

TRENDS IN **SUSTAINABLE TRANSPORTATION**

CASE APPROACH FOR
INDIAN AUTO INDUSTRY



NOBUTAKA
KAZAMA



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Indian Auto Industry

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PREFACE

TRENDS IN SUSTAINABLE TRANSPORTATION

As of 2022, the Indian automobile market has increased to the point where it boasts 4.73 million units, making it the third-largest market in the world. However, according to the 2021 National Family Health Survey, the car ownership ratio in India is only 8% of Indian households (corresponding to ownership of 22 cars per 1,000 people), and the Indian car market will continue to expand rapidly with continued GDP growth. The IMF announced that by 2026, India's GDP would overtake Japan's to become the world's third-largest.

Despite the market's growth, urban areas in India are grappling with worsening issues such as air pollution, noise, traffic congestion, and accidents. Addressing these social issues is urgent. In response, the 'CASE revolution' in the automotive industry is gaining rapid attention and is a topic of active discussion worldwide.

The 'CASE revolution' is a 'once-in-a-century' transformation in the global automotive industry, named after the initial letters of its key components: **C**onected, **A**utomated / **A**utonomous, **S**hared & **S**ervices, and **E**lectrification. This revolution is expected to shift the current business paradigm of internal combustion engine-based vehicles and single-car ownership per family. It aims to create a sustainable society through green transformation (GX) via electrification, car-sharing, and digital transformation (DX) through connectivity and autonomous driving.

On the other hand, green transformation aims to realize a "decarbonized society," and car electrification has rapidly attracted attention, particularly in Europe, China, and the United States. In these countries, car electrification focuses on BEVs. Nevertheless, this electrification includes battery electric vehicles (BEVs), hybrid electric vehicles (HEVs), plug-in hybrid vehicles (PHEVs), and fuel cell vehicles (FCVs).

Suppose local Indian conditions such as insufficient charging facilities, relatively low-income levels, and a power source composition centred on coal-fired power are considered. In that case, all options for electrification, including HEVs, should not be excluded. However, Japanese carmakers with strengths in HEVs could utilize their knowledge and technology.

On the other hand, digital transformation is about enhancing the user experience (UX) by enabling the download of software and applications at any time and from any location with an Internet connection (OTA, Over the Air). This innovation has the potential to significantly improve user experience (UX) through autonomous driving, taking it from the current level 4 (self-driving under certain conditions) to the ultimate level 5 (fully automated driving). These autonomous driving systems are expected to be a game-changer, fueling the rapid growth of car-sharing services.

The advent of these technological innovations is poised to significantly alter the traditional automobile industry's landscape, prompting a shift in its operational dynamics.

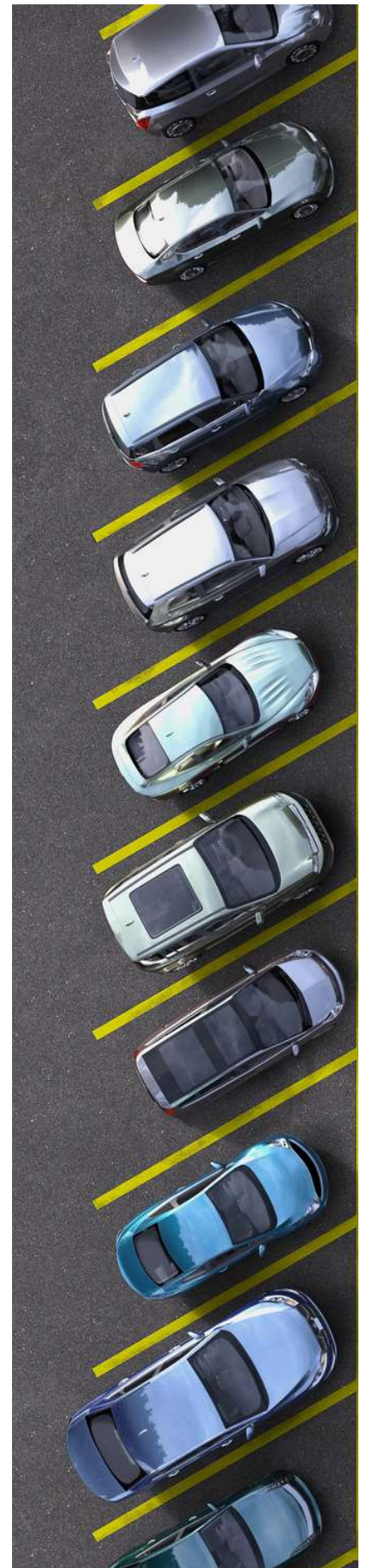
Simultaneously, Digitalisierung and electrification of cars are said to lead to fundamental changes in production systems (modular production systems and high-level automation), and the vertically integrated supplier structure (high-level integral architecture) will undergo a significant shift to a horizontally specialized supplier structure (modular architecture such as computers and smartphones) (Nakanishi,2023).

Furthermore, car performance will be defined by software, and this will shift from a hardware-focused model to a software-focused model. Competitiveness is directly linked to how quickly unique software can be developed and provided to consumers. Here lies the potential for India's future development: This car software development in India is a major attraction for Japanese automakers.

As mentioned above, Indian and Japanese automakers have mutually beneficial strategic relationships.

This research program is designed to illuminate the specific cooperation outcomes between Indian and Japanese carmakers. Through case studies of concrete 'Case Revolution' practices in India, we aim to comprehensively understand the dynamics in this strategic relationship.

Nobutaka Kazama





PUBLISHER'S NOTE

TRENDS IN SUSTAINABLE TRANSPORTATION

The Mizuho India Japan Study Centre (MIJSC) was established as a unique Centre of Excellence at the Indian Institute of Management Bangalore (IIMB) to increase India's presence in Japan and Japan's presence in India. This Centre is committed to sponsoring publications that focus on critical areas of interest to decision-makers through experience sharing between India and Japan, thereby helping to strengthen the bonds at all levels.

To move forward with this vision, MIJSC has been working with many Japanese universities, researchers, and experts. This partnership has ensured close interactions between researchers in both countries so that they can work together on projects of mutual interest. However, for the decision-makers in India – from industry, academia, and policymakers – the Centre is sponsoring papers that can be directly used to make informed decisions about critical areas of concern.

Professor Nobutaka Kazama is a well-known expert in auto industry research. His seminal papers on comparing Japanese and German approaches in the auto industry have been well acknowledged and have helped a deeper understanding of the trends in the auto sector. By inviting Prof. Kazama to write this paper on trends in sustainable transportation, the Centre hopes to bring out the pros and cons of the various global approaches towards sustainable transportation and help the decision-makers make informed decisions about India's approach towards sustainable transportation.

To help Prof. Kazama understand the dynamics of the Indian market, the Centre arranged for industry interactions across many industry verticals. Leading industries in software development, auto OEMs (both Indian and Japanese) and auto component manufacturers were introduced for in-depth discussions, which has helped Professor Kazama distil the opportunities and challenges of the Indian market.

We are sure that this paper will not only help decision-makers gain deeper insights into the Japanese and global approaches but also help students and researchers build a strong understanding of the trends in this fast-evolving field. We hope this will trigger other researchers, academics, practitioners, and policymakers to trigger a movement towards sustainable transportation in India.

Saideep Rathnam
Chief Operating Officer
Mizuho India Japan Study Centre



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