High technology industry - the past, present & the future

Since the invention of steam engines, technological innovations have played a big role in transforming the high-tech industry. For this issue, we take a deep dive into the guts of how Malaysia's industrial ecosystem has evolved over the years—and how new trends could possibly unfold in the future. This infographic aims to provide a few kernels of wisdom on several key industries to open up our minds to new possibilities that might play out down the track.

WE HAVE MADE PROGRESS

1957 to late 1970s — Agrarian Economy

1980s to mid 1990s — Resource-Led Economy

Late 1990s to NOW — Innovation-Led Economy

MANUFACTURING

From non-optimised crude manufacturing to **smart factories**

Past

In the past:
Non-optimised crude manufacturing

Present

Today, the manufacturing industry has grown by leaps and bounds:
Isolated and optimised cells

Future

A **smart factory** is a flexible system that self-optimizes performance across a broader performance network and self-adapts to learn changing conditions in real or near-real time, to autonomously run end-to-end production processes.

Advanced manufacturing systems

- Interconnected system/ system integration
- Machine-to-machine communication
- Machine-to-human interaction

Internet of Things

- Object tagging
- Internet to object communication
- Real time data capture
- Reduce waste

Mass customisation

- Customer and marketing
- Match customers' needs with mass production efficiency
- On-demand manufacturing

TALENT

From labour economics to **agile talents**

Past

Labour is physical work done by people, in contrast to that done by machines and working animals.

Present

High-tech industries are cultivating dynamic future-driven talents

Future

Agile Talents are independent workers hired on a contingency basis to cover specific outsourced projects that are time sensitive, cover for busy seasons or assist in urgent business needs.

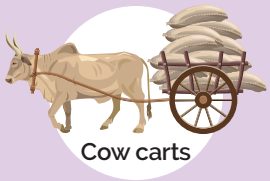
Agile talent provides a unique benefit: The ability to quickly and cost-efficiently gain access to the expertise necessary to solve a critical business problem or take advantage of a sudden opportunity.

AUTOMOTIVE

From driving to **autonomous vehicles**
From engine-powered vehicles to **energy efficient vehicles (EEV)**

Past

In the past, conventional transportation means and animals were used to get from one destination to the other.



Cow carts

Present

A combustion engine generates mechanical power by releasing energy from a fuel and air mixture.

Engine powered vehicles

Future

An Autonomous vehicle is a car with embedded advanced technologies and computational system, to recognise any dynamic condition of the road.

LiDAR

LiDAR - Light Detection and Ranging - A rooftop ranging system comprised of 64 lasers paints a 360-degree picture of the car's surroundings that is accurate to within 2 cm.

Radar

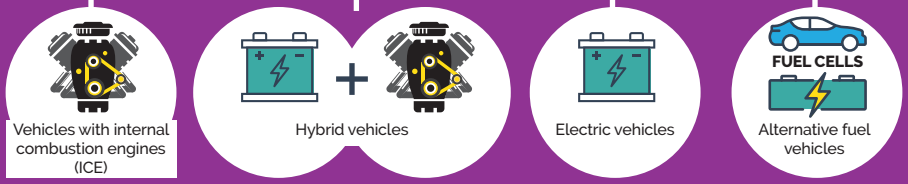
Accident-prevention systems trigger alerts when they detect something in a car's blind spot.

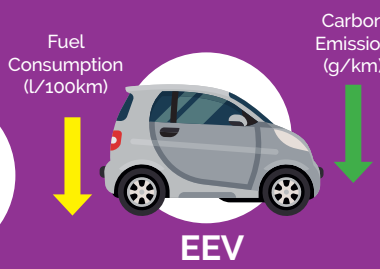
Infrared camera

Two infrared headlamps extend your vision at night without blinding other drivers. The signature of the infrared beam is detected by a camera, which displays an illuminated image on the dashboard.

EEVs are vehicles that meet any delineated fuel consumption or carbon emission standard. An EEV can be of any type of powertrain—internal combustion engines, electric vehicles, hybrids or alternative fuel.

EEVs INCLUDE



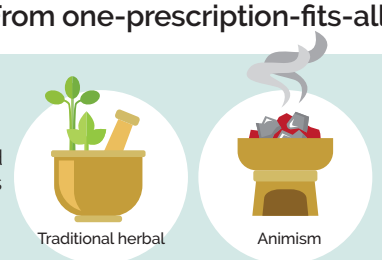


PHARMACEUTICAL

From one-prescription-fits-all to **personalised medicine**

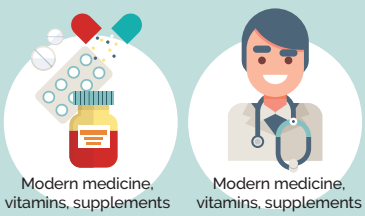
Past

Over the past decade, patients traditionally used herbs and animism rituals to restore health.



Present

Today, patients are attended to by modern doctors and get medicine distributed by hospitals or pharmacies.



Future

Personalised medicine is a type of medical care that provides individually customized treatments and medication for patients.

Data derived from smart devices worn by patients.

- Machines utilise patient data for diagnosis.
- Machines prescribe medicine for individual treatment.

AGRICULTURE

From agrarian farming to precision agriculture and **smart farming**

Past

Traditional farming is technically and technologically primitive. The land is farmed to provide sustenance; everything that is produced is needed for survival (subsistence).

Manual labour Working animals

Present

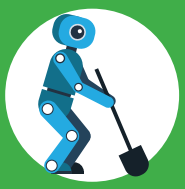
Intensive farming is an agricultural intensification and a mechanization system that aims to maximize yields from available land through various means.

Machanisation

Future

Smart farming is a farming management concept using modern technology to increase the quantity and quality of agricultural produce.

24/7 Sensors and real-time monitoring
Using round-the-clock smart sensors to monitor real-time crop and livestock health, soil quality, and weather—tracking sound, sight, or touch to provide constant and consistent observation and information about farms.



Drones, robotics, AI, and automation platforms
Fully autonomous robots, drones, and other intelligent farm machines to augment efficiency and improve worker safety as well as save costs (especially labor costs).

Precision agriculture and predictive data analytics
While sensors and robots will in themselves improve farming efficiency and compile massive amounts of useful data, it will require considerable analysis to convert the growing amount of big data available to farmers into actionable insights: relevant and usable information that helps them better manage operations.

CHEMICAL

From Commodities to **green manufacturing**

Past

Heavy reliance on commodities such as tin and rubber.

Present

In a time of oil price volatility, oil & gas and palm oil industries are diversifying through upstreaming and down streaming innovation activities.

Future

Green manufacturing is reducing pollution and waste by minimizing use of natural resources, recycling and reusing what was considered waste to reduce carbon emissions.

Waste Prevention
Prioritize the prevention of waste, rather than cleaning up and treating waste after it has been created. Plan ahead to minimize waste at every step.

Real –Time Pollution Prevention
Monitor chemical reactions in real-time as they occur to prevent the formulation and release of any potentially hazardous and polluting substances.

Use Of Renewable Feedstocks
Use chemicals made from renewable (e.g. plant-based) sources, rather than other equivalent or chemicals derived from petrochemical sources.

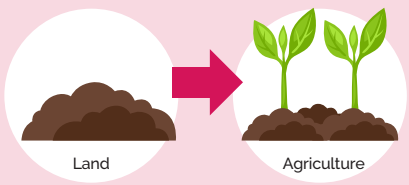
Less Hazardous Chemical Synthesis
Design chemical reactions synthetic routes to be as safe as possible. Consider the hazards of all substances handled during the reactions, including waste.

RESOURCE SUPPLY

From abundant natural supplies to **doing more with less**

Past

Resource-intensive

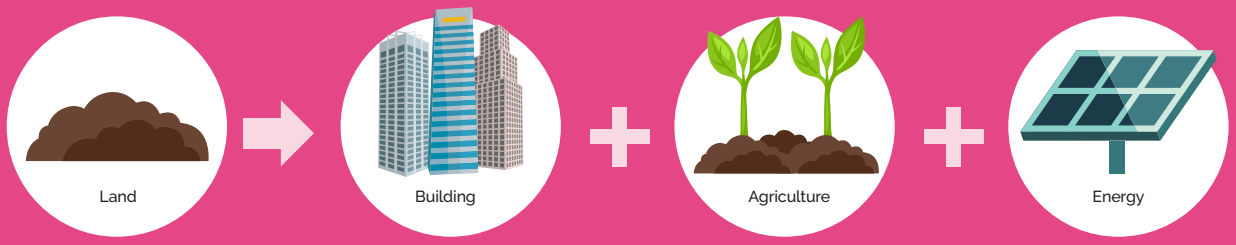


Present

Resource scarcity and climate change are raising the importance of sustainable practices and management.

Future

Doing more with less maximises resources' productivity. With depleting resources and increasing prices, industries are now forced to do more and pivot toward sustainable practices. This includes the use of alternative resources



Conclusion

There is however no absolute certainty for any sector. A development benchmark needs to be created to outline the full potential of each sector. Controlling resources, methods and widening research activities need to be carried out to cultivate greater improvement across all sectors. By and large, there will be peaks and valleys—and plenty of opportunities await our high-tech industry players as new economic shifts driven by emerging technologies bring about higher technology advancement. But in between, disruptions wait for no one. But looked at another way, some risks loom as well wherein the consequences of making the wrong decision is huge, but the risk of not acting at all may be even worse.

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