Automotive electronic technology roadmaping experience in Thailand

Pun-arj Chairatana

Graduate School of Management and Innovation

King Mongkut;s University of Technology Thonburi
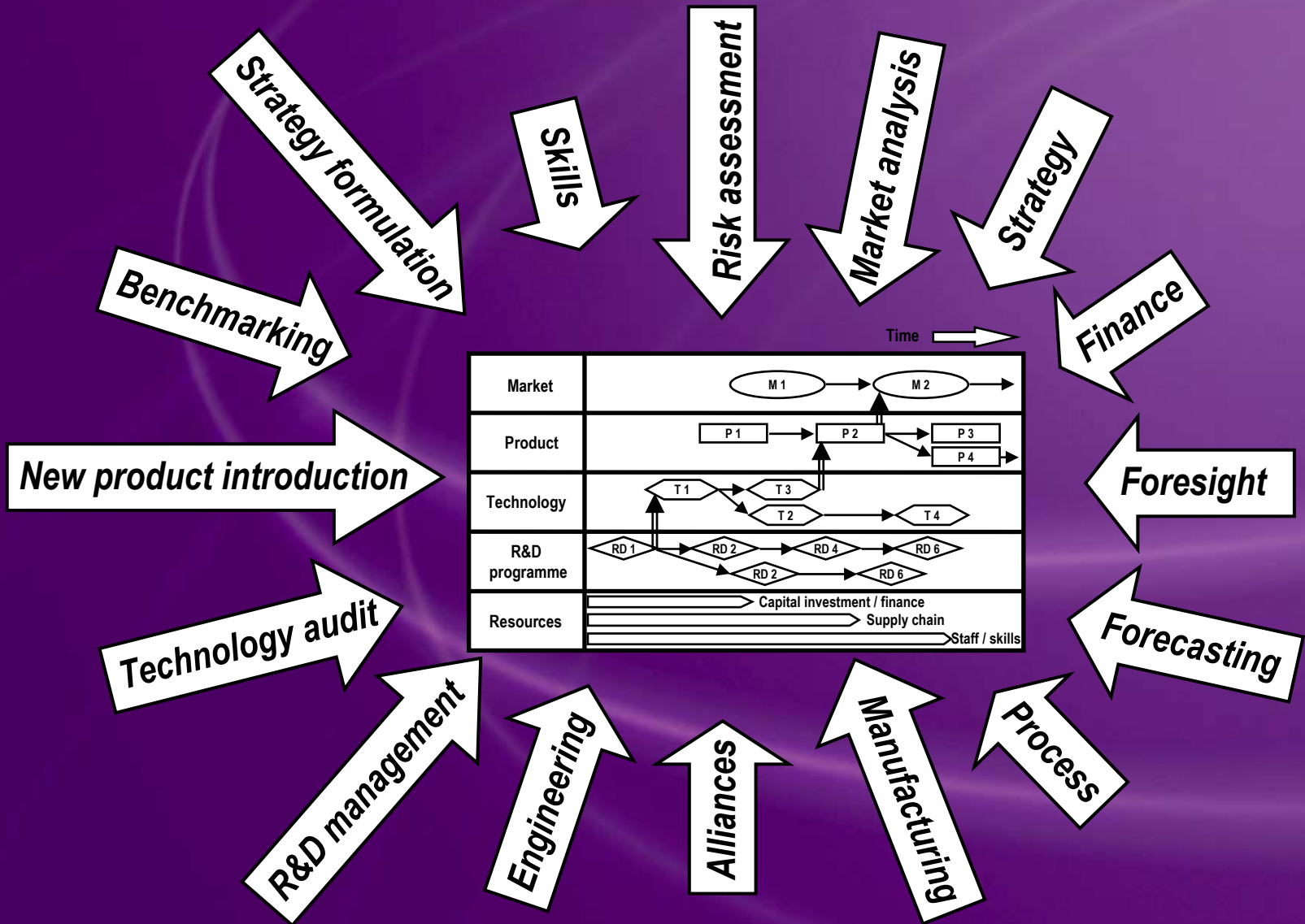
ipuntana@kmutt.ac.th

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Siam City Hotel

TRM Benefits

- **Effective communication of developed technology strategy, and support for technology planning**

- **Examples of companies that use roadmaps: Motorola, Philips, Lucent Technologies, ABB, etc.**

TRM as an integrating mechanism

# T-Plan: Fast-Start Technology Roadmapping Aims

- **To support** the start-up of company-specific TRM processes

- **To establish** key linkages between technology resources and business drivers

- **To identify** important gaps in market, product and technology intelligence

- **To develop** a 'first-cut' technology route map

- **To support** technology strategy and planning initiatives in the firm

- **To support communication** between technical and commercial functions

Technology roadmap architecture

Challenges

- **How to start up roadmapping in the organisation?**

- **How to keep roadmaps up-to-date?**

-

- **How to integrate roadmapping with other strategy and planning initiatives?**
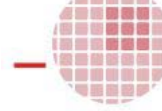
# Automotive Electronics Technology Roadmapping Experience

The Case of the British Foresight Vehicle Technology Roadmap

The British Vehicle technology roadmap

- Department of Trade and Industry (DTI)
- 130 experts
- 60 organisations
- 6 broad themes have been used to structure the information contained in the roadmap
  - Social trends
  - Economic trends
  - Environmental trends
  - Technological trends
  - Political trends
  - Infrastructural trends

Foresight Vehicle Technology Roadmapping Process
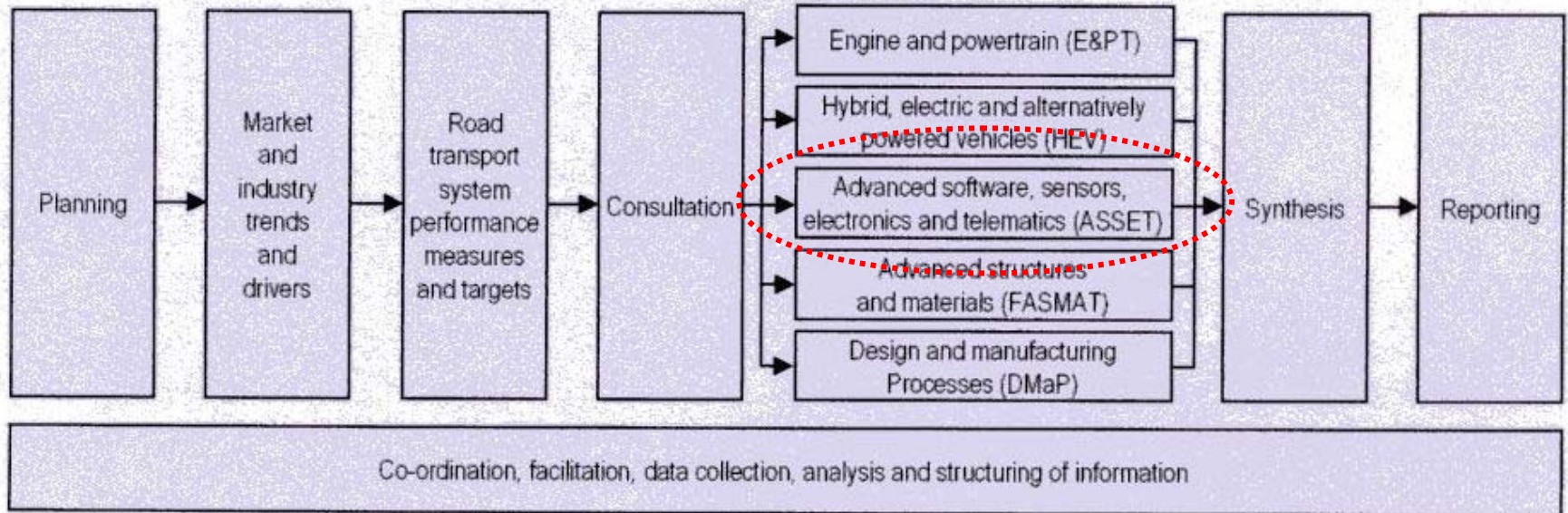
Electronics and control technological trends and drivers

- <u>Key performing areas</u>: processing speed, miniaturisation, cost and functionality
- <u>Value</u> of electronics and software in new vehicles will continue to increase in the following areas:
  - Control and intelligence
  - Telematics
  - Information and service provision
  - Entertainment and user interfaces
- The development and agreement of standards is a key enabler

Automotive Electronics Roadmap Product features and technologies

- **Performance measures and targets**
  - Sensors, software and telematics: aim to improve vehicle performance in terms of control, safety, adaptability, functionality, reliability, intelligence, driver support and integration
- **Key technology**
  - Advance software, sensors, electronics and telematics (ASSET)
    - Shift to software
    - Access and use of vehicles
    - Architectures and reliability

Technology Evolution of Automotive Electronics
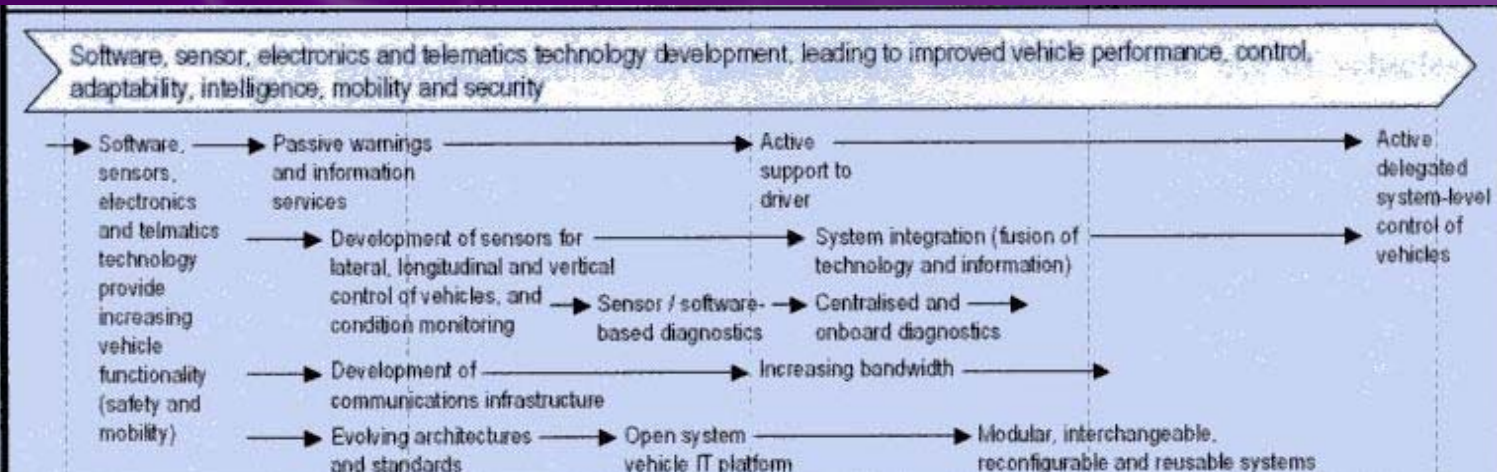
3 Key Technology Areas

- **Shift to software**
  - The general trends will be on vehicle design, manufacturing and use.
  - Major technical areas: vehicle control, adaptability and intelligence, with system integration being of particular importance
- **Access and use of vehicles**
  - Software, sensors, electronics and telematics technology will lead to significant mobility benefits,
  - In terms of improved safety reductions in congestion and crime, increasing access to mobility and greater vehicle adaptability
- **Architecture and reliability**
  - Requirement of development of appropriate systems architectures and standards, with an emphasis on safety and reliability
  - Long term vision leads to robust, tolerant and self-diagnosing and repairing system that is also responsive to user requirements.
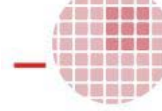
Thailand Automotive Electronics Technology Roadmap Exercise 2005

T-Plan: Fast-Start Technology Roadmapping Procedure

Workshop 1
Market

- Performance dimensions
- Market / business drivers
- Prioritisation

[Date]

Workshop 2
Product

- Product feature concepts
- Grouping
- Impact ranking
- Product strategy

[Date]

Workshop 3
Technology

- Technology solutions
- Grouping
- Impact ranking

[Date]

Workshop 4
Charting

- Linking technology resources to future market opportunities

[Date]

Automotive electronics defined

- **Defining automotive electronics in Thailand**
  - อิเลคทรอนิกส์ยานยนต์ คือ อิเลคทรอนิกส์ไฟฟ้า รวมถึงซอฟแวร์หรือ ฮาร์ดแวร์ และการสื่อสาร
    - Electronics system
    - Software development
    - Hardware design
    - Telematics
    - Intelligent Transportation System (ITS): Infotainment สาระบันเทิง, Advanced Safety Vehicle (ASV)

Market requirement

การประหยัดพลังงาน	Direct injection – common rail Gasoline – Hybrid – electric car
ความสะดวกสบาย	Advanced Safety Vehicle
สาระบันเทิง	Telemetics
ความปลอดภัย	Active – prevention Passive – protection Lighting
การอนุรักษ์สิ่งแวดล้อม และการลดมลพิษ	EURO3 – EURO4 (5 yrs. Gaps) Alternative fuel & engines

Market segmentation

- *1 ton pick-up*
- *Small passenger car (Less electronic equipment options)*
- *After market (REM)*
- *Medium/large passenger cars*
- *Bus & Truck*

Market drivers I

- ความสะดวกสบาย (Comforts)
  - ระบบอัตโนมัติ (Automatic system) เช่นกระจกไฟฟ้า, Voice recognition system
  - แผนที่นำทาง (Navigation) และระบบ Sensor รอบคัน
  - สภาพแวดล้อมภายในห้องโดยสาร เช่น ระดับเสียงภายในห้องโดยสาร (Acoustic) ระดับแสงสว่างและอุณหภูมิภายในห้องโดยสาร การลดการสั่น และกลิ่น
  - ระบบไร้สาย (Wireless system) เช่น ระบบควบคุม

Market driver II

- การประหยัดพลังงาน (Fuel economy)
  - การเผาไหม้ของเครื่องยนต์
  - การใช้ Electronic control, EGM, ECU
  - การใช้เครื่องยนต์ Hybrid การมีรถไฟฟ้า หรือ Alternative fuel engine
  - Control by wire
  - แบตเตอร์รี่ 42 Volts

Market driver III

- สาระบันเทิง (Infotainment)
  - I/O device:

  - High Bandwidth
  - Voice interface
  - GPRS
  - Acoustic design
  - Wind screen
  - Driver and passenger modes

Market driver IV

- ความปลอดภัย (Safety)
    - Security and safety alarm: กันขโมย
    - Sensors: Image, distance, speed
    - Processor and software

Market driver V

- การอนุรักษ์สิ่งแวดล้อมและการลดมลพิษ

  - Rule and regulation
  - Engine management system: ECM, ECU, EGR, Denox, SCR/CAT etc.
  - Noise and air pollution: ELV (End of life vehicle)

Identify competitors

- *Free trade (Global competition)*
  - *One market condition: ASEAN*
    - *Thailand gains competitive position among ASEAN competitors*
    - *China and India represent certain level of treat*
- *Key competitors:*
  - *AFTA countries: Malaysia*
  - *New & Emerging competitors: China (potential competitor) & India*
  - *Taiwan: car radio (focus on after market in the USA)*

Competitors Strengths & Weaknesses

- **Strengths**
  - *Technology development*
  - *R&D (roles of R&D utilisation)*
  - *Economy of scale: market access, price*
  - *Supporting infrastructure: testing centre, quality assurance*
  - *Creditability: (leading competitors) Trust, branding etc.*
  - *Logistics*
- **Weaknesses**
  - *Low quality (emerging competitors)*
  - *Reliability*
  - *Political atmosphere (some countries)*
  - *Investment promotion*

Strategic implication

- *R&D*

- *Knowledge creation (Know how)*

- *Government support*

- *Corporate investment policy*

- *Domestic market*

- *Absorptive capability*

- *Knowledge transfer*

Strengths

- *Social*
  - *Livable atmosphere*
  - *Life style (demand of automobile)*
- *Technology*
  - *Sufficient knowledge workers in the fields of electronics and computer science*
  - *Good manufacturing technology*
- *Environment*
- *Economic*
  - *Lots of multi-national OEM's*
  - *Strong automotive production base of the world*
  - *Good environment to do business*
- *Political*
  - *Strong political will: Detroit of Asia policy, Knowledge-based society promotion*
  - *Political stability*

Weaknesses

- ***Social***
  - *Lack of trust in Thai technology products*
  - *Lack of systematic thinking and problem solving skills*
  - *Communication & language barriers*
  - *Education system: Mismatch between demand and supply*
- ***Technology***
  - *Lack of industrial infrastructure: testing labs, certify bodies*
  - *Lack of R&D activities in automotive electronics*
  - *Lack of ICT infrastructure*
- ***Environment***
  - *Lack of law enforcement*
  - *Lack of green incentive*
- ***Economic***
  - *Insufficient IPR system*
  - *insufficient industrial linkage between automotive and electronic sectors*
- ***Political***
  - *Lack of specific government's support on automotive electronic*
  - *Good governance problem*

Opportunities

- *Social*
  - *Increasing demand in smarter car among new generation*
  - *Growth of automobile sector*
- *Technology*
  - *Technology convergence: exploitation of new and existing technologies in emerging sector*
  - *Exploitation of RTO's and Universities within the manufacturing proximities*
- *Environment*
  - *Emission, safety standard, and fuel economy*
- *Economic*
  - *Attractiveness for investors*
  - *As global pick-up manufacturing base (Good manufacturing infrastructure)*
  - *FTA (USA and Australia markets, etc.) and AFTA*
- *Political*
  - *Expansion of car export value policy*

Threats

- *Social*
  - *Increasing number of commuter using public transportation*
- *Technology*
  - *No representatives in international standard control bodies*
  - *Technology follower*
- *Environment*
  - *Non tariff barrier: EU, USA or Japan*
- *Economic*
  - *Economic uncertainty: fuel prices, terrorism, tax system*
  - *FTA: China & India*
- *Political*
  - *Policy conflicts*

Next steps

- Identify key product features
- Identify key technologies
- Develop Automotive electronic technology roadmap

Beware of all
small animals