



Israel's Self-Driving Future

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What will the car of the future look like? It may not be long before we know. In early February, Ford announced that it will allocate a staggering \$1 billion over the next five years to develop the first fully autonomous vehicle, and almost every global automaker is working feverishly to create the ultimate self-driving machine. The consensus is that people will soon be using "Jetsons-like" cars powered not by humans but by smart computers.

But policymakers and businesses interested in the car of the future should look beyond the traditional industry hubs in Detroit, Frankfurt, and Tokyo to a place that might appear to be an unlikely location: Israel.

COMPARATIVE ADVANTAGE

Fiat Chrysler, Ford, General Motors, Google, Lyft, and Uber are testing autonomous cars in six U.S. cities. Volvo recently announced that it intends to test its self-driving cars in China, and industry experts predict that fully autonomous cars will be on the road by 2030 and that revenue from this industry will grow to \$40-\$60 billion by then. Israel is playing a major part in all this, developing a significant number of the technologies required to enable self-driving vehicles to run.

Future cars will use less sheet metal and iron and rely more on software. Engineers must overcome huge challenges to seamlessly integrate cutting-edge computer chips, communication devices, and data analytics, all while protecting vehicles and drivers from potential cyberattacks. Israel's strong military and academic culture, along with its edge in information technology and cybersecurity, gives it a competitive advantage.

Israel has more than 5,000 startups and 750 venture-capital-backed companies, and the country attracts more venture money than any other country in the world relative to the size of its economy. In addition, Israel's so-called Silicon Wadi, or valley, has the second largest number of technology startups per capita, right behind California. Even though Israel lacks a native automobile production industry, companies focusing on this global sector comprise about 15 percent of Israel's industry sector businesses, and their numbers are growing steadily. In the last two years, Israeli automotive startups have raised \$820 million, according to Yoram Oron, founder of Vertex Ventures and a member of the Singaporean sovereign wealth fund Temasek Holdings. In addition, over 500 Israeli companies are currently focused on creating the infrastructure for driverless vehicles.

Israel's automotive companies primarily fall into one of four categories: electric cars, autonomous vehicles, smart mobility, or conventional vehicle technology. For the most part, the successful companies have developed strategic partnerships with global car manufacturers. In fact, it should come as no surprise that auto giants and their executives are flocking to Silicon Wadi to meet with and invest in local companies. In 2016, Volkswagen invested \$300 million in Gett, whose platform is similar to Uber's, to kick-start its fleet of smart vehicles. The German auto goliath also invested in a cybersecurity firm owned in part by Yuval Diskin, former head of the Shin Bet security agency. Last July, BMW and Intel signed a collaboration agreement with the Israeli firm Mobileye to produce a fully automated car by 2021. Mobileye's revolutionary technology - a device that emits a sound if the vehicle gets too close to the car ahead or the driver veers out of his lane in an unsafe way - is being integrated into cars manufactured by Audi, General Motors, Hyundai, Renault-Nissan, Tesla Motors, and Volvo. NNG, whose headquarters are in Hungary, bought Israeli automotive cybersecurity firm Arilou, and Ford bought Israeli company SAIPS, which specializes in both computer vision and machine learning. The list goes on. "Israel is a highly developed business location," says Dr. Volkmar Denner, CEO of the world's largest supplier of automotive components, Robert Bosch GmbH. "Relative to its population, no other country is as innovative."

SUPERCHARGED

For now, the auto industry and governments worldwide should consider a number of ideas to supercharge the development of an autonomous vehicle industry.

Israel has over 250 research and development centers owned by multinationals. Last year, General Motors and Daimler joined ranks to form such a center, and Honda and Volvo teamed up in February to establish an innovation center in Tel Aviv. Daimler's center "is aimed at boosting the global R&D array with the help of Israel, the high tech nation," notes Professor Thomas Weber, who was previously responsible for Daimler Group research and Mercedes-Benz Cars development. Other American, Asian, and European car manufacturers should consider establishing similar centers, in addition to directing their venture capital funds to invest in promising Israeli companies as a way of further accelerating their growth. Israeli technology companies have been extraordinarily successful in fostering innovation in fields that directly affect the autonomous car industry: cybersecurity, communication, computer vision, sensors, and artificial intelligence.

Auto manufacturers should likewise establish in-house incubators for joint ventures with talented Israeli startups to test their technology. Depending on the stage of development, car companies could provide seed funding, but more importantly, senior executives should be incentivized to provide guidance and insight to encourage innovation. Sponsors could take a small royalty on future sales, but above all, startups would have access to experience and brainpower with an eye to promoting a better society.

Government agencies have an important role to play as well. Last May, U.S. Transportation Secretary Anthony Foxx and his Israeli counterpart, Yisrael Katz, signed a formal partnership to examine autonomous vehicles. This involved a Memorandum of Cooperation stating that Israel will build a \$40 million center to develop autonomous vehicles, paid for equally by Israel and the United States. They also pledged to collaborate on cybersecurity best practices and share successful models of public-private partnerships. European and Asian governments should follow suit and structure similar relationships with the Jewish state to exploit Israel's competitive advantage for their own benefit.

Following Foxx's visit to Israel, the U.S. government took an important step with an Israeli company to implement "smart" policies. Last November, as part of the Smart City Challenge, the U.S. Department of Transportation chose Columbus, Ohio as the recipient of \$40 million in "smart car" grants to support its advanced transportation projects, including outfitting the city's public bus system with Mobileye. And in February 2017, Mobileye installed its anti-crash technology on 4,500 rideshare cars in New York City.

Michigan is exploring joint opportunities with Israel as well. Last December, Governor Rick Snyder signed into law a bill allowing autonomous cars and taxis on public roads with no driver in the front seat. The governor followed up the next month with a trip to Israel, where he met with a wide variety of companies in the auto industry. "Israel has an important role in the development of autonomous vehicle technology," says Snyder. "The United States, and Michigan in particular, [have] a lot to learn from the Jewish state and we welcome their expertise." Snyder should consider following the lead of California's Jerry Brown, who signed a Memorandum of Understanding with Prime Minister Benjamin Netanyahu in 2014, as Michigan would benefit from techniques pioneered by Israeli scientists and engineers in this emerging field. In addition to Michigan, four other U.S. states - California, Florida, Nevada, and Tennessee - and the District of Columbia have passed autonomous driving laws. If the Wolverine State wishes to remain at the head of the pack in terms of technological innovation, it would serve its interests well to work closely with Israel. This type of agreement would also encourage exchanges of startup delegations, summits, and above all, a heightened awareness of capabilities.

Finally, the Self-Driving Coalition for Safer Streets, the auto industry's autonomous-driving lobbying organization, would benefit from meeting with Israeli policymakers and industry leaders, which so far has not happened. The members of this coalition, launched in April 2016 to foster policies that advance self-driving vehicles and realize the industry's full potential, include Ford, Google, Lyft, Uber, and Volvo.

The automotive industry is undergoing a transformation. In the not-too-distant future, how humans use their cars will fundamentally differ from how they use them today. Policymakers, industry experts, and drivers should strap on their seat belts and get ready. As the auto industry transitions from semi- to fully autonomous vehicles, it should continue to look to Israel to help it cross the finish line as quickly and safely as possible.

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