

Transportation Policy Brief #6

Typology of Transportation and Trade Forecasts

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Panama Canal Authority



Panama Canal Authority



Texas Ports Association

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FOREWORD

The Lyndon B. Johnson School of Public Affairs at The University of Texas at Austin has established interdisciplinary research on policy issues as the core of its education program. A major part of this program is a nine-month policy research project (PRP), in the course of which two or more faculty members from different disciplines direct the research of 10 to 20 graduate students of diverse backgrounds on public policy issues of concern to a government or nonprofit agency.

During the 2016–2017 academic year, the Texas Department of Transportation (TxDOT) funded, through the Center for Transportation Research (CTR), a PRP addressing six key transport/logistics policy issues related to Texas international trade with foreign countries and domestic trade with other U.S. states. Overall direction and guidance was provided by Roger Schiller (TxDOT Maritime Division), who participated in classroom discussions at the beginning of the academic year.

As a consequence, the following policy issues were selected for study:

1. Panama Canal Utilization;
2. Texas Ports and the Panama Canal: Commodities and Infrastructure;
3. Global Logistics Hubs in Texas;
4. Texas-Latin American Trade;
5. Port Competition and Best Practices; and
6. Transportation and Trade Forecasts.

The findings of each policy issue are presented within the context of separate policy briefs. This particular policy brief, “Typology of Transportation and Trade Forecasts,” was researched and written by Shujaat Ali Haq and Lauren Marcotte Blair.

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EXECUTIVE SUMMARY

Forecasts are an integral part of businesses because they inform decision makers about upcoming trends. Shippers, transport modes, supply-chain managers, and government organizations all rely on forecasts to guide their future investment decisions and operations. In this regard, dozens of public and private entities perform forecasts of various kinds. Examples include consulting firms, banks, federal government agencies, international organizations, academia, media, and trade associations (International Chamber of Commerce).

Some forecasts are one-time studies, while others are annual reviews. Forecasts vary by time period, input factors used to forecast, transport mode, market sectors and commodities, countries, trade blocks (NAFTA), and the like. Moreover, forecasts take into account changes in technology and thereby help predict the future of existing businesses and their continuing relevance in the changing environment.

This paper will identify and examine the objective and characteristics of various trade and transportation forecasts to present a typology of forecast literature with relevance to trade and transportation. The focus will be on the extent that they are comparable or differ and under what circumstances they provide useful information to state and federal transportation policymakers.

BACKGROUND

WHY FORECASTING?

Forecasting is an essential part of running and managing a business. Forecasts help firms plan for and invest in future needs and development of the business. They also help firms to anticipate new technologies that may make their current services obsolete.

The most important use of forecasting is to fine tune the operations of a company so that it can efficiently and swiftly provide the level of service in the future.

In many cases, a firm's extent of work depends on the actions and results of other businesses. In this context it becomes even more necessary that firms invest in their capacity to predict future circumstances that will directly affect both their factors of input and demand for their output.

As an example, a railway firm needs to know the growth in demand for its freight services next year so that it can purchase the required locomotives this year for delivery by the time they are required. Without accurate forecasting, there will be a mismatch between productive capacity and market requirements manifesting an inefficient allocation of resources.

RELATIONSHIPS BETWEEN TRANSPORTATION AND TRADE METRICS

Different firms specialize in forecasting different outcomes related to trade. Often these correspond to the core nature of the business. For example, shipping companies are predominantly concerned with sea-borne freight trends.

Given the global nature of trade, forecasts also tend to take into account factors relevant at an international level. To understand growth in trade volumes, world economic growth at large is used as a starting point.

Additionally, manufacturing and consumption data provides tangible information on where goods are produced and where they are being demanded.

While these metrics are sufficient for short-term forecasts, long-term predictions account for certain other factors as well. These include data on investments undertaken by firms and sustainable infrastructure. A lack of both of these factors can inhibit long-term growth and as such they are essential components of a forecasting study.

Finally, political considerations always deserve considerable weight in forecasts. Wars, trade disputes and changing regimes can disrupt bilateral, regional, and global trade networks. As a result, firms regularly track political developments and incorporate various contingencies in their forecast models.

It is also important to isolate forecasts related to trade from those related to transportation. Trade takes a macro level approach incorporating all of the above mentioned metrics.

On the other hand, transportation can also take a more micro-level approach as it pertains to the needs of regional demands and movement of goods. As a result, transporters look out for new population developments and industrial hubs. Both of these raise transportation needs through demand and supply networks, respectively. Moreover, volatility in prices also affects transporters. Sudden spikes in the price of commodities can reduce their demand and, therefore, transportation being a derived demand is also reduced.

ORGANIZATIONAL TYPOLOGY

In exploring transportation and trade forecasting, the primary consideration is in understanding the types of organizations that conduct this research. This section outlines these types of organizations, background information on their missions and organizational structure, and features profiles of important forecasts and their content and relevance.

The organizations and forecasts featured herein by no means constitute a complete list nor are they selected in order of importance. The selection method for the list of organizations and forecasts maximizes the variability of profiled factors, thereby illustrating the variety of such forecasting organizations and forecast references available to the interested researcher or industry player. A more complete profile dataset was collected in the course of the research project and may be shared in spreadsheet form upon request.

PRIVATE ORGANIZATIONS

Private firms engage in forecasting to see and inform their own future. However, their forecasts hold substantial relevance to TxDOT in its role of promoting businesses within Texas and those that use the state as a gateway into and out of the United States. In this context, business forecasts relevant to TxDOT transpire from industries related to trade, transportation, infrastructure, retail, and policy think tanks. Organizations in these industries make forecasts that directly relate to the need for transportation networks in Texas and beyond.

In this brief, we look at a spectrum of industries that engage in forecasting relevant to transportation and trade forecasting and explore specific firms within those industries to illustrate their work.

BANKS

Banks are an intermediary in any transaction and as such play an important role in facilitating trade within and outside the United States. In order to consistently provide financial services and fulfill credit demands of trading companies, banks regularly make forecasts about the economy to ascertain future demand of their services.

Given the large scale operations of most banks, their forecasts tend to have a global outlook and are thereby helpful in understanding macro-level trends in world trade networks.

In this context, the commercial division of HSBC Bank published a comprehensive report (HSBC 2015) in 2015 on the future of trade and how it affects international businesses. HSBC, headquartered in London, UK, is one of the largest banks in the world. It provides significant corporate and investment services that place it in a unique position to understand and predict future trends in global trade.

In its report, HSBC traces the growth and need of trade over the last two centuries and predict that trade will witness massive growth in the coming decades despite current stagnation. This growth will primarily be driven by a) technology, b) plummeting costs, c) more liberal trade policies, and d) constantly improving business models. All of these factors will work to quadruple international trade to \$68.5 trillion by 2050. HSBC draws on investments undertaken by businesses, which it expects will drive demand and encourage growth. At the same time HSBC takes into account rising populations and consumerism in Asia, which will require even greater international trade.

CONSULTANCY FIRMS

Perhaps the biggest variation in services is seen in consultancy companies. The fact that they must provide a broad spectrum of services also means that they must be informed of all micro- and macro-level developments occurring around the world. These include both political and economic developments that can directly or indirectly affect the businesses of their clients.

As a result, consultancy firms invest heavily in conducting research and applying forecasting models to accurately predict future business needs. These forecasts allow them to provide the best advice to their clients.

PwC is one of the biggest auditing and business consultants in the world. Economists at PwC modelled bilateral international trade to project the top twenty-five bilateral sea and air routes in the world in 2030, and they regularly publish reports on major economic trends.

The report, titled “Future of World Trade” (PwC 2011), features a pair including the United States six times with its bilateral trade with China topping the table. In keeping with this projection and given the dominant status of Texas as the entry port of the United States, one can expect Texas’s share to continue to grow—with it requiring more transport infrastructure investment.

To conduct its study, PwC analyzed existing trade infrastructure and growth potential. They also took considered rising demand and manufacturing capacity of major regions and connected them to equivalently strong economies to map the largest bilateral trade routes.

NEWS ORGANIZATIONS

Particular news organizations specialize in certain businesses and conduct extensive industry research to provide impartial information to their subscribers. These organizations excel at gathering information from around the world and with the help of experts condense the information to make it relevant to their readers. *Forbes* is one such publication known for its extensive reporting on the business environment of North America specifically and the world in general.

Forbes collaborated with The Mexico Institute (a think tank based around US-Mexico relations) to analyze the future of NAFTA.

The report, titled “NAFTA’s Next 20 Years” (The Mexico Institute 2014), focused on China’s rising role as a major trading country and its potential to erode existing trade networks. The forecast argues that unless trading ties between US and Mexico are strengthened, the bilateral trade under NAFTA will decrease. From TxDOT’s perspective, this means that border management must become more efficient to reduce costs. Additionally, greater efforts must be made to develop and improve transport infrastructure from Canada through to Mexico, which requires TxDOT to overhaul its network in Texas.

For the purpose of this study, *Forbes* focused on the rising manufacturing capacity of China and its ability to dominate global markets. If the current trends continue, Chinese manufacturers will outbid and push global competitors out of business and dominate international trade. *Forbes* also focused on the required infrastructure investments required to make NAFTA even more effective in promoting regional trade in North America.

POLICY RESEARCH FIRMS

Policy research firms take a different angle on forecasts. For them it is necessary to understand the regulatory response to changing businesses conditions in the world. As modes of production evolve and trade partners change, policy firms analyze the need to make new rules

and regulations to uphold public interests. To this end, they forecast future business trends and anticipate required changes in laws. As both a regulator and state agency, TxDOT must keep abreast of future business developments in a way that allows the department to rapidly adapt to new roles when required.

The Information Technology & Innovation Foundation (ITIF) is a research organization focused on the interplay of technology and public policy. They regularly investigate and predict the effects of technology on policy outcomes.

In “The Myth of America’s Manufacturing Renaissance: The Real State of US Manufacturing” (Nager and Atkinson 2015), they report a depressing state of American manufacturing industry. It predicts that the recent upsurge in manufacturing is cyclical and manufacturing does not have a growth future in the US. As a result, the report implies, the US will be dependent on manufacturing imports more than ever putting pressure on international ports. In this context, TxDOT, which oversees twenty-nine ports of entry into the US will see its role expanding in streamlining the inflow of goods and their diffusion out of Texas.

ITIF predicts that policies should focus on developing trade infrastructure as opposed to manufacturing infrastructure in the US.

TRANSPORTERS

Large trade companies focus on trends in maritime and air trade. In this regard, they look at bilateral trade agreements, political environments, and major commodity trends. For them, entry and exit ports and their linkage to the US interstate system is of utmost importance.

The transport industry is made up of a variety of firms that specialize within the categories of land, air, and maritime modes. These firms are highly sensitive to fluctuations in trade flows as they directly and immediately affect their business. Moreover, they actively forecast the flows of particular commodities they specialize in transporting. Firms that operate rail, air freight, trucking, and maritime networks forecast annual flows as well as predict technological changes that will revolutionize the transportation industry. In this way, their forecasts also incorporate evolving infrastructural needs in line with new business models and technologies.

American Shipper is a publication that primarily focuses on maritime trade. Its organizational mission is to keep major trading companies informed about news, regulatory issues, and growth trends in the maritime industry. In January 2016 it predicted a slowdown in volumetric growth in freight shipments in the foreseeable future. Walter Kemmsies authored a report titled “Strategic View: 2016 Outlook” (Kemmsies 2015), in which he points to bloated inventories and excess production capacities as inhibitors of economic growth which results in retarding growth in trade.

PUBLIC ORGANIZATIONS

Some of the public organizations participating in forecasting work guiding investment and operations decisions in transportation and trade markets include federal government, international organizations, academia, and trade associations. Usually, these types of organizations engage in forecasting with the purpose of analyzing broader economic trends or with a specific public policy focus. The featured organizations and forecasts within this section represent a broad variety of missions, methods, and perspectives (global, national, macroeconomic, industry-specific, etc.), but all serve as important indicators of trends and relationships affecting transportation and trade in Texas.

INTERNATIONAL GOVERNANCE

International public sector organizations taking on a variety of forms such as autonomous government entities and global intergovernmental bodies, primarily focus on issues of international trade and development, highlighting global macroeconomic and industry-specific trends (especially transportation as it relates to freight volumes and international supply chains).

The Organization for Economic Co-operation and Development (OECD) is one such intergovernmental organization whose primary economic development focus is international and trade-related. The broad mission of the OECD is to promote policies that will improve the economic and social well-being of people around the world. The organization tends to take on the role of analyzing international trade development prospects. The OECD cultivates an extensive network of coordination with business and industry, labor, and civil society organizations through which it primarily works on policy research and forecasting economic indicators affecting international trade mediated by potential policy developments.

An important contribution to transportation-trade forecasting put out by the OECD is the “Trade in Goods and Services Forecast” (OECD 2015). The forecast is defined as the projected value of change in ownership of material resources and services between one economy and another. The indicator comprises net trade, imports and exports, and export-market growth, and is a standard indicator used to forecast macroeconomic growth.

FEDERAL GOVERNMENT

The U.S. Government issues a variety of statistics and forecasts that inform transportation and trade interests. Depending on the mission or focus of the specific administrative unit, these vary by nature and mode (some taking a broader macroeconomic focus and some more concerned with trade volume, specific mode, vehicle mile, or type specific).

The U.S. Department of Transportation (USDOT)’s Federal Highway Administration and National Transportation Systems Center, for example, published projections of vehicle miles traveled (VMT) specific to US highways (USDOT 2016). This thirty-year forecast provides a vision of the future that considers such broad economic data as baseline economic output, real disposable income, per capita GDP, population growth, employment, and oil prices to provide an accurate forecast of VMT. This granular-level approach informs long-term capacity planning, as well as indicates industry-specific and broader long-term economic growth trends. This effort is central to USDOT’s mission of enabling a transportation system that contributes to the nation’s economic growth.

Agencies like the Bureau of Trade Statistics (BTS), the U.S. Department of Agriculture (USDA), Energy Information Administration (EIA), and the U.S. Maritime Administration (MARAD) provide similar information. Both for the broader domestic system or mode or by specific commodity. These forecasts are supportive of domestic economic and trade researchers and also to specific industry players in planning at a more granular level.

STATE GOVERNMENT

State governments are the primary entities concerned with infrastructure planning and investment. Trade and economic forecasting at this level is typically focused on identifying sources of investment, intelligence on trade, construction, and consumer trends that aid in monitoring growth drivers and effectively managing capacity and fiscal balance. While some agencies may be more focused on planning and capacity and others more focused on directly promoting international trade and other local economic investment, regardless of the desired

forecast output, data sharing can prove very useful as many of the modeled factors are interchangeable.

The Texas Comptroller of Public Accounts, for example, has the broad responsibility of stewardship of the state's finances. However, it provides information that specifically informs transportation and trade forecasting in Texas. For example, in its 2015 report, "Fiscal Notes: Texas Road Finance, Part II: Economic Impacts" (Costello and Lowry 2017), the comptroller used data such as volume and value of imports/exports, jobs, infrastructure, and others to determine the state economic impact of international trade through Texas Ports of Entry. The information provided and the associated methodology is valuable to a variety of state and local planning organizations and business concerns in their trade and transportation forecasting efforts.

LOCAL GOVERNMENT

Counties, cities, and other local government entities take part in forecasting economic, trade, and traffic outputs for planning purposes. Indicators at this level provide granular detail on transportation access, demographics, industry clusters, local investment or trade facilitation and data can be fed into broader geographical models to further inform state or federal level planning or policy. There is also an effort at this level to demonstrate compliance with statutory planning requirements or to tie investments of federal and state funding to local outcomes. However, significant effort may be needed to compare or aggregate data across various localities.

While itself an NGO, the Association of Texas Metropolitan Planning Organizations (TEMPO) represents this effort of local government to "provide a continuing, cooperative, and comprehensive transportation planning process that results in plans and programs that consider all transportation modes and supports metropolitan community development and social goals. These plans and programs shall lead to the development and operation of an integrated, intermodal transportation system that facilitates the efficient, economic movement of people and goods."

A 2009 GAO report entitled "Metropolitan Planning Organizations: Options Exist to Enhance Transportation Planning Capacity and Federal Oversight" (GAO 2009), illustrates issues related to local efforts in modelling transportation and trade. It suggests increasing federal investment in modeling and data collection in order to improve the technical capacity of Metropolitan Planning Organizations (MPOs) and elicit greater reliability and consistency across MPOs in demand forecasting; it also recommends, among other things, that DOTs develop strategy to facilitate improved data gathering and modeling at the MPO level.

NON-GOVERNMENTAL ORGANIZATIONS

Foundations, public-private partnerships, trade and professional associations, co-ops, and a variety of other public sector non-governmental organizations (NGOs) play an important role in the arena of transportation and trade forecasting as well. NGOs provide forecasting that touches a variety of interest groups and topics related to transportation and trade that may not be specifically addressed by private organizations, government, or academia. From this information, industry professionals can often gain detailed outlooks related to their specific areas of concern or field of expertise.

The American Trucking Association (ATA), for example, publishes the annual "US Freight Transportation Forecast" (ATA 2016), which provides a detailed picture of the current state of the freight transportation industry, as well as a value outlook of trade by mode for the upcoming decade. In its effort to "effectively advocate and communicate efforts designed to

improve safety and profitability” on behalf of its industry members and affiliates, the organization provides a very broad yet detailed forecast which can be used in a variety of contexts. This is a great tool for long-term planning both for industry and public-sector professionals, specific to and encompassing various modes of transportation.

Similarly, other humanitarian and professional missions taken up by NGOs involved in transportation and trade, such as that of the American Society of Civil Engineers (ASCE), the World Economic Forum (WEF), and various geographic levels of chambers of commerce and economic development corporations often take on a broad process of networking. This context provides for successful data collection and analysis of information of various natures—economic, trade, and/or vehicle-specific—that proves valuable in a variety of planning contexts within and across specific industries.

ACADEMIA

Whether public, private, or non-profit, academic institutions play a crucial role in the development of new research methodologies and empirical studies which support rigorous analysis of economic and trade dynamics. These are primarily point-in-time studies, but many of them provide sound methodological platforms for forecasting trends and interpreting potential political, economic, and technological developments well into the future.

The Harvard Kennedy School Belfer Center for Science and International Affairs, for example, in a June 2015 publication entitled “The Next Great Emerging Market?: Capitalizing on North America's Four Interlocking Revolutions” (Petraeus and Bhayani 2015), provides a compelling outlook of economic, political, and technological development that has long-range implications across a variety of industries. Specifically, the report highlights dynamism in energy, manufacturing, life sciences, and information technology sectors likely to drive renewed economic and trade growth in North America. Trends such as increasing energy independence, manufacturing resurgence, and developments in agriculture generally bode well for the transportation industry.

Some of academic institutions, like The University of Texas at Austin’s Center for Transportation Research (CTR), focus on economic and trade issues specifically related to transportation. Within its mission of promoting cutting-edge developments in transportation science and technology, CTR’s researchers, faculty members, and students work together on a variety of multidisciplinary analyses which affect cross-over between fields of study such as economics, multi-modal engineering, transportation policy, traffic congestion, behavioral and environmental impacts, and infrastructure development. For example, CTR’s report “Trade Flows and Texas Gulf Ports: Panama Canal and South American Markets” (Seedah, et al. 2013), assesses the impacts of the planned Panama Canal expansion project on US ports and state transportation systems, including an analysis of global trade, expected local shares of such trade, and implications for infrastructure investment. The team of engineers, administrators, consultants, and academics at CTR used a variety of methods to model economic impact, future port activities, trends in trade with major trading partners, landside impact of increased port tonnage, and key cost elements that influence steamship company decisions to use a specific port of call—vessel operating costs and port terminal costs, among other outputs—in modeling the effect of the expansion project.

In the appendix, Figure 1 summarizes the list of all public and private reports mentioned above.

FORECASTING METHODOLOGY

The methodology for forecasting employed by each organization is dictated by its type of industry. Consultancy firms and think tanks employ both qualitative and quantitative data to predict the future. Additionally, they also incorporate the political environment and its effects on invigorating or inhibiting growth.

On the other hand, trading and transportation industries look at historical manufacturing data and combine that with data about future investments by different industries to make projections about future production and transportation.

All forecasts vary in terms of time horizons and this brief makes an effort to incorporate both short- and long-term predictions. A great deal of this research involved categorizing various forecasts with respect to factors such as the nature of the forecast, length of time, and input facts. An appendix to this report provides a selective subset of this categorized data. A broader dataset categorizing transportation, trade, and economic forecasts has been collected and is available in spreadsheet form upon request.

In the short term, growth is unanimously projected to be slow, however, with certain qualifications, long term growth is promising. Some of these qualifications include newer technology, better business models geared towards innovation and cost reductions, as well as the creation of new and strengthening old trade ties among countries and regions.

NATURE OF FORECASTS

ECONOMIC

Economic forecasts mostly deal with macro-level variables such as GDP growth and trade growth at the global level. They use economic growth as a proxy for growth in trade and a resultant need in infrastructure. These forecasts are useful in understanding global patterns particularly when considering infrastructure at ports.

TRADE

Trade forecasts tend to be highly segmented. They range from studying individual goods to broader topics that cover the modes of trade such as air, sea, and land. Moreover, they take into account bilateral and multilateral trade agreements and their effect on the future trade relations among countries.

TRAFFIC

Traffic forecasting is frequently done by transporters themselves to forecast freight needs at many different levels. These include international sea and air routes and intra-country land routes served by both trucks and railways. These forecasts are directly related to infrastructure needs and forecasts. For example, the Panama Canal upgrade significantly affects the operations of transporters.

TIME HORIZON

Length of projection varies according to the goals of the forecast. This outlook may be near-, short-, medium-, or long-term and publication may take place as a one-time effort, or at regular intervals. If the goal is to determine investment needs, the forecast tends to project in the medium-term, such as 5–10 years out, and tends to be updated annually as opposed to when determining working capital needs (for which the outlook is typically short-term—one year and assessed monthly or quarterly).

In certain cases when studying global trade trends, forecasting horizons can extend up to 30–40 years, as analysts predict how the world will look given current trends while making room for other contingencies in their models. However, extreme long-term forecasts are notoriously hard to do accurately. The models suffer from multiple omitted variable biases and many assumptions of the continuation of the current world order are often unjustifiably incorporated into the models.

INPUT AND OUTPUT VARIABLES

The type of factors used in a forecast are the single biggest indicators of its accuracy. Researchers and forecasters design elaborate models to incorporate all variables that can affect the outcome they are studying.

Investment, population growth, manufacturing capacity, economic growth, commodity prices, consumer confidence, exchange rate fluctuations, and political circumstances are a few of the many varied factors that go into a number of different models and analytical schemes.

WHAT'S NEXT?

Through the course of our review, a few themes were salient across a variety of forecasts, indicating some likely prospects for “What’s Next?” in transportation and trade forecasting.

Given the existing business environment, the predominant prediction is that of a continuing domination of China in global trade. As such, China will remain the largest bilateral trade partner of a number of countries including the US in the foreseeable future.

Additionally, we are witnessing an upheaval in the political circumstances of the world. Many global trade forecasts that assumed the success of the Trans-Pacific Partnership (TPP) for trade suddenly became irrelevant when the US withdrew from it. Similarly, the future of NAFTA is also uncertain due to the volatile political climate in North America. In this context, new forecasts must now incorporate new contingencies in their models and predict global trade levels accordingly.

Additionally, rapidly changing technologies offer another challenge as well as an opportunity to trade and transportation firms to evolve and design their operations to gain maximum advantage from the latest technology.

FUTURE TRENDS IN FORECASTING

Due to increasing structural instability in the global economy, forecasting of transportation and trade dynamics occur in a world in which near-term developments take a much greater importance than they have in the past. The preferred method will be to work backwards from a variety of predicted long-term outcomes or scenarios, and then determine

incrementally the degree to which structural challenges have been met and global growth has become divergent. Thus, forecasts move forward to articulate near-term development in largely a scenario-based structure (Enriquez, Smit and Ablett 2015)

Furthermore, the relatively recent explosion of more and more sophisticated applications for IT, cloud computing, and big data portend the emergence of more data-rich methods of forecasting. Consequently, forecasting efforts will increasingly rely on ever more complicated multivariate modelling techniques (less on trend analysis) with smaller and smaller units of analysis (relying less on aggregate or summarized data).

WHAT IS THE FUTURE OF TRANSPORTATION TECHNOLOGY?

The future of transportation technology is bracing for massive changes. Two main changes that will begin to be implemented at a large scale are:

DRIVERLESS TRUCKS

Driverless trucks promise to increase efficiency and the safety of highways as driving algorithms improve. Regulators are expected to begin allowing driverless trucks on roads in the near future. This will substantially reduce trucking costs, making the mode more attractive when compared to railway transportation. Although this development will put more trucks on the road, the fact that driving efficiencies will increase manifold means that the pressure on highways may not change by much (Kockelman 2017).

DRONE SERVICES

Drones are rapidly gaining traction as a fast and efficient means of delivering goods over short distances. The greatest effect of drones will be to reduce pressure for the need of last-mile connections. Last mile connections require massive investment but serve much smaller markets as compared to highways. Using drones instead of trucks to deliver goods in areas away from major highways will translate into massive infrastructure cost savings.

LESSONS LEARNED

The major takeaway is that while forecasts are performed to prevent firms from becoming obsolete, forecasts themselves can become obsolete. As a result, the process never stops and forecasts are continuously updated with new information and variables. Market dynamics and changing technologies not only affect transportation and trade, but also the methods with which they are forecast.

Although longer-term forecasts require more updates, even annual forecasts can be affected by exogenous changes to input variables.

In this very dynamic context, it is essential to understand the mechanics behind a forecast and complement that with an informed knowledge about expected changes in the input factors of the forecast. Forecasts, at best, are a resource to understand how different factors affect the dependent variable. Their ability to give precise information about the future must be supplemented with other information regarding the variable being measured and tailored to the organizational context and/or a specific research question of the individual.

CONCLUSION

This paper shows that forecasts are performed by every industry and every entity within them. We have tried to present a summary of the information that is available for policy makers to make more informed decisions by understanding the expectations of the future of different industries. This list in by no means exhaustive, nor are forecasts themselves stationary.

As the world around us changes suddenly and unexpectedly, forecasts will continue to be updated. However, the point to note is the difference in the type of forecasts made by each industry as it tries to predict the future along the variables most relevant to itself. As a regulator and policy maker, TxDOT stands to gain from understanding the needs of every industry operating in the realm of trade and transportation. This takes particular importance in today's world when the loss of one industry is the gain of another. Hence, TxDOT must consider different industries before it decides on its own policies.

Moreover, as TxDOT makes its own policies, it will help the agency to understand the short-, medium-, and long-term predictions made by other firms. This is important because each time-horizon incorporates different variables and expectations. If short-term forecasts predict an economic downturn, medium-term forecasts could predict an upturn based on future investments. As a result, a broad overview of literature is required to understand the needs of the economy in the immediate and long-term future.³

Finally, technological advancement presents many challenges to TxDOT. It has the ability to make current practices obsolete and require new regulations and infrastructure needs. By anticipating such changes early, TxDOT can turn challenges into opportunities to streamline trade and transportation networks in Texas.

APPENDIX

Figure 1: Featured Forecasts and Reports by Type (Nature of Forecasts, Time Horizon, Indicators, and Organizational Context)*

Publisher & Report Name	Outlook/ Publication	Nature/ Mode	Primary Indicators/ Data Sources	Organization/ Stakeholders/ Audience
HSBC: “Trade Winds: Shaping the future of international business”	35 years	Global Trade	Industrial and technological development	Policy makers, general audience
PwC: “Future of World Trade: Top 25 sea and air freight routes in 2030”	15 years	Sea & Air freight	Industrial investment, consumption growth	Policy makers, trade & transportation firms
<i>Forbes</i> : “NAFTA’s next 20 years: In face of Chinese competition, bonds must be strengthened”	20 years	Overland Trade	Infrastructure Trade Laws	Policy makers Manufacturing & transportation firms
ITIF: “The myth of America’s manufacturing renaissance: The real state of US manufacturing”	10 years	Manufacturing Industry	Manufacturing data, national economic growth	Investors & policy makers
American Shipper: “Strategic View: 2016 Outlook”	1 year	Economic & trade growth	Inflation, consumer demand, inventory and production capacity	Investors, policy makers, trade firms
OECD: “Trade in Goods and Services Forecast”	1 year	Country wise trade growth	Dollar value of trade	General audience & policy makers
USDOT: “30-year Freight Projections”	30 years	Highway Traffic	Vehicle miles travelled	Environmental & civil engineers & policy makers

Publisher & Report Name	Outlook/ Publication	Nature/ Mode	Primary Indicators/ Data Sources	Organization/ Stakeholders/ Audience
Texas Comptroller of Public Accounts: "Fiscal Notes: Texas Road Finance, Part II: Economic Impacts"	5-25 years	Highway Traffic	Cost of transportation	Policy makers, transporters & construction firms
GAO: "Metropolitan Planning Organizations: Options Exist to Enhance Transportation Planning Capacity and Federal Oversight"	—	Public sector planning expertise	Organizational performance indicators	USDoT & federal policy makers
ATA: "U.S. Freight Transportation Forecast"	10 years	Freight transportation	Transport & economic growth	Policy makers & transportation industry
HKS Belfer Center for Science and International Affairs: "The Next Great Emerging Market? Capitalizing on North America's Four Interlocking Revolutions"	Near Term	Technological Advancement	Research and development in the US	General audience & policy makers
CTR: "Trade Flows and Texas Gulf Ports: Panama Canal and South American Markets"	Near Term	Seaborne Trade	Freight growth in South America & Panama Canal	General audience & infrastructure planners

*A more complete dataset on transportation/trade forecasts and related organizations was collected in the course of the research project and may be shared in spreadsheet form upon request.

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