

# Accelerating Industry 4.0 Involvement via Sophisticated In-House Solutions





# BOSCH

**Bosch Malaysia is a multi-national company that was established locally in 1972, and operates within several locations in Malaysia. Robert Bosch Malaysia (RBMA) Sdn. Bhd., a subsidiary of the Bosch brand in Penang, focuses on car multimedia products within mobility solutions. In 2017, the mobility solution business sector contributed over 60% of Bosch's global sales. Besides Malaysia, Bosch in China and Portugal also produce car multimedia products to fulfill the escalating demand around the world.**

Its three manufacturing plants in Penang produce car multimedia, power tools and automotive steering systems. In 2017, total net sales of overall Bosch Malaysia had reached RM 5.2 billion (1.1 billion euros). RBMA is set to increase the total headcount to about 2,000 associates by end of 2018.

The car multimedia (CM) division in Penang which specialises in the manufacturing and Research and Development (R&D) of car multimedia products envisions its business to provide exciting mobility, as well as enjoyable and safe experiences for its consumers. The division aims to offer high quality solutions, to shape interfaces in line with the need of passengers, as well as creating the vehicle as the third living space - a private space in which passengers are able to have an exciting, enjoyable and safe experience.

To support the long-term target of the CM division, especially in the sustainability of its profitability and growth, the division builds valuable competencies for Bosch in complex software (SW) and electronics in the fast-changing environments.

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"Bosch Dual Strategy introduced by Bosch in Germany offers a good symbiosis nature between the leading provider and the leading user for continuous improvement of the Industry 4.0 solution set creation, innovation and application that would establish more efficient operations and generate revenue to the company globally."

**Mr. Yap Thoong Poh,**

Head Deployment Business Excellence Department  
& Technical Engineering Function Department

## Embarking Industry 4.0 with Bosch Dual Strategy

Bosch, the parent company, is also a leading internet of things (IoT) company that possesses all the core competencies required to shape Industry 4.0. The company digitalises and connects its own plants, offers customised solutions, and optimises working conditions. In 2013, Bosch officially started the Dual Strategy, which comprises two main strategies, namely 'Leading Provider' and 'Leading User'.

The Leading Provider solution strategy is designed to build the most practical and innovative Industry 4.0 solution set (products and systems) that are relevant to the requirements of the Leading Users which could comprise of all divisions in Bosch worldwide. Meanwhile, the Leading User strategy is where subsidiaries have the opportunity to select, implement and also co-create the suitable Industry 4.0 solution set for their operations, which are created by the Leading Provider for industry 4.0 implementation.

Bosch combines their expertise from their own manufacturing activities with their competence as a Leading Provider of industrial solutions along the value stream. As a Leading User, Bosch is not only optimising their own worldwide manufacturing base in numerous plants, but also actively seeking to work with partners around the world to build a value creation network beyond company boundaries and turning Industry 4.0 into reality.

By 2020, Bosch wants to have utilised the potential of Industry 4.0 to save a billion euros at its own sites and generate a billion euros in additional sales. With roughly 280 Bosch plants, there are over 60 Industry 4.0 related products and services in its portfolio and 700 storages worldwide.

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## Industry 4.0: Involvement and Integration

As an effort to sustain its position amidst the growing market and technological challenges, the CM division invests in its Industry 4.0 solutions to strengthen its business performance, alongside initiatives to improve the efficiency and effectiveness of its operations.

The CM division also envisages to become a valuable and competitive Industry 4.0 player within the global Bosch Group by setting up a holistic cross-plant approach and roadmap in Industry 4.0, parallel to its focus on the corporate Industry 4.0 solution sets.

The journey to partake in Industry 4.0 began with the formation of the Industry 4.0 core team in Q1 2016. The core team consists of key roles in the CM central division in Germany and the plant levels. The CM Industry 4.0 roadmap has been developed to outline the planning and implementation within a three-year timeline. Interdisciplinary collaboration, the linking of information and manufacturing technologies, and IT know-how will become increasingly important.

As Industry 4.0 is a journey that requires long-term planning and investment to see the desired results, suitable boundary conditions have been created and a variety of Industry 4.0 solution sets have been established by the CM division for the manufacturing plants in Malaysia, China and Portugal.

In Penang, three key Industry 4.0 solutions were identified as the most suitable solutions to be used for implementation; Nexeed MES Platform, iFLOW / DTS, and BCore. These three solutions are viewed as the most suitable systems in embarking on Industry 4.0 for production lines, raw materials and finished good tracking flow, as well as maintenance activities. A total of 15 employees were involved in these implementations, representing each department that is involved in Industry 4.0.

The Nexeed MES Platform is a Bosch Manufacturing Execution System (MES) that can simplify the everyday working lives of its workforce and design their manufacturing and logistics operations to be more efficient, more flexible and more economical in their use of resources. The core team has successfully completed the pilot run of several Nexeed MES modules at the Surface Mount Technology (SMT) production lines in the 4th quarter of 2017.

For monitoring of shipment and tracking of logistics, the iFLoW and DTS solutions have been deployed at the manufacturing plants in 2017. The iFLoW solution is used to track shipments of materials from the supplier to RBMA while the DTS solution is used to track the shipment of finished goods from RBMA to warehouses in the United States of America.

The iFLoW and DTS solutions are integrated tracking platforms that track all the raw materials in transit by their part number in real-time, from their starting point to the arrival at the plants, or warehouses. The solutions control and monitor the raw material flow from the suppliers to the warehouses. Additionally, the solutions also alert associates at the plants in the case of any deviation to the Estimated Time of Arrival (ETA), quantities or part numbers.

The web-based system, BCore was developed and is used to track production maintenance activities, as well as planned and unplanned production activities. The system provides real-time monitoring of machines' status in the production area. It covers features such as breakdown management or corrective maintenance, preventive maintenance scheduler, production management, intervention validation, skill matrix and spares management. Having been successfully implemented in the second half of 2017, the system operates with the minimum requirements and will be further enhanced to expand the usage scope of the system.

In regards to the consumption of energy, water, OFA, and nitrogen gases, the Energy Platform was introduced in the first half of 2018 to monitor the consumption of resources within the plant. A pilot run will be conducted at RBMA's new building which houses the new final assembly production line. The implementation will be further extended in the building, production lines, and in the machine or station stages.

In achieving its goals pertaining to Industry 4.0, the CM division is continuously supported by the top management, participation of the associates as well as consumers, and by the yearly budget allocation to further enhance existing solutions.

## Shaping Mindset to Encourage Employee Participation

To ensure that everyone is onboard in the Industry 4.0 journey, various initiatives have been put in place for associates to participate in, enabling them to see a clearer picture of how the working culture will be continuously improved. In 2016 and 2017, the Industry 4.0 tech-talk forums were held to keep associates up-to-date and familiar with the various technological and communication advancements.

The Bosch Industry 4.0 web page and promotions on the intranet portal were also introduced to boost the reception of Industry 4.0 within working environments, in addition to encouragement from all management levels. Rewards were also given out to associates to recognise their participation and contribution towards the Industry 4.0 journey as the company worked towards creating a conducive environment for the approach to be well-received and practiced by associates of all levels.

RBMA is guided by seven key features that have been identified based on the outcome of the numerous pilot projects and changes that have been implemented worldwide for Industry 4.0 solutions. The features are namely, People as the key players, Distributed intelligence, Fast integration and flexible configuration, Secure value-creation network, Digital life-cycle management, Virtual real-time representation and Open standards.

The features are part of the R&D specifications for every new product, service, and piece of software, as well as for continuous product improvements. All components and systems within the organisation must at least adhere to some of the key features to ensure a successful synergy between the real and digital world.

Most divisions in RBMA are involved in the Industry 4.0 projects, especially in covering the operations and transportation of the plants, for example, the warehouses, production, supermarket, facilities, et cetera.

As an example, the IT Shop floor solution connects production from sensors via control to the Nexeed MES platform, whereas the Energy Platform provides a full breakdown of energy consumption within the plant. The information gathered from the platform will be analysed and converted into useful data that can be viewed online via any internet browser.

## Reaping the Gains of Industry 4.0 Involvement

Although RBMA is in the initial strategic establishment stage of Industry 4.0, the benefits of the involvement in Industry 4.0 can be seen through the transparency and traceability of operations and other data within the plant.

The real-time performance monitoring of the plant, as well as smart planning, effective triggering, deeper analysis, correlated improvements, learning database and predictions, and efficient decision-making can be facilitated in the overall improvement of the future operations efficiency and effectiveness.

# Embarking on the Industry 4.0 Journey



**BOSCH**



Investing in the Industry 4.0 solutions to strengthen business performance and improve efficiency.



Nexeed MES Platform: focusing on manufacturing-related functions.



iFLoW and DTS solutions are integrated tracking platforms that track all the raw materials in transit by their part number in real-time;

- iFLoW solution: to track shipments of materials from the supplier to RBMA.
- DTS solution: to track shipment of finished goods from RBMA to warehouses in the United States of America.



BCore is a web-based system that was developed to track production maintenance activities and plan production activities.



The Energy Platform was introduced to monitor the consumption of resources within the plant.



## Moulding Mentality to Attract Employee Participation

Seven key features for Industry 4.0



People as the key players



Distributed intelligence



Fast integration and flexible configuration



Secure value-creation network



Digital life-cycle management



Virtual real-time representation



Open standards