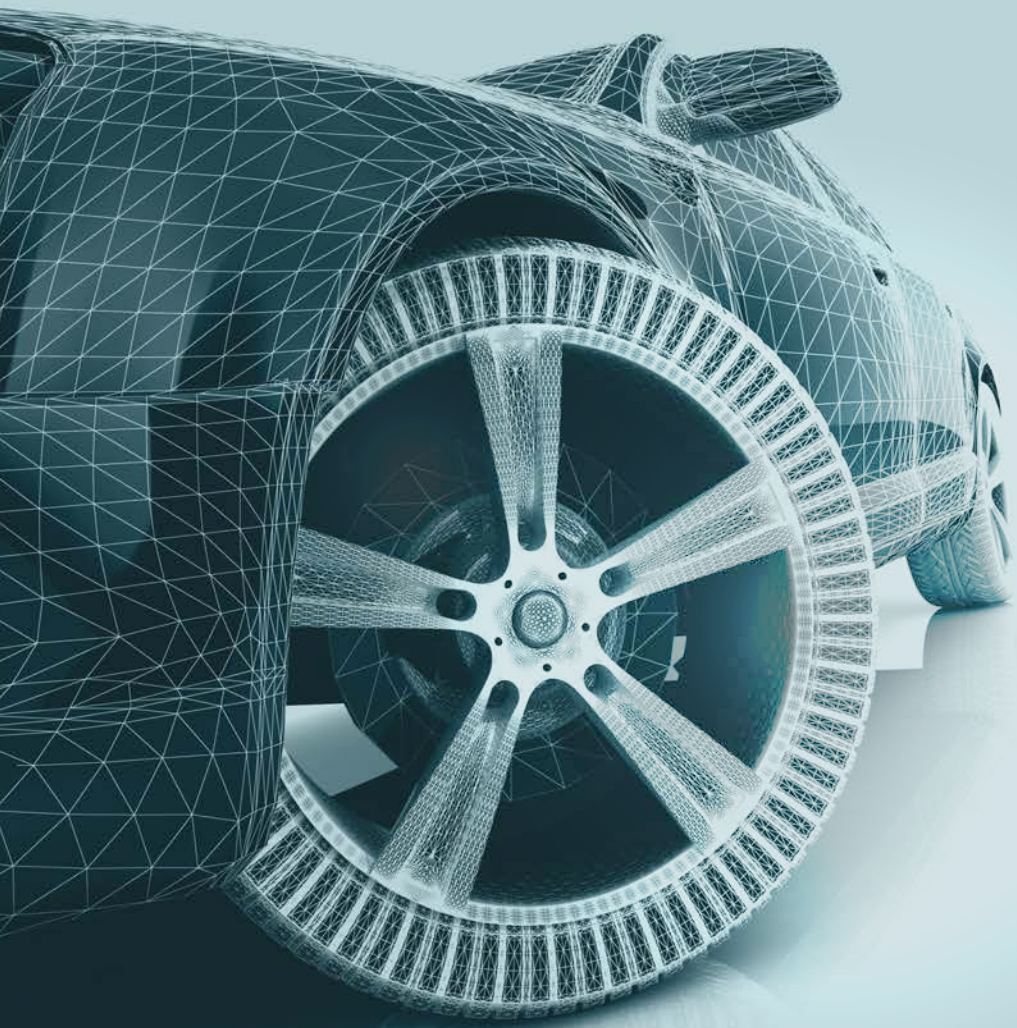
AROBS
Transilvania Software

Automotive Technology Outsourcing in Romania

Offshore and Nearshore - *Whitepaper2020*



arobs.com

Table of content

"It's not the end of the world. It's the beginning of a powerful, all-new world."

Scott Keogh, President of Audi America

"And an all-new world is built upon partnerships."

Voicu Oprean, AROBS Founder&CEO

The **automotive industry** has seen incredible growth in recent years. However, like most industries, it is hard-hit by the consequences of the new coronavirus. The restructuring of the global economic order is imminent.[1] Even though the industry will suffer, specific sectors will flourish.

This is an excellent opportunity to *rethink* the future of the automotive industry.

The disruption in the automotive industry happened before any biological disaster. The rapid adoption of sustainable vehicles and new R&D directions towards autonomous driving and shared mobility have changed the sector's course. Therefore, this dramatic global change has only accelerated specific trends that were already on their way.[2]

Another change in the industry amid COVID-19 is the reluctance of people to use means of public transportation. A recent study by IPSOS asked 1620 Chinese citizens about how the virus is changing their habits. Respondents indicated their desire to travel in protected spaces. **Two out of three** respondents said they **prefer a private car to public transportation, double the number compared to before the COVID-19 outbreak.**[3]

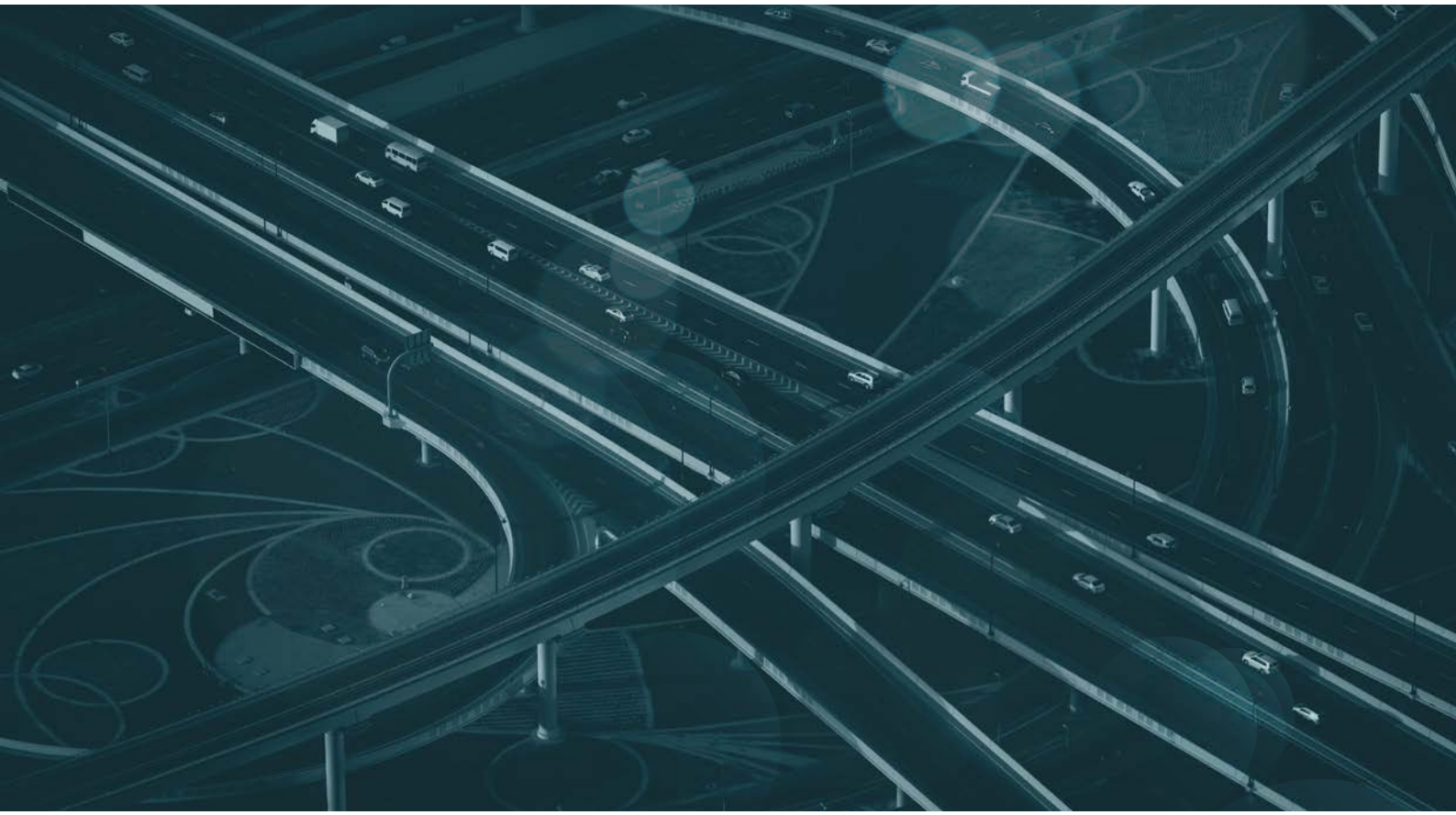
Furthermore, some automobile producers are very optimistic.

Volkswagen CEO Stephan Wöllenstein said earlier this year, *"I expect the car business to reach last year's level in early summer."* [4]

Similarly, Mercedes-Benz's CEO in India talks about the shaping impact of this crisis with a positive attitude.

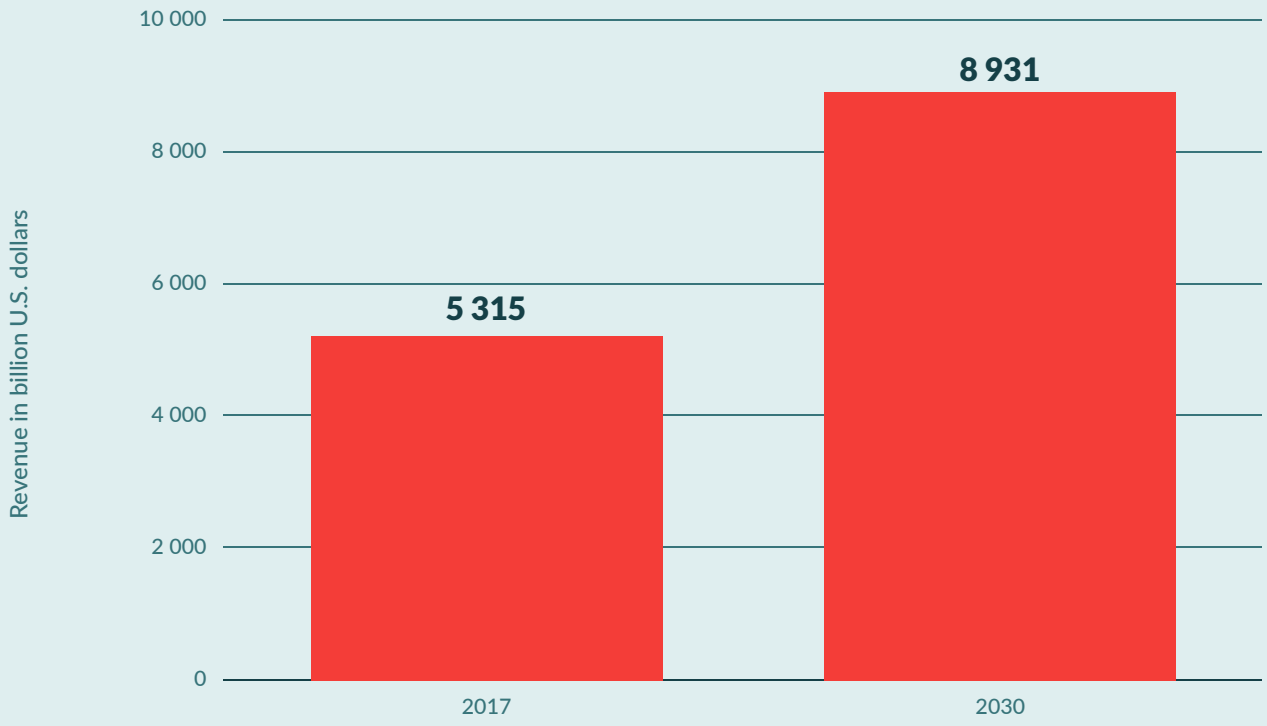
"We will not cancel any of our major planned initiatives as we want to continue to create customer interest and demand. We are not immune from the overall slowdown in consumption and spending. Hence, we have to re-calibrate and re-prioritize our objectives for the year and the short-term. For instance, we will have our key product introductions and customer outreach initiatives. However, we may adopt new ways of doing things; depending on further development, there might also be delays."[5]

Furthermore, he claimed that a new way of doing things is online automotive sales. A strategy that they implemented starting only last year. The consumer response so far is positive.



The automotive market

While the future is uncertain, forecasts show a long-term growth of the global automotive revenue, which is expected to reach almost **USD 9 000 billion by 2030.**



Source: Statista 2020

Disclaimer: Any mention of an automotive brand is strictly informative. The brands in AROBS' portfolio are nondisclosed.

The beginnings

The 19th century brought the automobile to humanity. Although it originated in Europe, the US took over and dominated the industry in the first part of the 20th century due to the invention of mass production. Later, Western Europe and Japan forcefully entered the industry.

It started with **steam engines** and **electrical engines**, but **gasoline engines** proved to be more efficient and hence, dominated the industry.

After WWI, there were only three major players in the industry, lead by Ford, GM, and Chrysler.[6] These three companies together held the three-fourths of the American automotive industry.
Between 1919 -1939, the European automotive market has seen progress as well. Peugeot, Renault, and Citroën emerged in France, Benz, and Volkswagen in Germany, and Italy was starting to get recognized for well-engineered sportscars.

During WWII, the industry has quickly reinvented itself for war needs and proved its military value.
After the war, the automotive industry regained its original purpose and expanded significantly. In the 1980s, Japan emerged to the scene with companies like Nissan, Honda, and Toyota.

Today the biggest challenge of the industry is the COVID-19 pandemic, which has already shaken economies. Since many countries, like the USA, heavily relies on the automotive industry, the country's handling of this crisis is strongly interlinked with the repercussions on the industry.

Production by country

According to data from the International Organization of Motor Vehicle Manufacturers in 2019[7], **China** is the most prominent auto vehicle producer in the world, followed by the **USA** and **Japan**.

Country/Region	Total
Total	91786861
China	25720665
USA	10880019
Japan	9684298
Germany	4661328
India	4516017
Mexico	3986794
South Korea	3950617
Brazil	2944988
Spain	2822355
France	2202460

Source: Organization of Motor Vehicle Manufacturers, Production statistics

Automotive in the European Union

European automotive history goes back a long time. Throughout the years, it has become a crucial sector. It provides **13.8 million jobs to Europeans**, which accounts to **6,1% of the total employment in the EU.** [8]

Also, this is the sector that benefits from the most significant private investors in research and development, led by the European Commission. The aim is to strengthen competitiveness and global technological synchronization.

One of the most attractive markets for **automotive technology outsourcing** or **engineering services** is Eastern Europe. Particularly, Romania.

Romania's automotive market

Romania is well-known in the automotive industry for pre-revolution brands like ARO and Oltcit, but its most popular brand is Dacia. Throughout the communist era, **Romania was the biggest automobile producer of Central and Eastern Europe.**

According to the Association of Automobile Constructors in Romania, **Romania is the 4th largest automotive manufacturer in Central and Eastern Europe**, with over 600 automotive OEMs opening here just in the last ten years.[9]

In 2020, the automotive industry generates about **14% of the nation's GDP** and **27% of its exports**, employing over **230 000 people.**[10]

Given these statistics, Romania is an attractive offshore and nearshore destination for developed countries.

Disclaimer: Any mention of an automotive brand is strictly informative. The brands in AROBS' portfolio are nondisclosed.

Romania's competitive advantage

While Romania is well known as an automotive manufacturer, in recent years, the country has become known as a **software technology outsourcer.**

EU membership

Romania's accession to the EU in 2007, and the processes that the country went through before it, accelerated its development. This membership proves the **country's economic and political stability** and a shared structure based on European values.

Functioning market economy

With a functioning market economy, it offers **an outlet for foreign investors looking for long-term partnerships.** The leading indicators of the functioning market economy are a balance of supply and demand, no entry and exit barriers for new companies, macroeconomic stability, sustainable public finance, and such a development of the financial sector that savings can be redirected to the private sector.[11]

Open culture

Agility and rapid adoption of a global culture transformed the academic cities into talent hubs that generate over **125 000 professionals working in outsourcing**, which amounts to 1.5% of the country's active population.[12] Due to renowned universities, the country's engineering culture is blooming.

Disclaimer: Any mention of an automotive brand is strictly informative. The brands in AROBS' portfolio are nondisclosed.

Besides competence, Romania's youth has high-level English proficiency, and speaking a third language like French or German is common.

Over 500 000 scientists and engineers

Romania ranks **8th on the list of European countries** with the highest number of engineers and scientists,[13] with over 525 300 professionals, based on data from 2018. This makes Romania, alongside Poland, the only country on the list of 8, that previously belonged to the Eastern Bloc.

Many of these engineers are working in the automotive sector. This creates a pull effect for foreign investors that rely on business and engineering expertise.

Cost-effectiveness

There are multiple reasons for outsourcing. However, the main benefit comes from the difference in the cost of living between countries. Therefore, countries where the cost of living is lower, represent a highly attractive destination for outsourcing, since high-end projects can be implemented cost-effectively.

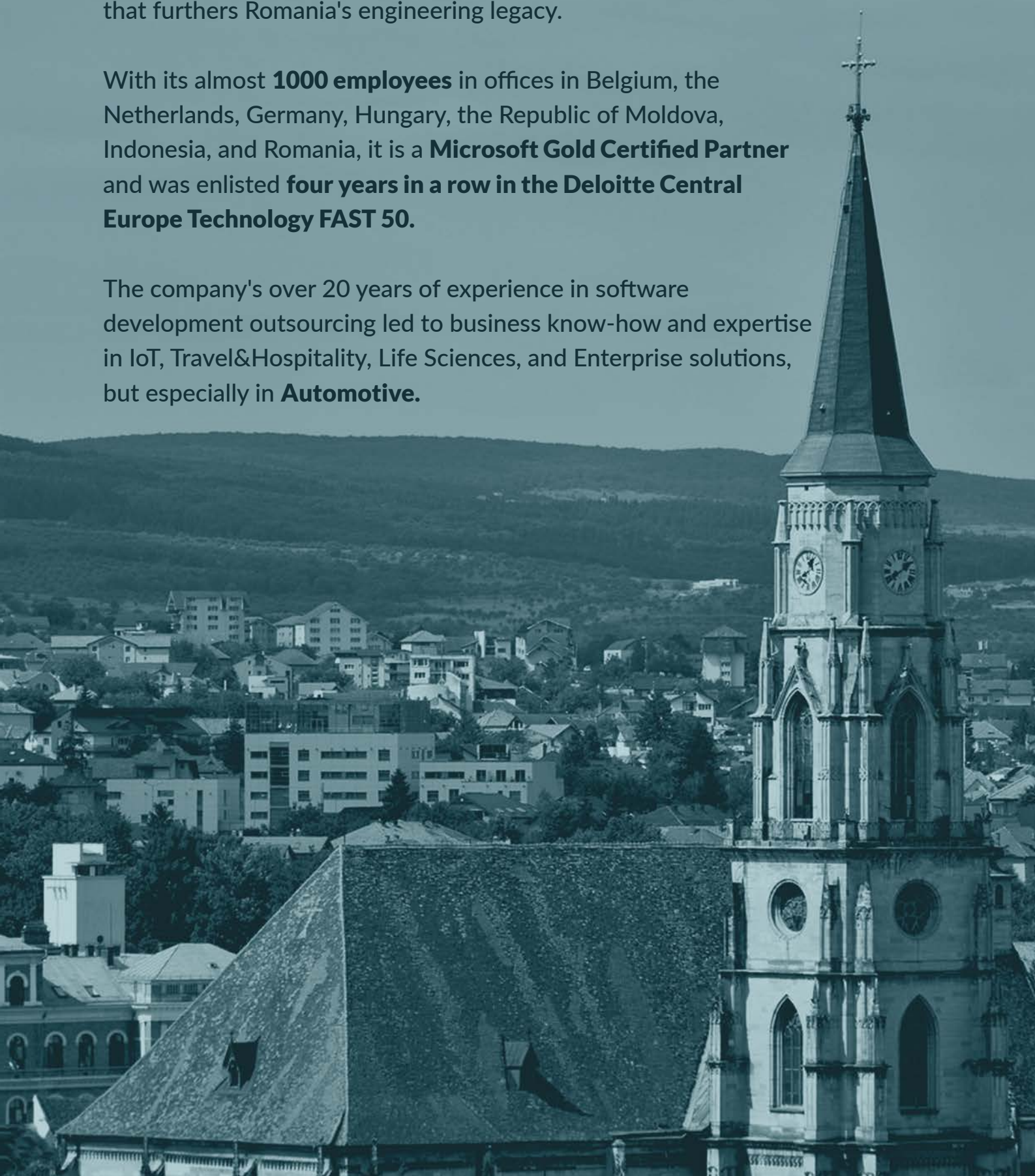
In Romania, the cost of living is about **50% lower** compared to West Europe.[14]

AROBS

AROBS is a leading software development company in Romania that furthers Romania's engineering legacy.

With its almost **1000 employees** in offices in Belgium, the Netherlands, Germany, Hungary, the Republic of Moldova, Indonesia, and Romania, it is a **Microsoft Gold Certified Partner** and was enlisted **four years in a row in the Deloitte Central Europe Technology FAST 50.**

The company's over 20 years of experience in software development outsourcing led to business know-how and expertise in IoT, Travel&Hospitality, Life Sciences, and Enterprise solutions, but especially in **Automotive.**



AROBS automotive

AROBS' automotive team consists of over *450 automotive engineers* internationally. These professionals have high-level embedded expertise with a highlight on *C++ and Linux*.

This expertise translates into high-level software engineering services, including *Body Control Modules, Gateway ECUs, Door Control ECUs, Power closures, ADAS, Radars, Car Keys, Wireless chargers, Instrument Clusters, Head-Up Displays, Secondary Displays, Infotainment Systems, Embedded*, and *Telematic units*.

Furthermore, these teams are able to develop software for almost any platform (Linux, Windows, RTOS).

Disclaimer: Any mention of an automotive brand is strictly informative. The brands in AROBS' portfolio are nondisclosed.

Safety, data security, and agility

Any competitive company in the automotive industry must ensure safety, security, and agility.

Accelerated by the current pandemic, the market demand is starting to shift towards autonomous driving and electric vehicles, a fact that further stresses the importance of safety, security, and agility.

Functional safety

Safety is a top priority in the automotive industry. To assure it, it needs to be implemented in every part of the process. **ISO 26262** is a risk-based safety standard that ensures the avoidance of multiple types of possible failures. This international standard is also known as *functional safety.* At AROBS, all automotive processes are ISO 26262 compliant, making the output reliable, hence, functional within the automotive industry supply chain.

Security and data security

Scalability is one of the main factors that led to the development of the automotive industry. On the other hand, it makes original pieces of equipment highly valuable; hence patents are becoming increasingly essential to maintain market position. Therefore, *companies that can ensure confidentiality and data security have a competitive advantage.*

Disclaimer: Any mention of an automotive brand is strictly informative. The brands in AROBS' portfolio are nondisclosed.

AROBS is consistent in its compliance with the following international standards: ISO/IEC 27001, ISO/IEC 15504 (revised ISO/IEC 33001), and Automotive SPICE.

Agility with AUTOSAR

AUTOSAR (Automotive Open System ARchitecture) is a global partnership that aims to standardize software architecture in the automotive industry. Its wide adoption is due to its three significant benefits: *standardization, reusability, and scalability.*

Based on layered architecture, any possible change in the process has a minimal effect on interconnected areas. This enables rapid, cost-effective, and hence, **agile** response to the market needs.

agility

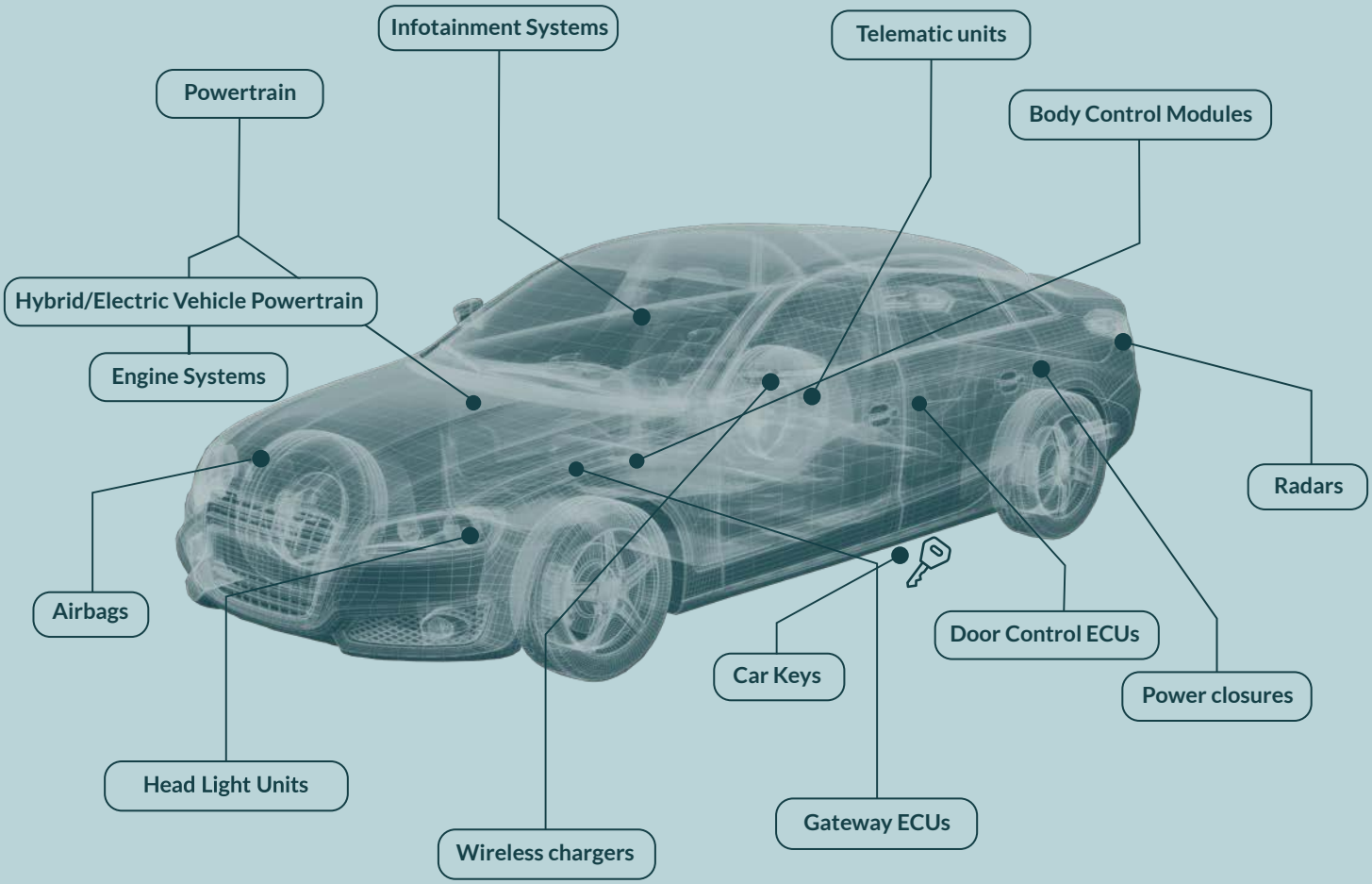
Engineering expertise

- applications and essential software (requirement engineering, SW architecture, code construction, software integration)
- software/system testing (system software development, quality assurance, assurance engineering)
- system engineering and safety engineering
- hardware (hardware layout engineering, automotive electronics, bus com. mixed-signal/PCB design)
- mechanical (design and prototyping)
- the technical project leading and software project management, all following Automotive SPICE and AUTOSAR standards.

Disclaimer: Any mention of an automotive brand is strictly informative. The brands in AROBS' portfolio are nondisclosed.

Automotive products

AROBS' expertise covers but is not limited to the followings:



Disclaimer: Any mention of an automotive brand is strictly informative. The brands in AROBS' portfolio are nondisclosed.

Light Control Units

Light Control Units or LCUs create intelligent lighting with innovative control concepts. These are responsible not only for the vehicle's lighting but also for signaling.

LCUs automatically select the light pattern based on external factors. Additionally, they offer adaptive front lighting systems and adaptive driving beams.

Powertrain – Engine systems

There is a constant need for better engines that are more efficient in performance and environmentally. The main components, that are responsible for generating power, need software development as well. Our expertise incorporates application for both ICEs (Internal Combustion Engine) and PHEVs (Plug-in Hybrid Electric Vehicle).

Infotainment – Secondary displays

Infotainment assures connectivity and entertainment when on the road, from radio to getting online. At the same time, it provides essential data like navigation, combining entertainment with information. Autonomous driving and advanced driver-assistance systems are already taking charge of many car features. Infotainment will continue to be a critical factor in enabling the driver's independence.

Human-machine interface – Head-up display

A head up-display projects the essential data to the windshield so that the driver is focused on the road without any interruption. It provides vital information displayed at the driver's line of sight.

It requires technical expertise in 2D and 3D color graphics, cruise control, adaptive cruise control, tachometer, fuel content indicator, battery capacity indicator, and electric power meter.

Gateways

Automotive gateways are ECUs that enable secure and reliable communication among the vehicle's electronic systems. It serves a critical role in vehicle security as it performs data routing functions, and supports new, vehicle-wide applications. Modern ECUs (TCUs) can also connect to the cloud or the internet, as the demand for this kind of in-car connectivity grows.

Body control module

A Body Control Module (BCM) operates all the required vehicle body functions such as windshield wiper control, exterior, and interior light control, central door locking control, and car access through communication between ECUs. It centralizes and controls the functions of the vehicle's body without controlling any of the engine's features.

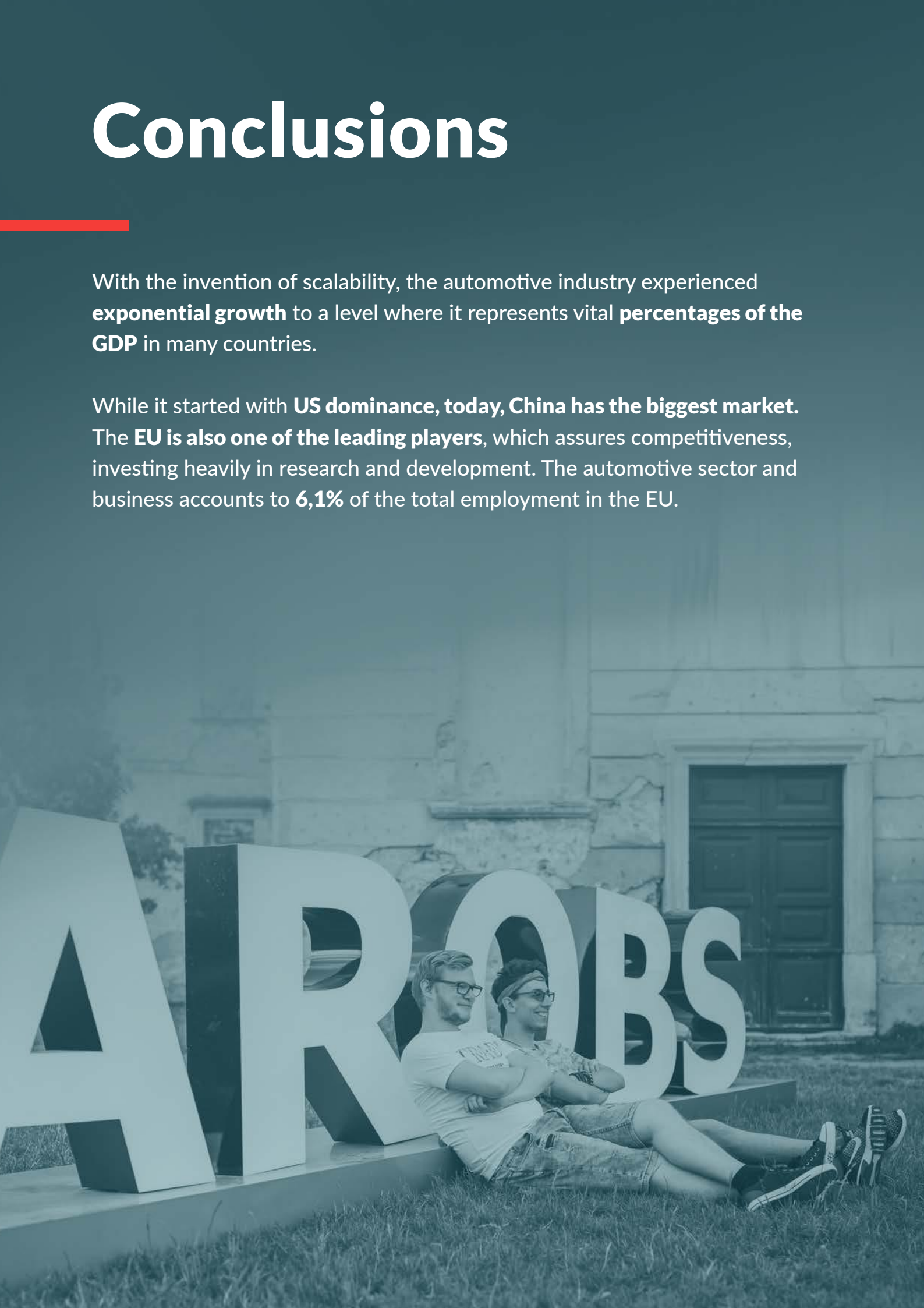
Access systems

Access systems permit or deny access to the car. To satisfy market demand, these systems get more complex, more secure, and more digital. Aligning with the market, we focus on innovation and user-friendly access for the driver's comfort.

Conclusions

With the invention of scalability, the automotive industry experienced **exponential growth** to a level where it represents vital **percentages of the GDP** in many countries.

While it started with **US dominance, today, China has the biggest market.** The **EU is also one of the leading players**, which assures competitiveness, investing heavily in research and development. The automotive sector and business accounts to **6,1%** of the total employment in the EU.



Romania is one of the most attractive destinations for investors in the automotive industry. This sector currently represents 14% of the nation's GDP and 27% of its exports, employing over 230 000 people. As a destination for international automotive clients, its competitive advantages are a **functional market economy**, the **EU membership**, the **open culture** and a **high number of engineers and scientists**.

AROBS is **one of the biggest companies on the Romanian software development market.** With a team of almost 1000 members spread across seven international offices, the company relies on over 20 years of experience and business knowledge in various industries.

With almost half of the team working for the automotive industry, AROBS furthers the country's **engineering culture** through an **open culture, inclusiveness**, and **competent embedded professionals.**

Providing **quality engineering services** to top brands in the industry, AROBS continuously invests in its agility, data security, and relevant industry standard compliance. This makes the company not only competitive but attractive to international clients.

Amid the COVID-19 pandemic, the automotive industry was highly affected. However, agile companies with well-designed inside architecture not only survive but are destined to thrive in the post-pandemic era.

Disclaimer: Any mention of an automotive brand is strictly informative. The brands in AROBS' portfolio are nondisclosed.

Sources

[1]https://www.mckinsey.com/featured-insights/leadership/the-future-is-not-what-it-used-to-be-thoughts-on-the-shape-of-the-next-normal

[2]https://www.thinkwithgoogle.com/consumer-insights/auto-industry-impact-during-coronavirus/

[3]https://www.volkswagenag.com/en/news/stories/2020/03/chinese-customers-rely-on-the-safety-of-their-own-cars.html

[4]https://www.volkswagenag.com/en/news/stories/2020/03/chinese-customers-rely-on-the-safety-of-their-own-cars.html

[5]https://www.moneycontrol.com/news/technology/auto/covid-19-lockdown-will-rethink-our-business-mercedes-benz-india-ceo-5136991.html

[6]https://www.britannica.com/technology/automotive-industry/Ford-and-the-assembly-line

[7]http://www.oica.net/category/production-statistics/2019-statistics/

[8]https://ec.europa.eu/growth/sectors/automotive_en

[9]https://www.automotive-today.ro/index.php/2018/11/12/romania-to-rise-as-regional-automotive-hub/

[10]https://www.zf.ro/auto/cum-facem-ca-economia-sa-functioneze-in-continuare-industria-auto-o-zi-de-oprire-a-productiei-industriei-auto-in-romania-genereaza-o-scadere-de-business-de-124-milioane-euro-19017650

[11]http://ceswp.uaic.ro/articles/CESWP2010_I1_INC.pdf

[12]https://business-review.eu/business/the-outsourcing-industry-125000-employees-generating-eur-4-billion-every-year-187134

[13]https://business-review.eu/business/romania-has-more-than-525000-scientists-and-engineers-the-8th-biggest-number-in-the-eu-184843

[14]http://investromania.gov.ro/web/why-invest/cost-of-living/

Looking for a reliable *automotive* engineering partner?

Let's work together!

AROBS
www.arobs.com
arobs.sales@arobs.com
Cluj-Napoca
44-46, Henri Barbusse Street, 400616,
Phone: +40 264 202 116

AROBS
Transilvania Software