Overcoming network logistic complexities in emerging markets

When carrying out supply chain network modelling projects in emerging markets, there are a number of challenges to be considered and managed. This paper describes how a sample of these can be overcome.

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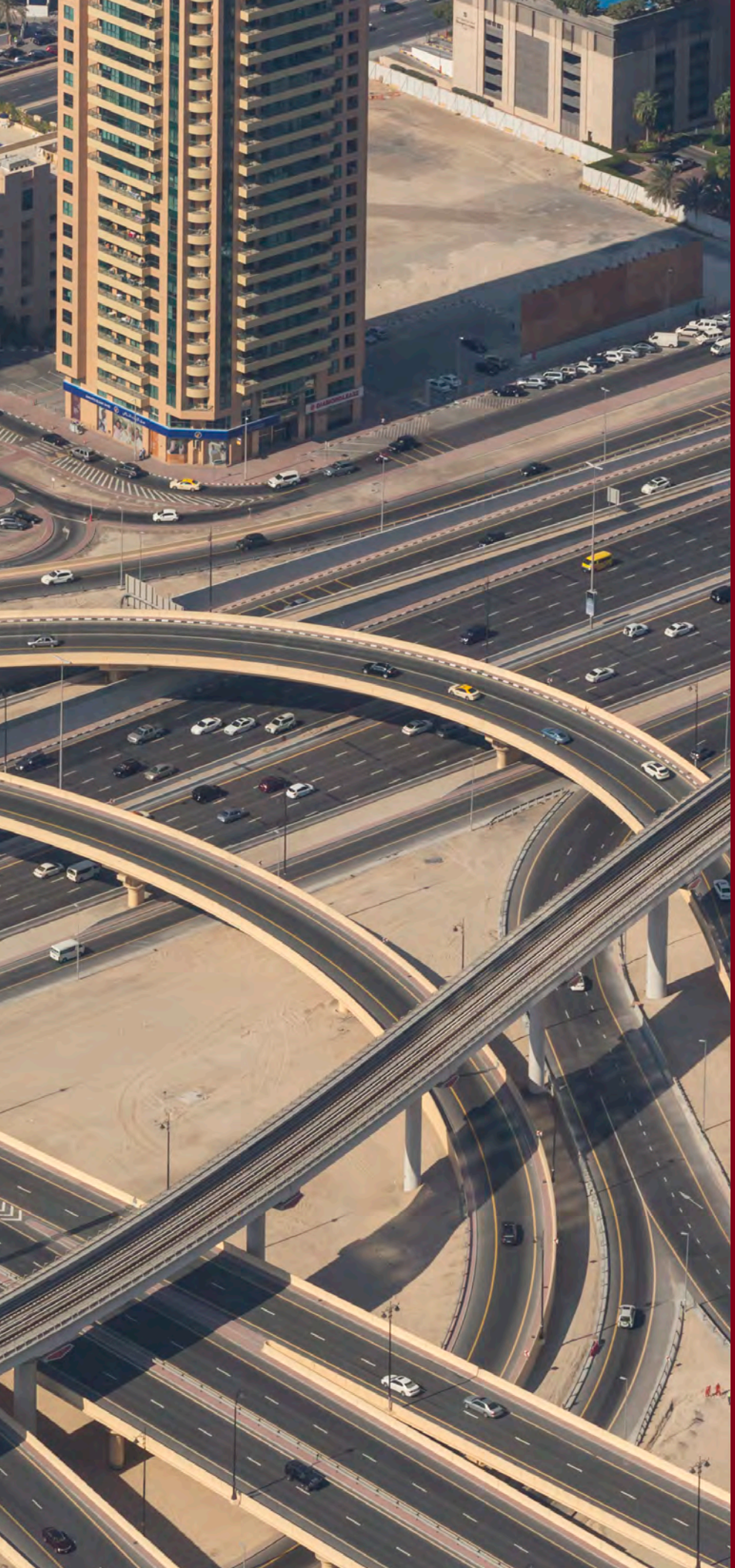
FRENCH BAKERY



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Introduction

Supply Chain Network Modelling

When conducting supply chain network modelling projects in developed countries, different methodologies and tools have been successfully developed over time to overcome the typical complexities involved. When carrying out similar projects within emerging markets, however, there are a significant number of additional factors to consider, typically leading to a range of further challenges to manage. Using PwC's extensive global experience of conducting these projects in emerging markets, this paper summarizes the key challenges faced and how these can be overcome.

For the purposes of this paper, we have defined both 'Emerging Markets' and 'Developed Markets' by common observations made through six lenses (see figure 1):

1. IT Infrastructure
2. Legal and regulatory
3. Customer segmentation
4. Capability
5. Geography and environment
6. Social and political climate

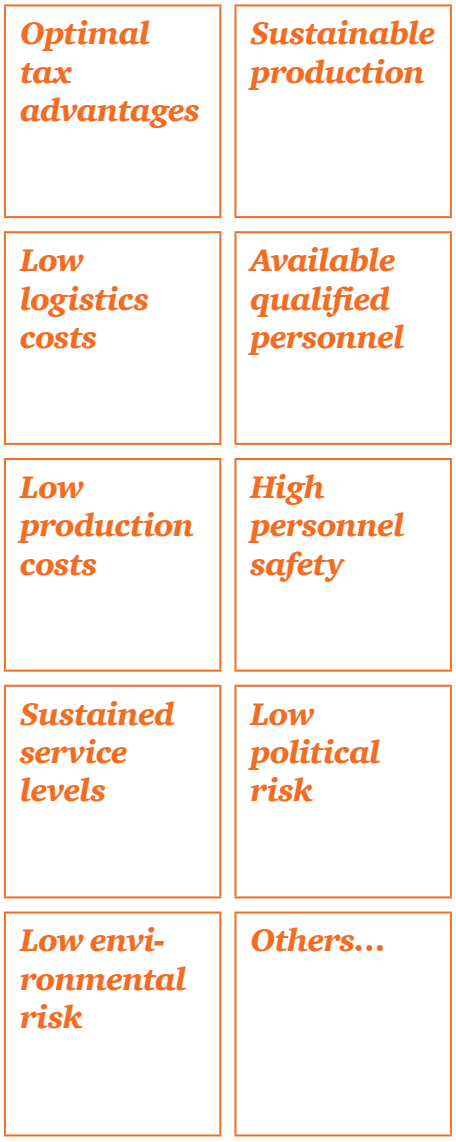
Figure 1. Key consideration categories

Key consideration categories	*Emerging markets*
1. IT infrastructure, e.g. • Systems • Data	Limited use of IT or wide variation in the quality of IT systems used. Data commonly split across several systems, collected manually, or not collected at all.
2. Legal and regulatory, e.g. • Borders/customs • Tax • Government incentives	Border crossing can add to transit times significantly and ports are frequently congested. Wider Government incentives may exist to bring business to economically weaker areas.
3. Customer segmentation, e.g. • Social classes • Sales channels	Variation of social classes with a significant financial gap. Customer segmentation is not always well known.
4. Capability, e.g. • 3PL / 4PL providers	Limited 3PL availability. Skill level and experience of 3PLs lower than in developed markets. Potential challenge in global providers being willing to develop business in new emerging markets.
5. Geography and environment, e.g. • Landscape • Natural disasters • Utilities and technology	Landscape challenges may exist on routes not frequently used for commercial purposes. Existing infrastructure at risk to natural disasters. Some areas may have a complete distinct lack of infrastructure.
6. Social and political climate, e.g. • Safety • Demographics	Variation in political and social situations can create a safety risk. Lower availability of skilled employees and management levels can be difficult to relocate.

Developed markets
Widespread use of middle – leading IT systems with data readily available or split across a limited number of systems.
Policies and procedures in place to expedite customs processes (e.g., within EU) enabling fast transit times. Limited Government incentives to develop business in economically weak areas.
Clearly defined and known social classes with routes to market tailored service to each type of customer. Financial divide between social classes limited.
Widely available providers with a breadth in capability and competitive rates. Specialist logistic providers also readily available or willing to develop business in new geographical areas. Emerging number of 4PL providers.
Infrastructure developed to overcome landscape challenges. Lower risk of natural disasters or infrastructure developed to mitigate risk of common environmental problems (e.g., sea-walls, flood defences, etc.)
Risk to safety is generally lower due to more political, environmental, and social stability. Widespread availability of skilled workers. Management level employees willing to relocate.

When conducting projects in developed markets (e.g., Western Europe, USA, Australia), methodologies for logistic network projects are readily available. Data can be collected and validated with relative ease, and existing software tools can then be used to model future networks. Benchmark data for warehousing and transport costs is usually readily accessible to use as required. Within a developing market (e.g., India, Turkey, Brazil), although the same framework methodologies and IT software tools can be used, additional steps should be taken to collect the required data, validate it, and understand any additional factors to be considered. It is also important to remember each country or region can bring its own specific challenges which must be examined, and that those described in this paper are representative rather than exhaustive (see figure 2).

Figure 2: Sample of key elements which should be considered when choosing a site location



These areas should be considered for each country, and the importance of each factor will vary in the future.

Key considerations when entering emerging markets

1. IT infrastructure
Systems and data

Background and benchmark data may not be readily available. In developing countries, the availability of data from usual desktop sources can be limited, meaning that more primary research should be undertaken. This is unlike developed countries where information on costs, travel times and processing times can be readily available through publicly available sources or from experienced companies. When looking at less developed or remote areas, this information (e.g., elements in figure 2) may need to be sourced through individuals or captured manually by the project team.

Data collection can be more complex. From an IT perspective, data collection is known to be a key challenge in the first stages of supply chain network projects. This challenge intensifies moving to emerging markets as organizations do not have a core ERP in place and have limited or varied IT systems across the business. In addition, specialized technology solutions, such as Warehouse Management Systems, Transport Management Systems, Planning Optimizers, are frequently not used.

As a result of both of the above, more time should be allocated to the data collection process. More often than not, network projects may need to employ the '80/20 rule', where if data is available for 80% of what is required, appropriate assumptions or estimations can be used for the remainder.

2. Legal and regulatory
Borders and customs

Border crossing and transit times are longer. International and domestic transit times within developed countries and areas, such as the EU and USA/Canada/Mexico, are not usually constrained by custom processing times. This is a result of both various agreements between states and/or provinces, countries, and available options to help facilitate this process, such as bonded warehousing. The situation is very different for the majority of countries within South America, Asia and Africa. Crossing international and domestic borders can often involve a high amount of administration and typically takes much longer. This can typically be due to infrastructure constraints, inefficient processes, extensive regulation, as well as continuously changing policies and regulations.

In addition to building in additional transit times when network modelling, some companies help mitigate this by contracting third party logistics (3PLs) who are experienced and support in expediting goods through customs and strong established relationships. Additionally, it is possible to leverage experienced internal or external organizations or teams for information. For example, within South East Asia, PwC has a dedicated team who are experienced in building local regulatory experienced professionals across the various countries, which are able to support their supply chain network.

Every country is different. It is important to understand which assumptions may need challenging before commencing network projects

3. Customer segmentation
Sales channels

Sales channels can vary dramatically country to country. Channels may vary due to geography, social classes, and access to infrastructure. For example, Brazil is geographically dispersed with long stretches of geography with poor infrastructure, making transport difficult. Additionally, taxes vary significantly region to region, in turn causing companies to incur additional costs every time their product crosses into a new territory.

In addition, due to sometimes dramatically varied social classes, price point becomes critical. Many companies rely on finding a partner with a perceived 'established' distribution and sales channel. In the emerging countries, very rarely are there many established distribution and sales channels.

When evaluating emerging market entry, many companies enter a market leveraging a distributor or dealer with already developed and available access to markets. As sales increase, a company may then migrate to establishing their own sales team in market. Eventually, as sales continue, a company may consider building the associated infrastructure for a given sales channel. It is important regardless of country, that the company recognize that they may need to have more than one channel to market. This may require building a physical network to service one channel, but continuing to leverage a partner for another channel.

It is critical to understand the country specific pricing nuances, such as whether discounts are common, how critical brand is versus price, and what is the value proposition for what the company is trying to sell. Companies should consider all costs, even when leveraging a distributor, as many emerging countries are making efforts to reach back to the original seller, even in distributor arrangements.

Finally, for those hard to reach geographies seeing growth, it is important to visit the locale and develop relationships with local government and chamber of commerce (should one exist). Those companies who make efforts to cultivate relationships in emerging markets find it easier to enter those markets and frequently receive hard to find advice on the best channels to market and possible partners.

4. Capability
3PL/4PL Providers

There is a much lower availability of suitable 3PLs. The process to research, source and select a 3rd party provider or supplier in the developed world is well known and organizations often find themselves in a position to select from several suitable providers based on capability and commerciality. Typically in emerging markets, capability is much more limited. Further difficulties arise when specialist capabilities are needed, such as the movement of 'Out of Gauge' items, where there may only be a handful of companies globally with the experience and infrastructure to support.

Organizations often have to contract and manage multiple 3PLs, and may even have to investigate the option of collaboratively working with these suppliers to upskill their workforce and build their infrastructure to a level which is required. This behavior is often seen with many Oil and Gas companies who require logistical capabilities in remote areas. In some areas where capability does exist, but is limited, many different organizations have to pool resources either through operating as Joint Ventures or having similar less formal agreements.

5. Geography and environment
Landscape and natural disasters

Multiple challenges existing with physical infrastructure, natural disaster risks, demographics and safety. In many developing countries outside of the key cities and towns, the road infrastructure can be poor and limited. Reliability can be lower where unforeseen environmental challenges impact remote routes (flooding, mud slides, etc.). Physical infrastructure (especially in rural areas) can be unsuitable for commercial use. Typical examples include roads of poor quality, bridges which are weak and railways which are poorly maintained. Further, physical landscape constraints include island based countries where there are frequent passages of water to cross (e.g., Indonesia and Philippines).

Typical savings
Network optimization projects
5–15%

For physical infrastructure and environmental risk factors, a contingency against these should be accounted for when incorporating customer service delivery times.

If an organization, typically an Oil and Gas company, requires to move a high amount of traffic through a limited road landscape, they may need to collaboratively invest to improve this landscape with the government. These costs and complications should be factored in when modelling.

In island based countries, where a transport lane consists of multiple ports and islands, there may be a need to account for much longer transit times, more inventory across the supply chain and impact on service levels in the modelling.

Utilities and technology

Access to power and water can be limited and unreliable. Utility limitations also should be taken into account when considering the network modelling. Limited access to continuous power, and/or 'brown/black-outs' can occur frequently in countries with an underdeveloped infrastructure.

The cost of limited power, whether it be driven by acquiring back-up power sources or measuring the impact of lower productivity, should be factored.

6. Social and political climate

Safety

Personal safety is a larger issue in countries with higher crime rates. Safety is a significant issue in many countries and should be factored into the modelling. In neighboring countries, armored vehicles or escorts may be required.

Additional transport costs may need to be factored into modelling. In neighboring countries, the situation may be dramatically different (e.g., Malaysia and Singapore) which also should be evaluated if a transport lane crosses borders.

Demographics

Management level employees are harder to find and relocate. Within the USA and Western Europe, organizations can relocate management level employees and above with relative ease. Within remote areas of developing countries, although skilled and unskilled labor may be relatively straightforward to source, obtaining executive and management level employees can be a challenge. When establishing new, potentially temporary communities for a workforce, organizations also should consider the logistics involved in moving people and supplies in and out of remote areas.

Demographics should be taken into consideration when network modelling, typically when using a 'center of gravity' approach. Adjustments may need to be made to move optimal distribution locations towards major towns or cities. When this is not an option, organizations should look into the options of using expatriates, but the higher cost of compensation due to difficult living conditions should be accounted for within costs.

When setting up a remote community (e.g., an oil field), the organization should model how it will move people in and out of the required area, and how food and suppliers will be brought into the 'camp' and waste removed from the camp. This typically requires a similar modelling approach to the distribution of goods, and similar modelling software can be used.

Cultural sensitivity

Different communities react in different ways to change. In some countries, there may be a need to be respective of different cultures. While healthy competition is welcomed in many developed countries and protected by regulation and law enforcement, companies should manage the risk as aggressive corporate behavior in some countries and regions may result in illegal threatening and violent action by individuals, groups or local organizations.

There is a requirement to understand the country and culture and potential risks which may arise from proposed plans so these can be mitigated accordingly.

Political structure and stability

Some countries have existing political instability or are at risk from future instability. For some markets, national elections can cause uncertainty for multinational companies to operate or invest. Some countries are also at high risk of future instability due to unfavorable political structures. Some countries, such as India, see its political structure vary by state which creates significant variability. Policies may also frequently change, and local representation is often required to navigate through the regulations. 3PLs have developed these networks similar to the carrier networks, but delays often occur and fines are levied.

All political issues and risks should be assessed as a qualitative factor and considered in network design programs. For policy variation complexities, additional transit time may need to be factored into modelling while a contingency against delays and fines should be included in cost modelling.

Country specific examples
Case studies

PwC's structured approach to supply chain network modelling in emerging markets leverages in-house experience in areas including Operations, Strategy, Tax, and Customs at local and global levels to help establish the right factors are considered when developing solutions.

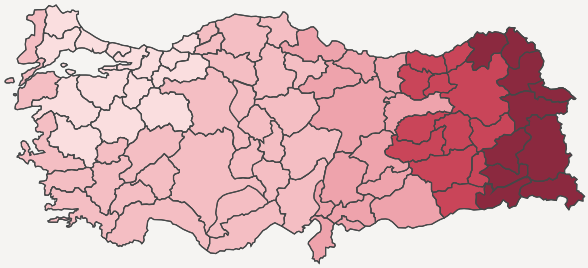
Turkey

Manufacturing location site selection

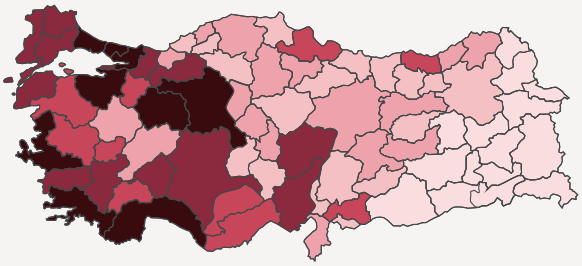
Client's challenges	Our client wanted to invest in a new manufacturing site in Turkey to meet local and export markets' demand, which they forecast to exceed their capacity by 2017. The main requirement to determine the optimal location for a new production facility was driven by tax and incentives, supply chain costs, HR costs and labor relations, and land availability.
Our approach	PwC identified the key areas for consideration as: • Tax incentive savings • Supply chain logistic costs • HR costs and availaiblity • Political risks • Natural disaster and climate risk • Geographical feasibility • Level of industrialization PwC helped the client conduct a detailed qualitative and quantitative analysis across these areas using tailored methodologies.
Benefits	Our client was presented with eight suitable investment locations, scored by the level of tax incentives, HR and supply chain costs for the 2017–2030 period. We helped our client maintain confidentiality throughout the process.

Quantitative factors

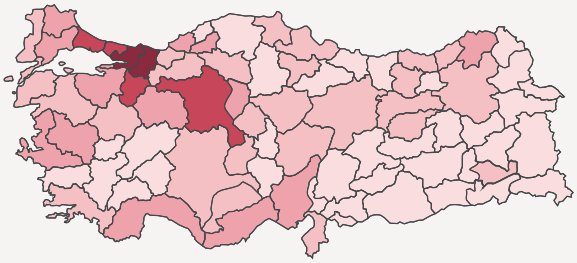
Total supply chain costs



Tax incentive savings



HR costs



High *Low*

Qualitative factors

Identify region specific considerations

- Labor availability
- Political risks
- Natural disasters (earthquakes)
- Climate risks
- Geographical feasibility
- Level of industrialization

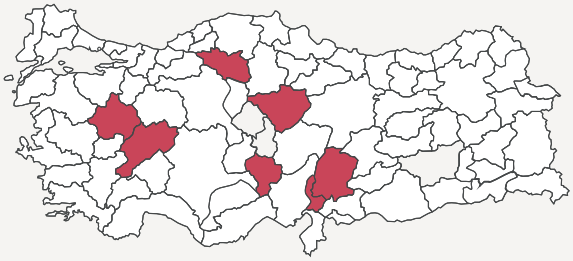
Rank using tailored methodology

High

Med

Low

Short listed site locations

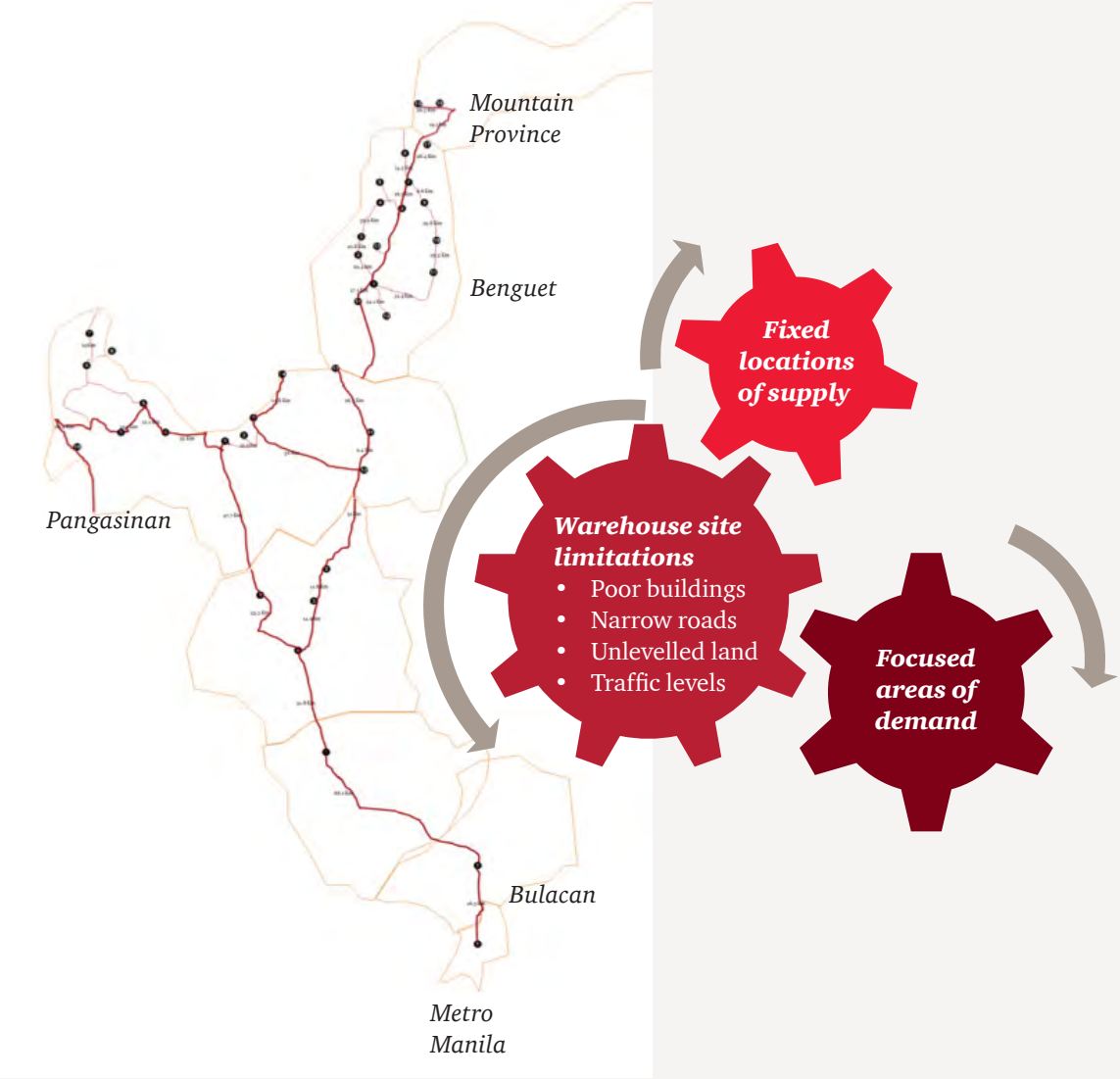


Philippines

Establishing a cold chain network

Client's challenges	Our client wanted to establish a cold chain supply chain for handling specific fresh produce. This type of supply chain was at a very low level of maturity in the Philippines. Awareness of food safety and product standards was low compared to other markets, and the desire was to meet international hygiene and handling standards.
Our approach	PwC helped the client analyze feasibility through assessing: • The key fresh products produced in each region province • The key markets for each produce across the region • The key challenges and risks: – Landscape: Availability and quality of roads – Environmental: Risk of flooding – Utility infrastructure: Availability of water supply and power and traffic congestion – Social: Resettling and displacement issues There was a need to balance project objectives, market needs and provider requirements.
Benefits	Our client benefited from a high level design and holistic benefits analysis to implement a cold chain distribution network across the country.

Each province supplied a different mix of cold chain products to consider



Philippines specific considerations included:

- Limited data availability on supply and demand
- Low awareness of food safety standards
- Low compliance to food quality and safety standards in fresh commodities

Brazil

Cost reduction within the current footprint

Client's challenges

Our client faced yearly increases in transportation and inventory costs due to a lack of visibility into its supply chain and Brazil's complex tax structure. Senior management wanted to take control of its supply chain, increase visibility into processes, and identify opportunities for savings by reconfiguring product flow through the network.

Our approach

PwC helped the client assess the network and identified opportunities for savings by:

- Performing a center of gravity study to identify the concentration of point of sale locations across the country
- Analyzing transportation data across multiple vendors, benchmarking costs and performance
- Factoring tax considerations when providing network recommendations
- Developing various scenarios and testing the corresponding sensitivity
- Developing an optimization strategy

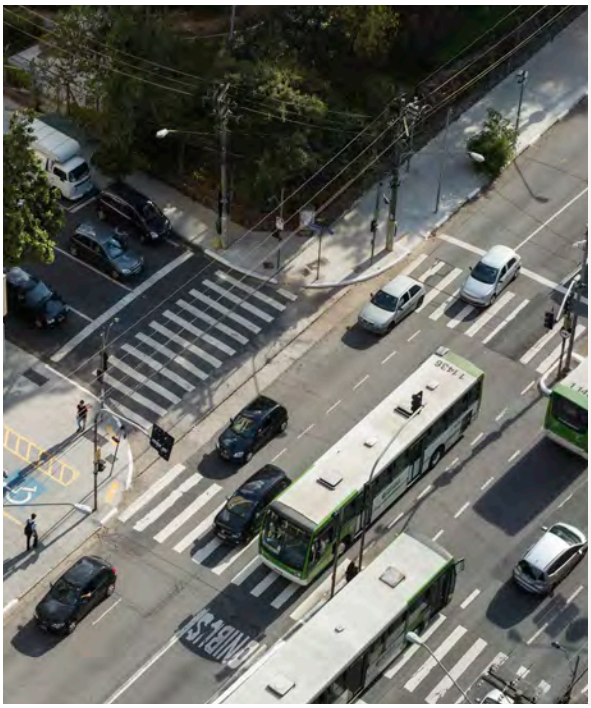
PwC recommended solutions to capture the identified savings.

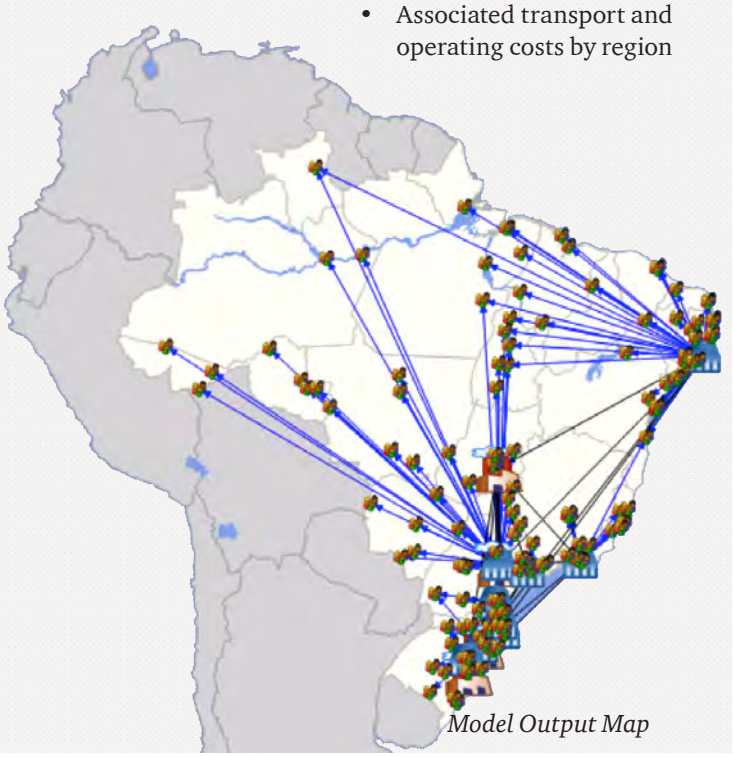
Benefits

Our client was presented with an actionable plan to capture transportation savings by redirecting the product flows for more than 200 SKUs and adjusting the capacity of certain distribution centers.

Qualitative and quantitative considerations for Brazil included:

- Accessibility of locations
- City regulations
- Available 3PL providers
- Associated transport and operating costs by region





Model Output Map

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