *Global Population and Urbanization*

For 99.9% of the history of mankind, the global population was less than 10 million. On October 31st 2011, the 7th billion living person was claimed to have been born. Projections about future developments are contradictory.

The significant number of factors relevant for population growth (or shrinkage) can be summarized into two categories. First, there are material conditions such as nutrition, living space, medical supply, etc. Second, there are socio-cultural factors such as the reputation of families with many children and religious factors.

Over the past 100 years it was observed that wealth and birth rates were negatively correlated. In Europe, France has the highest birth rate with two children per woman. Small families may even be described as a syndrome of the middle class. Projections for emerging countries with their increasing wealth indicate that it is highly likely the global human population will see its peak during this century, although what that peak may be varies between 7 and 14 billion. It seems that the aging of the global population cannot postpone this phenomenon. In any case, the overall population growth most certainly will slow down rather than accelerate.

Effects on total consumption patterns are inconclusive as fewer people consume less, but they have more capital per person available to spend. At the same time, women will be less occupied with raising children, and more involved in jobs requiring higher education, producing more economic value and accumulating more global spending power.

Growth will predominantly take place in emerging regions, leading to an aged and wealthy population in industrialized nations and a young, but less wealthy, demographic structure in emerging countries. The result will be migration pressure and growing ethnic diversity in industrialized nations, e.g. in Europe and China.

Migration also takes on another form: towards cities and megacities. When communication technologies first experienced broad acceptance by large numbers of people, some analysts predicted the decoupling of the presence of an individual with a location. It was argued that it was irrelevant where one is because the Internet and telephone erase the necessity for physical presence. A case for living in the countryside while living off professions far from agriculture was hypothesized.

Reality developed differently. While in the early 20th century there were only 11 cities with more than 1 million citizens, by 2015 this number will rise to more than 400. The world's 25 largest cities take 2% of the global land surface but account for 60% of water usage and 80% of pollution. Cities are, and will continue to be, centers of wealth and knowledge, but also problems.

Every year one additional percent of the global population moves or is born into life in cities. In 2008 this figure reached 50%. The fact that today more than half of the population lives in cities has remarkable implications. One such implication is that less than every second person is able to have self-sufficient food growing possibilities, and therefore is dependent on outside supply.

Increased wealth speeds up urbanization since wealth creates cultural and leisure investments that depend on patronage from consumers (e.g. an opera or a spa). More than ever in a world where

knowledge is the primary raw material, cities will continue to be the place where knowledge networks thrive (e.g., at the pub in the evening) and where knowledge workers can be attracted due to the breadth of services available (leisure, culture etc.).

For most urban places, mobility industries, be they producers of individual vehicles or public transport, will have to reinvent themselves using new technologies and services if they want to maintain their value. It is highly doubtful that current trends, whether growth of population, more sustainable energy sources, noise reduction, ways for vehicles to occupy less space and highly integrated mobility information, can sustain the size, let alone the current growth rate, of the automotive industry.

Effects on Logistics:

The slowing of population growth will likely not have a negative impact on logistics volumes during this century, if wealth and consumption continue to increase as they have in many developing regions during the past 30 years. On a regional level, the impact can be very different: Overall population numbers may bring logistics growth to a standstill or turn it negative in Europe by around 2050 and in China within the fourth quarter of the century.

As logistics balances supply and demand between regions, it is impacted by the regional development of populations and urbanization. Bringing food, water and consumer goods to the most populated areas will, in the future, prove an ever greater challenge for logistics providers.

A and B will be moving away from each other with, for example, A being in agricultural regions with low population and B being located in highly populated areas.

The megatrend of urbanization with respect to logistics is two faced. While some elements become concentrated and need less logistics services, e.g., shopping malls, cities themselves are very dependent on the outside supply of goods.

The increasing concentration of many people in little space is a huge challenge for transportation infrastructure. Already in many cities streets can hardly cope with the number of vehicles. This is due not only to inner-city traffic but also to commuters who must travel into the city since living space in cities is limited. This poses enormous challenges for logistics services when supplying the city.

This situation will worsen tremendously if city populations in developing countries adopt western consumption profiles. Statistics state that per inhabitant of a western city, 20t of incoming and 4t of outgoing freight are generated. Also, reverse logistics will increase, since, e.g. garbage is usually processed or deposited outside of a city. Growth in consumption could even lead to complete break

downs in megacity logistics (both people and cargo), leading to enforced demolitions and the reshaping of city designs.

City, or micro logistics has been a big topic in logistics sciences in Europe since the late 80s and early 90s. A number of studies were produced on how cities should regulate last mile distribution. For example, Stockholm developed a city distribution system with some enforcement rules that they licensed to outher for use for last mile delivery. This megatrend points in the direction of a revival of such ideas, and wide spread implementation of last mile monopolies or oligopolies in the most crowded developing cities.

More electric vehicles will have to be used in exchange for permission for night distribution. Some models also considered the use of public transportation systems, such as tramways and metros, during the day for passengers and during the night for freight. The applicability of these concepts, however, must stand the test of large scale application.

Urbanization causes production sites (agriculture or manufacturing – the As) to be moved outside of the city due to the high costs of real estate. On the other hand, consumers (the Bs) accumulate within the city.

De-consolidation and repacking hubs near the cities are likely to flourish. Since deliveries from stores (store-to-home) in contrast to warehouses (warehouse-to-home) create (at least one) additional stopover and thereby add complexity and volume to the city logistics. Home shopping may even be encouraged by city managers as a way to reduce traffic jams and emissions.

Sea ports close to megacities are likely to continue to be a driver of growth and increase their asset value because they offer direct access to international trade routes. Today, 7 of the 8 biggest cities have a seaport (Tokyo, New York, Seoul, Mumbai, Sao Paolo, Manila and Jakarta).

The airports of megacities will need to expand or face congestion since passenger transportation will continue to enjoy high growth rates and receive preferred treatment vis-à-vis freight. Belly space within passenger planes will increase and may exceed demand if passenger growth rates exceed global freight growth. Such a scenario would not bode well for owning a cargo airplane fleet. On the other hand, landing rights may get much more expensive and noise regulation much stricter, so that pure cargo flights to remote airports might remain an alternative option.

4.3 Technology

4.3.1 Communication and Connectivity

Our times have often been called “the age of communication”. The reasons for this are obvious: telephones, the Internet, Facebook and email allow people to communicate with others or access

information in many different ways. This megatrend has been facilitated by ongoing miniaturization and portability. Ten years ago one had to be in front of a computer in order to access email, today you can do this wherever you are with a smart phone or tablet PC while prices for access have dropped enormously.

The next step for communication and connectivity may be equally revolutionary: the role of object-to-object communication and connectivity. One may argue that this step has already been taken since there are millions of sensors, cameras and even RFID chips being used on a daily basis. But there is ample evidence that we have only seen the early stages of this development. Smart technologies interlinking and managing all energy using devices in homes are just starting mass market penetration. New technologies that monitor your health and safety, while sending data either continuously or just in emergency situations, currently are being created. Interaction of cars with each other to regulate traffic flows is only in the pilot stage. Mass usage of RFID tagging of tickets for public transport, of consumer products, of seafreight and airfreight containers – is still in its early stage of adoption.

Effects on Logistics:

The main criterion of mobility is portability. Only if appliances are not too big or too heavy, we can carry them with us all the time. Miniaturization means that less and less transportation capacity is needed per appliance. There are only a few examples where a new model has been bigger than its predecessor.

On the other hand, fears in the logistics community that the convergence of technologies, where previously separate appliances were bought and shipped to the consumer, would lower logistics revenue, have never materialized. Overall, we see more appliances such as MP3-players, smart phones, tablets, laptops, and televisions being used simultaneously and requiring mass distribution.

Challenges for logistics service providers result, not by the developments in consumer electronics, but due to new possibilities through information technology. The possibilities to create transparency have been significantly increased and will continue to do so. Tracking and tracing, a service allowing customers to see the current shipping status of their goods, has become a commodity for logistics service providers. With increasing possibilities to gather and process real time information, customers will require even more transparency. This could be through live-tracking of goods through GPS or RFID sensors, environmental control or even video surveillance accessible to the customers.

More powerful hardware and software will help significantly in managing increased data volumes and more complex supply chain models.

The transformation of supply chains, including all logistics services, to paperless processes will change the entire logistics industry during the next 30 years. DB Schenker has set a goal of going completely paperless by 2015, DHL Freight Forwarding is planning to roll out their 'New Forwarding Environment' globally by 2016, just to name two examples. Once these systems are installed, the focus will be on data quality and analytical excellence.

If the benefits of mass real time communication are to be realized, input data needs to be much more accurate. Today, between 25% and 80% of all e-bookings need to be reworked depending on the service supplier and transport mode. Many more smart checking algorithms need to be established to capture incorrect data at the earliest possible point. New data related service providers will surface, automatically analyzing data from carriers, forwarders, ports, traffic control systems, customs agencies, etc. comparing such data for consistency, checking schedules and feeding into sophisticated transport optimization algorithms that try to optimize supply chains or networks for speed, time reliability and cost parameters.

How much of this data will be captive and how much openly available (e.g. container positions, car positions without revealing owners, content etc.) remains an interesting field of speculation. The British government has already passed a bill requiring all schedule information for any publically accessible means of transport in the UK to be provided at no charge as a data feed over the Internet. The purpose of this bill is so that entrepreneurs can build new products and services using this data.

With respect to our model, P will become smaller and lighter – both central criteria for logistics. The growing possibilities for transparency will have a much bigger impact on logistics service providers, however, since customers will demand real time information about where their Ps are as they transit from A to B.

4.3.2 Increasing Speed of Innovation

Of course, future innovations are impossible to predict with certainty. The possibility of a disruptive innovation, that is to say, an innovation that fundamentally changes our world, is impossible to anticipate.

Nevertheless, patterns can be identified allowing assumptions about future developments. One of the most important patterns is the rising speed of innovation. The pace at which innovation occurs is fueled by a number of factors, some that even reinforce each other:

- Cumulative knowledge base: many innovations are the result of recombination of existing knowledge
- Much easier access to information: Internet, digitalized libraries, politically less restricted information

- A much higher number of global scientists, researchers and innovators of all kinds
- Much more intensive communication and connectivity between researchers
- Widespread application of open source innovation and crowd intelligence not only for software development but for all kinds of products
- New technologies allowing much cheaper testing and simulation of new ideas
- A much faster penetration and proliferation of innovations across the globe
- Larger government investment into education, research and innovation as part of competition between countries
- Global oversupply of free capital in private hands looking for areas to invest.

Pressure for innovation will be the highest in areas of resource scarcity. Oil in general, being a major component of a number of higher-value products, will be gradually and wherever possible replaced as a source of energy. A second important field of innovation will remain the reduction of weight and size of products. New materials (e.g. carbon instead of steel, nano particle based surfaces) allowing for weight reductions and other improved product characteristics will benefit many applications both in their use and also in their logistics costs.

Effects on Logistics:

To precisely define effects of innovation on logistics is obviously impossible. Innovation transforms the kind of goods being shipped, but also the way logistics itself works as happened with standard containerization.

With respect to product innovations, customer proximity and flexibility will become even more important for logistics service providers in order to recognize innovations and their influence on supply chains. Shorter model cycles, ever more frequent change of product components and suppliers, new variations of value chains enforce this strategic necessity. At the same time, larger and longer term commitments may be possible if they include enough flexibility.

With respect to the identified general trends of lower weight and higher value, impacts on the logistics industry are undeniable. Another persistent trend will be the increased need for clean and secure (e.g., surveilled) transport capacities in contrast to the requirements of bulk goods.

In logistics, electronic innovations will proliferate much faster than physical ones like the standard container, and more powerful IT systems may manage and optimize much more complex systems. As a result of paperless processes and automated optimization of transport flows, network efficiency and event management, the office workforce employed by logistics service providers may

be drastically reduced or, more likely, partially moved to software related tasks and sales and marketing.

Of course, new concepts of innovative logistics are constantly being developed.

Cars could be assembled on ships; rail wagons could be self powered and steered through automated network management systems, pipeline systems for parcels and pallets could be erected in urban areas. Some of these innovations involve immense infrastructure investments. Although promising, these concepts still have to prove applicability.

The one most important implication of increasing speed of innovation may be the high probability that it will save the entire logistics and transport industry, including most global supply chains, from a completely disastrous oil price shock.

4.4 Sustainability, Resources and Recycling

4.4.1 *Climate Change and Natural Resources*

Although still hotly debated by some scientists, it seems wise to consider climate change as a megatrend as its consequences are already visible. In the last 40 years, an increasing number of floods, hurricanes and other natural disasters have been observed, as well as changing temperature and rain patterns in many parts of the world.

Globally, recognition of climate change has risen dramatically over the past few decades. This has resulted in greater willingness to spend on environmental and health protection issues once other basic needs have been fulfilled. Emerging markets are catching up in this development, maybe even taking the lead.

Biologically grown food products can be found in stores of many of the world's largest cities. Green technologies are growing faster than others in all regions. The "green aspect" has become a purchase criterion for consumers as well as companies.

As 'green' is usually measured as the "carbon footprint", including the total amount of CO_2 equivalent gases emitted along the entire value chain, e.g. along all production and, all transportation steps, storage, etc., logistics has gained significant attention from everyone trying to reduce it. The number of large global companies introducing 'sustainable' practices in procurement and investment decisions that go far beyond legal requirements is rising daily. As this development is driven by preferences of the financial markets, management, employees, customers and other stakeholders (like auditors seeking a whole new dimension of expanding their business); it is a trend that is here to stay.

Becoming more resource efficient, for many companies, is simply another optimization approach for taking out costs in production.

The origin of a movement towards sustainability is the realization that resources are limited. While the supply of salt water or air may not be an issue of scarcity, population growth, higher standards of living and new technologies requiring certain materials will continue to put pressure on prices of many natural resources. Higher cost of extracting them from more remote locations (such as rare earth and other metals) can be expected.

Recycling will continue to grow. In many cases it is the developed nations that have been catching up in this area over the last century, as in poor countries a large part of what developed countries have called waste has been reused for lack of alternatives. Establishing modern recycling technologies will remain a growth market for decades. China already has invested heavily into recycling facilities in order to become less dependent on foreign iron ore.

Effects on Logistics:

Being a significant CO_2-producer, the logistics industry is a target of efforts for more sustainable value chains. The pressure on the industry to use less and cleaner fuels will increase even if the logistics industry is more the user than the reasoning for the immense load of energy. The demand is driven by consumer or production cost optimization. Whether more intermodal transport using water or rail will be required even if road is less costly, remains doubtful. By the time, we will see more companies ready to accept, at equal cost, a longer transport time if the schedules are reliable and the carbon footprint can be reduced significantly.

It might sound paradoxical at first, but in some cases climate change has helped environmental friendliness. The melt of the polar ice pack has opened the Northeast Passage along the northern borders of Norway, Finland and Russia for navigation. Some early pilot projects have taken advantage of this new passage between Europe and the Far East, which is only 6.500 km long, 5.400 km shorter than other passages e.g. through the Suez Canal and the Indian Ocean.

Noise reduction requirements will also have significant impacts on the industry, affecting rail and air cargo night operations as well as city logistics, where it will drive investment into electrified first and last mile delivery.

If and to what degree companies will accept surcharges for greener solutions must be awaited. IKEA, for example, backed off a plan to significantly increase its use of rail transport even though the company has a strong green image. DB Schenker Rail started selling a renewable energy cargo rail product at a price premium, but fell far short of its not very ambitious business plan. A crucial element for the future development of ‘green logistics services’ will be the consumer’s willingness to accept higher product prices in order to finance sustainability and environmental protection.

With more natural disasters driven by climate change, supply chains have an increasing need for robustness. Inter-continental just-in-time supply chains often have proven to be too fragile. Buffer stock levels, multiple-origin sourcing and some regionalization of production are becoming more attractive solutions to this problem.

In our model, a buffer between A and B will be established in order to create higher supply chain robustness. To provide this robustness at least possible cost will be a central challenge for contract logistics and supply chain services.

Scarcity of resources will inevitably cause increasing recycling in order to provide supply for production. If you remember the UNICEF picture of the year 2011 of a boy holding an old TV in the middle of a waste dump, the question will soon not be who brought this here, but who will pick it up in order to exploit its built-in components. Resources have always been unequally distributed around the planet and logistics has balanced these regional differences. The central development in the push to recycle is that garbage will become an additional resource for production. To what extent, and at what speed, this development will take place depends on the degree of scarcity of the resource and its price and exclusivity. Reverse logistics is needed in order to pick up used resources and feed them into the recycling process.

Applied to our model, recycling is the swapping of A and B. The manufacturer ships the product to the consumer and after usage the product goes back to the producer. With better technologies for separating materials in the recycling process producing better quality 'secondary raw materials', more sophisticated logistics chains (containers, tracking etc.) are needed. With recycling technologies becoming more sophisticated larger recycling plants are already being build for glass, paper, plastics, etc. requiring much larger transport distances for both the inbound and outbound flows.

Whether more waste reduction and recycling will create more logistics volumes is a doubtful case. As incentives get higher for waste reduction and reducing the raw material intensity of products, more production on demand will occur. This in turn increases time pressure on transportation since every day in the supply chain is a day a customer is waiting for delivery.

4.4.2 Energy

Although international agreements like the Kyoto-protocol are controversial in their effectiveness, more and more nations are undertaking steps to change their energy policies. Even if no more Fukushima-events happen for decades to come, the long-term future of nuclear power may depend on finding a technology for solving the waste problem within the next 20 years. Currently 30 nations operate nuclear power plants and apart from some exceptions like Iran or Poland, this number will decrease in the future. For example, the US last approval for a new nuclear power plant was granted in 1979.

Most nations have undertaken significant investments in renewable energy production and energy saving efforts. China alone invested 221 billion US$ in 2009 in green infrastructure, e.g. renewable energies, building insulation and emission free vehicles – not only to transform its own economy, but also to bypass some of the Western economies with advanced technologies leapfrogging traditional know-how e.g. for fuel combustion. Both India and China may have few choices other than betting on a mixture of nuclear power and renewables to satisfy the increasing power demand of their growing economies.

It is estimated, however, that by 2025 80% of energy demand will still be met with fossil fuels. Longer term may see a drop in this dependency as costs for fossil fuels rise and the efficiency of using thermal or solar energy improves (projection are for a doubling of efficiency within the next 30 years).

Energy prices are expected to climb significantly in the coming decades due to the following factors:

- Traditional large, cheap oil fields are less productive
- New oil sources are more costly to explore, both on shore, oil sands and off shore
- Many governments (e.g. Argentina, Venezuela, Denmark) have set out to reap a larger share of the profit from oil exploration
- Since price competitive and effective batteries, or hydrogen based technologies, for cars have not been developed yet, it may take another 50 years until half of the global car fleet has been replaced with electric vehicles. Meanwhile, the global car fleet will continue to grow faster than population for at least the next 20 years
- Many nuclear power plants are reaching the final phase of their life cycle with very tough political decision making processes for replacements
- More stringent requirements for emission reduction of sulphur and carbon-capturing will be placed on coal plants
- Renewables require significant investment in direct current networks to connect sun and wind regions with the urban and economic centers
- Offshore wind power is comparatively more costly to build and maintain, even with advanced technologies
- It may take another 30 years until new energy sources from bacteria, algae and special crops are developed to a point where they can cover the bulk of fuel needs and innovative heat exchangers (even creating electric power from temperature differences) reach high relevance.

There are examples of energy price decreases realized through new technologies, as seen with gas in the US, having an effect on the entire global gas market. Similar developments could be expected in oil exploration in combination with higher energy efficiency. Also, global industrial production still has significant energy savings potential. However, the likelihood of global energy prices coming down in the next 30 years, rather than rising in most parts of the world, is very low.

Investment in energy has traditionally been a high spend area for most industrial economies. The share of global spend on energy production is certain to increase for all stakeholders. More spending on energy will make this money unavailable for infrastructure investments such as railways. These increased expenses may also reduce consumption of other goods by a few percent.

Oil exporting countries, such as Russia and Canada, coal producers such as China and Australia, water rich nations like Switzerland and Austria, and combination countries like Norway (oil and water) and France (nuclear) may enjoy significant profits from their resources.

Effects on Logistics:

With respect to logistics, energy production and distribution should be viewed separately.

The exit of nuclear energy holds significant potential for logistics services in energy production as nuclear power plants require only limited service. Distributed wind parks, for example, have to be maintained, and, in the case of offshore-wind parks, are hard to reach. This is already a lively challenge for the logistics industry.

In terms of energy distribution, especially for the case of electrical energy, there is little potential for the logistics market since distribution will be provided by infrastructure (power supply lines). Liquid natural gas (LNG) or hydrogen, however, have potential since transportation is required to move the product from producing facilities to consuming areas. The type of service provided by logistics companies will depend on the technologies required to ensure safe transport of these explosive energy sources. On top of all this the “battery pack“ or the “mini power plant” covered in a TEU container is one of the just kicked-off ideas to be watched.

With fuel prices rising and no large scale algae-based or crop-based substitution available, costs of logistics services are likely to continue to increase more than any other cost item. This fact, along with ever more automated transport and production processes, may affect world trade and inter-continental supply chains to a degree that could slow down, or even reduce, global logistics spend at least on seafreight over the course of the next 30 years.

4.4.3 Water and Food

Water and food are the basic supplies every human being needs – no (currently imaginable) innovation will be able to change this. On average, every human being consumes 4'000 liters of water every day. The water supply of ancient Rome was the foundation for its development as a metropolis. Unfortunately, more than half of world population's water supply is worse than that of ancient Rome.

Today only 4% of water consumption is being used for private households. Industrial production accounts for roughly the same amount. 92% is used in agriculture. Food transports often are a substitute for the transport of water – instead of transporting water to grow food in an arid region, food is imported into the area for consumption. To move food instead of water is often more efficient since many regions in need of food would need a higher amount of water because of climatic circumstances. Also food is a form of (indirect) water for the consumer.

A strong correlation between wealth and consumption of water, proteins and processed food exists. For many emerging countries, increasing wealth and ongoing urbanization will result in an exponentially increasing demand for processed food distributed by supermarkets in contrast to traditional fresh food markets. In contrast to fresh water distributed by pipes, bottled water will experience increasing demand as part of this development for processed food.

Further conflicts exist with energy production not only because of crops being used for both food and bioenergy. Another interface of food/water with energy arises from the increasing use of water desalination and purification.

Water cannot be destroyed only polluted. This makes it possible to substitute an external supply of either food or water with infrastructure (e.g. desalination or purification plants). To obtain clean drinking water will be the biggest challenge for decades to come.

The discussion of the effects of climate change on creating more or less production areas for agriculture seems to have a balanced outcome. With better fertilization, it is estimated that on many soils, production can be doubled. Greenhouse farming and underwater food production may be other potential sources for supplying the growing demand of the world's population. Taking all these factors, population growth, wealth growth, rising energy prices and water scarcity into consideration, food is very likely to become more expensive.

Effects on Logistics:

Due to climate change and urbanization, there will be significantly more and longer food transportation chains. Regions with better climatic conditions become the food supplier for other regions with less favorable ones. Cooling requirements for fresh products will be higher. At the

same time, with increasing product value, the relative share of logistics costs will decrease – supporting the business case for longer distance transportation.

With respect to our model, the volume of P in the form of food will continue to grow. Furthermore, the A will move into regions with the capacity and climatic condition to export food while the B will be located in regions with high populations and / or wealth without having sufficient production capacities or less favorable conditions for agricultural production.

The distribution of water for agriculture and industry will not be of relevance to logistics services, but rather for infrastructure providers. Potable water may also partly move away from bottled water to investments in purification and pipelines supplying decent quality to homes in most global megacities.

Fresh food from all over the world will be demanded as wealth increases. Therefore, perishables logistics will increase to generate the availability of fresh and exotic food as e.g. Europe is already enjoying high growth rates and likely will continue to do so for some decades.

5. HYPOTHESIS

As we attempt to translate the macro-trends into their implications for logistics - the transportation and logistics industry, its various sub-sectors and individual companies - four hypotheses have been developed on how the trends will interact in forming forces that shape the future.

These hypotheses allow us to apply the key findings mentioned above to concrete issues deriving solid implications.

5.1 Flexible, regional logistics services will grow strongest

Free trade blocks with rising protectionism and more independence towards global markets and increasing equality of wealth, labor costs and demand, will create more "glocalized" markets. That means inter-regional transportation will out-grow inter-continental transportation – with population, consumption and transport on the rise primarily in India and the Middle East, but also across all of Asia and throughout the MEA countries. Decentralized energy production and efforts to reduce overall energy consumption will strengthen regional structures, probably supported by political policies.

On the other hand, the size and demands of megacities will require more goods to be transported in greater volumes into these densely populated zones. This places pressure on where to source goods and how to get them to their end consumer. Consumers still want the highest quality at the lowest price increasing pressure on producers to increase efficiency. This means producers will be squeezed by the higher costs of logistics operations for long distance shipping and the need to locate where they can best serve user and regional demands for fast delivery using sustainable approaches.

As a consequence of these competing pressures, regional imbalances in supply and demand will not be reduced but the average transport distance will drop as the global exchange of goods will not be solely determined by producing in low labor cost countries. Less material intensive production reinforces this trend. These pressures will benefit road and short sea transportation, and to a less extent railway transportation where governments or government directed logistics companies, invest in intermodal terminals and modern rail track infrastructure. Robustness will be required and provided by higher stock levels that separate inbound flows from outbound fulfillment requests, and managed by contract logistics service providers.

5.2 Food logistics becoming a key element in the future

Although how much and how fast population may increase, it is almost certain that population density will shift throughout the planet. Emerging nations will continue to grow while developed nations stagnate, if not shrink. Increasing wealth within these developing nations will raise food requirements due to higher demands for quantity, quality and diversity.

Scarcity of resources, first of all water, will push food production into regions offering the best (climatic) setup in order to produce more efficiently. Food will become more expensive making the distance between production and consumption less relevant. Also, the increasing proportion of urban population will not be able to provide much of their food supply, thus placing further pressure on the development of efficient food production.

Demand for food and its supply are influenced by different factors. Demand is driven by socio-cultural factors while supply is driven by the suitability of localities for the efficient production of different food stuffs. This difference between supply and demand drivers will result in increased demand for logistics services as matching supply with demand will require the movement of food products over increasing distances. Imbalances between Latin America, Europe, Africa and Asia demands for food and North America, India, Russia and Australia as suppliers to these regions will continue to grow and drive increased logistics requirements.

Lastly, food cannot be substituted by innovation or consumed virtually. Even oil might be one day without application of any kind. Food and water, however, will always be needed wherever humans decide to live.

5.3 Prices for logistics services will increase

Transport and logistics costs are highly dependent on costs for energy and labor. A third important factor is the cost of capital for both equipment and infrastructure.

The expected increase of energy and labor costs in traditionally low cost countries in Asia and also in Europe, where population is decreasing in relevant dimensions until 2050, clearly indicates that base logistics costs will increase. Tighter legal restrictions, e.g. with respect to security, the environment, noise and health & safety, are further adding to the increase.

Capital costs of logistics assets are an important part of the overall logistics industry cost structure of between 25-35%. This includes buildings, ports, vehicles, containers and IT infrastructure in various formats.

Infrastructure capacity, especially in and around the growing megacities, is quickly approaching its maximum capacity. Road, air, port and rail congestion poses difficult challenges to the logistics

industry as well as political authorities. Relieving congestion through higher fees, taxes and regulation only serves to increase costs, with little actual benefit.
The difficulty in finding suitable space and the large amounts of capital needed to increase the capacity of transport infrastructure will cause costs to rise for new capacity as well as old. We believe these costs will increase transportation costs faster than other service costs over the long run. Regional differences will occur, but cost increases are inevitable.

The increasing demand for capital, and the high costs of increasing capacity, will further consolidate the industry. Both asset owners and logistics service providers will be forced to merge, so that they have the scale to access scarce capital as well as develop economies based on higher operating costs. The pace of these mergers will increase, in our view, as scarcity increases over the next 30 years.

5.4 Forwarding and Parcel/Express will integrate more

The shifts in supply and demand forces described pose interesting questions concerning the future relationship between forwarders and integrators.

The global express leaders, DHL, UPS and FedEx, have been building their forwarding capabilities: DHL with the acquisition of Danzas and AEI (now part of DHL Global Logistics), and UPS with that of Fritz (now UPS SCS) and TNT. FedEx acquired Towers Group in 2000, which it then combined with another acquisition in customs brokerage to create FedEx Trade Networks, its forwarding arm.

On paper, the benefits of integration are many:

Operational synergies:

- Higher utilization of owned fleet capacities
- Consolidation, market power
- Customs brokerage
- Contract logistics, economies of scale
- Customs brokerage, IT, etc.

Commercial synergies:

- “One-stop-shopping” for their customers, regardless of shipment size
- Sales force integration
- Brand building

However, the extent to which the two businesses are effectively integrated has been mixed. The integration of forwarding and express brings substantial complexity to the business model - and in any service business, complexity is risky and for sure costly. A new balance appears to have settled

on a form of integration where the two businesses operate side-by-side rather than on an integrated basis, and synergies are exploited in a rather limited range of areas.

Interestingly, all these integration initiatives have originated with the express carriers. The remaining large freight forwarders have not pursued this opportunity, nor have the "standard" parcel operators and other fragmented postal operators. All of these companies enjoyed substantial growth in the last decade building on the e-commerce trend. They continued to build their presence regionally (standard parcel carriers) and globally (forwarders), and apparently didn't feel compelled to look for major sources of growth outside their core business.

Current megatrends point to developments that are altering the business landscape, both from a forwarder's and a parcel operator's perspective.

From a forwarder's perspective, the best years of globalization seem to be over; some of the biggest emerging markets will be shifting from an export to a domestic consumption focus; market fragmentation is continuing to work in favor of parcels versus larger shipments for final deliveries; and, the fastest growing segment in transportation has been B2C parcels, and further urbanization will likely make that a long term trend. The forwarder's control of the upstream leg from manufacturer to deconsolidation point has traditionally been the major source of profit and growth. With the projected decline in inter-regional shipments and the rise of direct to consumer parcel shipments, it will be in the final distribution operation that high value growth will occur in the future.

To understand the parcel operator's perspective, the field first needs to be structured into its three major components.

- The Big 4 integrators, now on their way to being the Big 3
- The European "standard parcel" operators
- The other European postal operators

The integrators' distinctive strength in parcels is their time-definite product. The last few years in Europe have shown that this product is now the slowest growing segment of the parcels industry. Day-definite / deferred products started to grow faster before the financial crisis. The trend then accelerated in 2008-2009, and continued as the economy picked up again in 2010 – confirming that this is a structural shift. In this context, freight forwarding is taking on a new importance – particularly road forwarding operations.

This is one of the reasons why the acquisition of TNT is increasing UPS's stability and in particular enlarging its European road network. Future moves or combination of existing players might lead to only two large express-forwarding giants in Europe.

The European "standard parcel" operators are currently in a sweet spot. Their efficient parcel networks and deferred product are generating fast growth. However, their single product positioning is under pressure from shippers requesting multi-product suppliers. In addition, they find themselves vulnerable to those who control "upstream" flows – i.e. freight forwarders. DPD has started to offer freight forwarding through partnerships. This might be a first step in seeing "standard" parcel operators building up larger scale freight forwarding ambitions. DPD also acquired Germany based ILOXX in an attempt to expand the business model to other countries and position it as a European online C2C, B2B and B2C freight portal for all kinds of cargo from heavy weight and XXL to pallets and parcels.

Other postal operators are still highly national-oriented; they usually dominate their domestic parcel markets, and have the benefit of controlling the last mile. Will they remain fragmented with over 20 operators, or could they somehow become a unified force in the European parcels industry and beyond?

For Posts, faced with mail's structural decline, parcels have been "promoted" from a small ancillary occupation to an exciting growth business. As such, they will not easily be spun off from the core mail business. Some sort of European federation of Posts' parcels businesses would therefore imply a federation of national Posts themselves. Full integration is highly unlikely in the foreseeable future, as it would require the end of the Posts' state ownership (which is more than overdue). Posts are one of the few remaining bastions of trade unions. Few European countries would have the appetite to risk the major conflicts that privatization would likely entail. More likely, Posts will eventually mutate into distribution "utilities", particularly if intra-city distribution takes the form of concessions.

Overall, more integration of forwarding and parcel services will happen – by large acquisitions or close cooperation with each side acting as a Lead Logistics Provider towards the business customer. Large forwarders may seek to build a network of independent local parcel operators in each large urban area, which they use as subcontractors. This model is much like the one Amazon has started to set up in the US for the last mile to bring down its distribution costs.

The model, in the end, might not look so different from the evolving model of traditional parcel operators outsourcing more last mile business to franchise partners. What needs to be explored is the future role, technology and ownership of sorting centers in this context and in the context of the rise of larger deconsolidation centers near the big cities.

All in all two major rules should be applied in the industry: public ownership has no justification and is hindering economic optimization, and secondly, not every trend leads to an economically successful model – so watch out what to decide as a manager in a logistics firm!

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After two years apprenticeship at Deutsche Bank and completing studies at the University of St. Gallen, Switzerland, with an MBA, Karl Gernandt started his professional career at Deutsche Bank AG. From 1988 to 1996 he held various positions including assistant to the Chairman of the Board as well as posts in the international banking business in Asia and in the USA. In his last function he had regional responsibility for Deutsche Bank branches in the West of Germany.

From 1997 to 1999 he set his mark on the Financial Institution Group of A.T. Kearney GmbH by concentrating on strategic topics in international banking. In 1999, Karl Gernandt moved to Holcim (Deutschland) AG as CFO, in 2000, he was appointed CEO and at the same time member of the European Board of Holcim Ltd. In 2007, he became CEO of the Holcim Western Europe region, Brussels, placing emphasis on strategy and performance improvement programs.

On October 1, 2008, Klaus-Michael Kuehne, majority shareholder of Kuehne + Nagel International AG, appointed Karl Gernandt as his successor. Consequently, Gernandt became CEO of Kuehne's privately held Kuehne Holding AG, Schindellegi, a member of the Board of Directors of Kuehne + Nagel International AG and a member of the Board of Trustees of the Kuehne Foundation. In addition, for a period of time he served as Chairman of the Board of the Kühne Logistics University in Hamburg. In 2011, Karl Gernandt was elected executive Chairman of Kuehne + Nagel International AG. Since 2011, he is also Vice Chairman of the Board of Directors of Hapag-Lloyd AG.

The Logistics Institute – Asia Pacific (TLI – Asia Pacific)

The Logistics Institute – Asia Pacific was established in 1998 as a collaboration between National University of Singapore (NUS) and Georgia Institute of Technology (GT) for research and educational programs in global logistics. TLI- Asia Pacific's vision is to be the Asia Pacific's premier institute nurturing logistics excellence through research and education. Since its formation, it has served as the training ground for aspiring logisticians, equipping them with analytical tools to meet supply chain challenges. Since 2003, the institute has been voted Asia's Best Education Course Provider at the annual Asian Freight & Supply Chain Awards for ten consecutive years. The Institute was also awarded the Best Training Provider at the Supply Chain Awards in 2009, 2010 and 2011.

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