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Trucking to the future

How GCC governments can open the road for autonomous trucks

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Executive summary

Today, most freight moves through the countries of the Gulf Cooperation Council (GCC)[1] by truck. Trucking companies benefit from artificially low commercial costs because of fuel subsidies, low driver wages, and minimal enforcement of regulations. GCC countries absorb many negative effects of road freight, including pollution, accidents, and congestion. Virtually all drivers are expatriates who transfer most of their income to their home countries and so do not contribute to the GCC economy. Autonomous trucks — driverless vehicles that operate independently — are an emerging technology with significant potential benefits for GCC countries, particularly given the region's ambitious plans to shift to a knowledge-based economy, foster digitization, and develop human capital.

Manufacturers are making notable progress in developing autonomous truck technology, with mass production possible in the next 10 to 15 years. Although these trucks have higher up-front costs than manned vehicles, these expenses will likely be offset by reduced salary costs and increased operating efficiencies, with total lifetime cost savings of 15 to 20 percent in the Middle East. Autonomous trucks can also create significant economic and social value for GCC countries. The technology will reduce the region's reliance on expatriate labor, improve road safety, and create digital technology jobs and companies in the region.

Given the potential benefits of autonomous trucks, GCC governments have an opportunity to seize the initiative and begin creating the right conditions for their adoption. Even before manufacturers develop the technology, policymakers need a holistic strategy for the introduction of such vehicles, which includes legal, regulatory, and infrastructure elements. By taking action today, GCC countries can put the necessary structures and frameworks in place to support autonomous trucking — and become global leaders in the technology.

The trouble with trucking

In recent years, governments within the GCC have launched major initiatives to shift to a knowledge-based economy, digitize industries, and create technology-based jobs for nationals. One critical area that many policymakers have not considered — but should — is cargo freight, and particularly the trucking industry. Autonomous trucks, which are capable of sensing their environment and navigating without human input (using GPS technology, radar, sensors, cameras, and software) are currently in development and will likely go into mass production within 10 to 15 years. The technology holds particular promise for the GCC because it can greatly improve the region's freight transportation industry and because it furthers the aim of GCC countries to digitize and diversify their economies.

Autonomous trucks further the aim of GCC countries to digitze and diversify their economies.

Trucking is the predominant mode of freight transportation in the GCC. Today, practically all land cargo within the region travels by road. More than one million trucks are in operation, a number that increases by 5 to 9 percent each year.[2] One reason is that truck transport is artificially cheap. Government fuel subsidies reduce gasoline (petroleum) costs — one of the largest expenses of trucking companies — by at least 20 percent.[3] In some countries subsidies may reduce gasoline costs by as much as 60 to 80 percent.[4]

Furthermore, a lack of regulation in the GCC contributes to artificially low operating costs for trucking companies. For example, although the maximum cargo load is limited to 45 tons, some countries do not enforce the limit, and trucks often carry up to 75 tons.[5] Drivers often exceed their maximum number of driving hours per day, exceed speed limits to get to destinations faster, and make more trips than allowed — whether to receive overtime pay or simply because their employer requires them to do so. Companies cut corners on maintenance, and some trucks operate

in conditions that would be unacceptable in most mature markets. As a result, trucks cause thousands of accidents in the GCC each year. Overall, accidents involving heavy trucks account for at least 10 percent of road traffic fatalities, and cost up to US$8 billion per year in accidents and injuries, according to Strategy& estimates.[6]

GCC governments have invested heavily to build railways, which offer a more cost-effective, safer, and environmentally friendlier alternative to truck transport. However, given the generally short distances involved in freight delivery, only 15 to 20 percent of current freight cargo is expected to shift from road to rail.

Autonomous trucks ahead

Autonomous vehicles are already on the road. Experimental self-driving vehicles such as Google's driverless cars have travelled more than 1 million kilometers on U.S. highways since 2011.[7] Car manufacturers including Ford, Volvo, Toyota, Audi, BMW, and Daimler have announced plans for the mass production of autonomous cars in the near future.

The first commercial driverless vehicles are likely to be trucks. The development of autonomous commercial and industrial vehicles is far ahead of similar passenger vehicles. Already, driverless trucks operate in closed environments: the mining firm Rio Tinto uses driverless trucks at its iron ore mines in Western Australia, which are remotely controlled from 1,400 kilometers away in Perth.[8] In May 2015 the first autonomous truck, Daimler's Freightliner Inspiration, was licensed to operate on a public highway in the U.S. state of Nevada, and in autumn 2015 Daimler launched its first autonomous truck on German highways.[9]

Of course, the transition to fully autonomous technology will take time and the Freightliner Inspiration is only the first step. Although the Freightliner Inspiration can drive automatically on highways, a driver must be present to take control when the truck leaves highway conditions and automation is no longer possible, for example when crossing busy interchanges or driving through populated areas. Moreover, these trucks may need to undergo a decade-long period of testing and further development before they can operate on a large scale. Most industry analysts expect that fully autonomous, driverless technology will be available for trucks by 2020 and take another five to 10 years to start mass production.[10]

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A wide range of benefits

Once mass production starts, however, clear economic advantages are expected to lead to the rapid adoption of autonomous trucks. Although these vehicles will cost more initially, that disparity will likely be offset by significant savings from fewer driver salaries, improved fuel efficiency, lower accident-related expenses, and lower insurance premiums. In addition, asset utilization will increase for each vehicle, as daily driving hours will not be limited by a driver's ability to stay alert. Cargo companies therefore will need fewer vehicles, so their overall capital investment will decline. A recent Strategy& study estimates that when the autonomous truck market in Europe matures, the total cost savings can reach 30 to 35 percent over the lifetime of each truck. The lower current cost levels in the Middle East mean correspondingly smaller savings, but we still estimate that savings of 15 to 20 percent are achievable.[11]

Looking specifically at fuel efficiency, some estimates suggest that driverless truck technology would increase the efficiency of cargo trucks by 15 to 20 percent through computer-optimized acceleration and braking.[12] Autonomous trucks will also be able to "platoon," a technique in which two or more trucks travel together with only a small gap between them. This reduces drag for the trailer in front and allows the truck behind to draft in its wake. Volvo is currently developing such technology. Reduced fuel consumption would reduce costs, lead to lower emissions, and so less environmental impact. This would allow GCC governments to scale back some of their fuel subsidies.

Beyond the cost and fuel advantages, autonomous trucks could also create significant additional economic and social benefits for the GCC. The industry holds the potential to create new digital technology jobs, such as software developers, data analysts and programmers, and control center operators. Such industrial development aligns with regional initiatives to shift to a knowledge-based economy.

Moreover, autonomous trucks would reduce the region's reliance on expatriate labor. The region's trucking industry employs a large number of expatriates — currently about 1.3 million drivers, potentially growing to 2 to 3 million drivers by 2030. As with other low-paid expatriates, drivers transfer most income to their home countries and so do not contribute much to GCC economies through spending locally. Expatriate drivers could also pose security risks, especially when crossing GCC borders. In addition to eliminating truck-driving jobs, autonomous trucks would reduce the need for expatriate service staff in housing, food, cleaning, retail, and other trucking-related sectors. This is a critical difference between the GCC countries and mature markets. In developed economies, driverless trucks are already sparking debate because of their potential to eliminate jobs; whereas in the GCC, they can help countries to make good on their desire to reduce the number of low-value expatriate jobs.

The industry holds the potential to create new digital technology jobs.

A final advantage is safety. Autonomous operation will clearly reduce the number of accidents involving trucks. Estimates hold that 90 percent of accidents are due to human error, which drops substantially in driverless trucks.[13] Mechanical failures due to brakes and tires — another common cause of truck accidents — will occur less frequently as well, because autonomous trucks will be able to monitor their condition and anticipate technical problems. Governments can enforce regulations — such as weight limits, speed limits, restricted hours, access to highways — more easily, indeed even automatically, with autonomous trucks. Last, as fewer trucks will be required due to higher utilization, the region will have less traffic congestion.

Creating the right conditions

Most GCC governments have yet to adopt any policies regarding autonomous trucks, which is understandable given the nascent state of the technology. However, some governments in other areas are already taking active measures to explore driverless vehicles. For example, the state of Nevada in the U.S. has enacted regulations regarding the testing and operation of autonomous vehicles.[14] Similarly, Germany has begun developing legal guidelines for the use of driverless cars on the country's autobahns.[15]

GCC policymakers have an opportunity to take action today to create the right conditions for driverless trucks because of the substantial advantages these vehicles can bring to their countries. To that end, GCC governments should develop a holistic strategy to prepare for autonomous vehicle technology and to promote it. Policymakers face a long list of considerations. These fall into four main categories.

GCC governments should develop a holistic strategy to prepare for autonomous vehicle technology and to promote it.

First, policymakers will need to develop a legal framework that can accommodate autonomous vehicles. On the policy level, the most complex area is the allocation of liability. Currently, primary liability usually rests with the operator of the vehicle. Yet when a driver has limited control over the vehicle (or when the vehicle has no driver onboard), the liability issue changes dramatically. To address this issue, governments will need to put rules in place to allocate the liability, without creating disincentives for manufacturers. Governments can take various approaches to solve this challenge, such as taxing cargo companies and establishing an insurance pool that can reimburse accident victims. Another controversial area of the legal framework is the

set of principles that will guide the programming of the software for autonomous vehicles. This software will have to make choices in case of unavoidable accidents that could result in harm to people and property.

Second, GCC policymakers will need to develop regulations to support driverless vehicles. Standards and regulations for almost all aspects of vehicle licensing, testing, and operations will require amendments and upgrades. This includes driver training and testing, vehicle performance requirements, traffic rules, and safety regulations. For example, to allow platooning, governments will need to revise the laws regarding safe following distances. The regulatory framework will also need to address communications and data policy issues. Regulatory issues include the allocation of short-range communication spectrum, distracted driver laws, data security and ownership, as well as privacy.

Third, the region should start preparing its physical infrastructure and technology. Around the world, road infrastructure is currently designed and built with the implicit assumption that a driver in each vehicle will assess the situation and make decisions accordingly. Driverless trucks, however, require infrastructure that allows them to download and access route information and sense real-time conditions. Although the specific ways of dealing with these problems still need to be defined, governments will need to rethink their road infrastructure with driverless vehicles in mind.

Fourth, GCC governments can proactively spur the development of such technology through research collaboration with original equipment manufacturers and technology firms. For example, establishing research and development and manufacturing facilities in the region will not only benefit the industry development globally, but also put the GCC at the forefront of one of the most promising technologies in transportation.

To push the adoption of such technology, GCC governments can also provide financial and other incentives to cargo companies (such as subsidized loans to cover the cost of assets). Moreover, governments can create a "negative incentive" for conventional trucking by returning its effective cost to something approaching economic reality — through reductions in fuel subsidies, stricter enforcement of current regulations, and new technical and environmental standards.

Conclusion

GCC countries, more than any other region in the world, will benefit from autonomous trucks. The technology can reduce fuel costs, dramatically reduce the number and cost of accidents, reduce expatriate labor, and create digital technology jobs and firms. However, GCC countries will not capture these benefits by waiting for the market to develop on its own. Instead, policymakers need to take deliberate action today in order to create the right conditions for autonomous trucks to thrive.

A strategic program that can spur the development and adoption of commercial self-driving vehicles includes four dimensions: a legal framework, new regulations, suitable road infrastructure, and partnerships with manufacturers. By thinking proactively about these issues, GCC countries have a chance to get ahead and become global leaders in an evolving technology.

Endnotes

[1] The GCC countries are Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

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