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**
- 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** - 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

- Vehicles with internal combustion engines (ICE)
- Hybrid vehicles
- Electric vehicles
- Alternative fuel vehicles

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

**Traditional herbal**

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

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

**Modern medicine, vitamins, supplements**

**Future**
Data derived from smart devices worn by patients.

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

**Modern medicine, vitamins, supplements**

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

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**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.

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

- **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.

- **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.
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.

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.

Conclusion

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