

JABATAN KERJA RAYA MALAYSIA

# **Construction Industry in the Industrial Revolution 4.0 (IR4.0) Era**

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KETUA BAHAGIAN

KOMPETENSI, INOVASI DAN PRESTASI

CAWANGAN KEJURUTERAAN ELEKTRIK



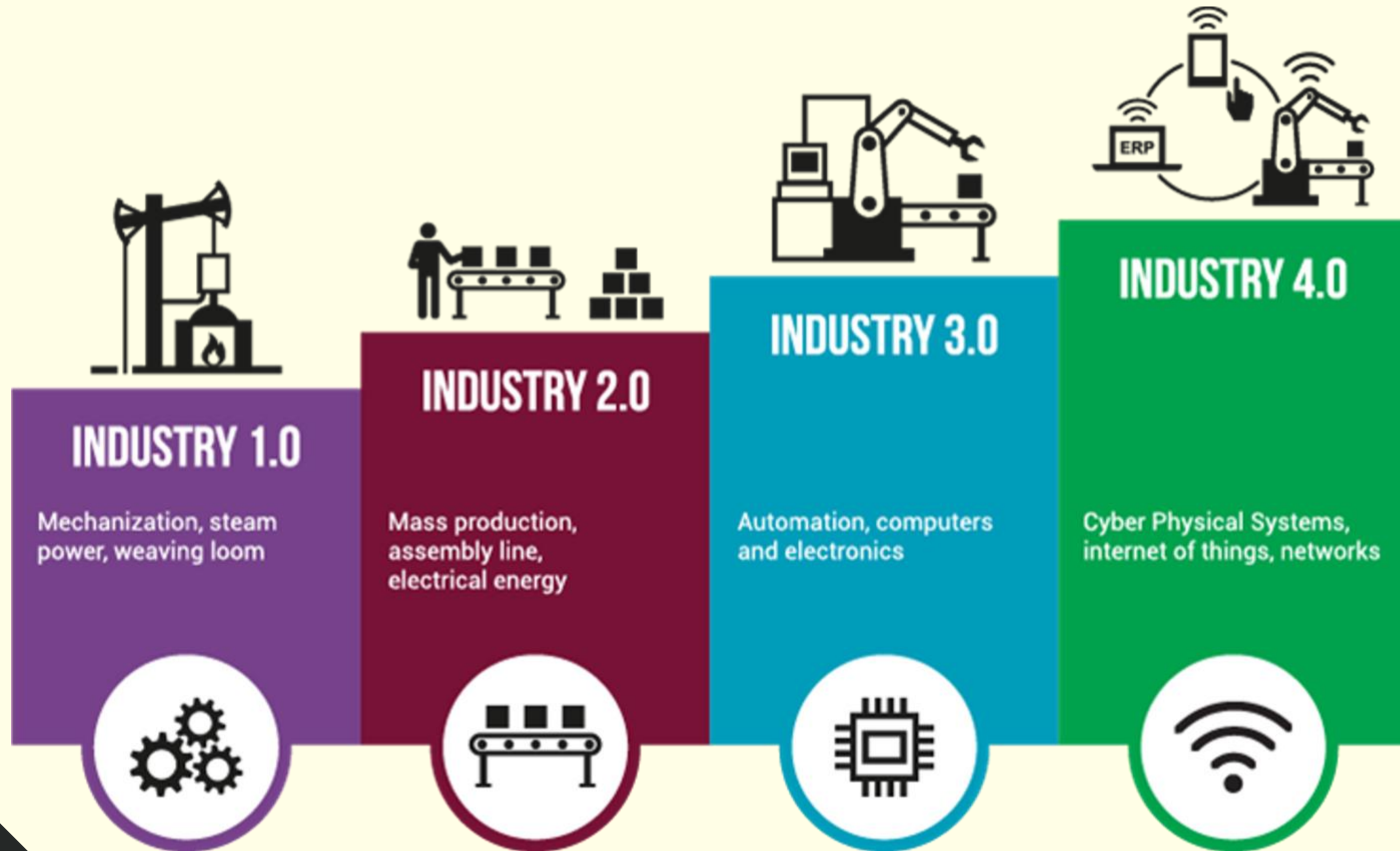


## Topics to Cover

- Industrial Revolution 4.0
- Construction Industry
- Jabatan Kerja Raya Malaysia
- JKR's Strategies
- Fundamental
- Challenges
- Conclusion

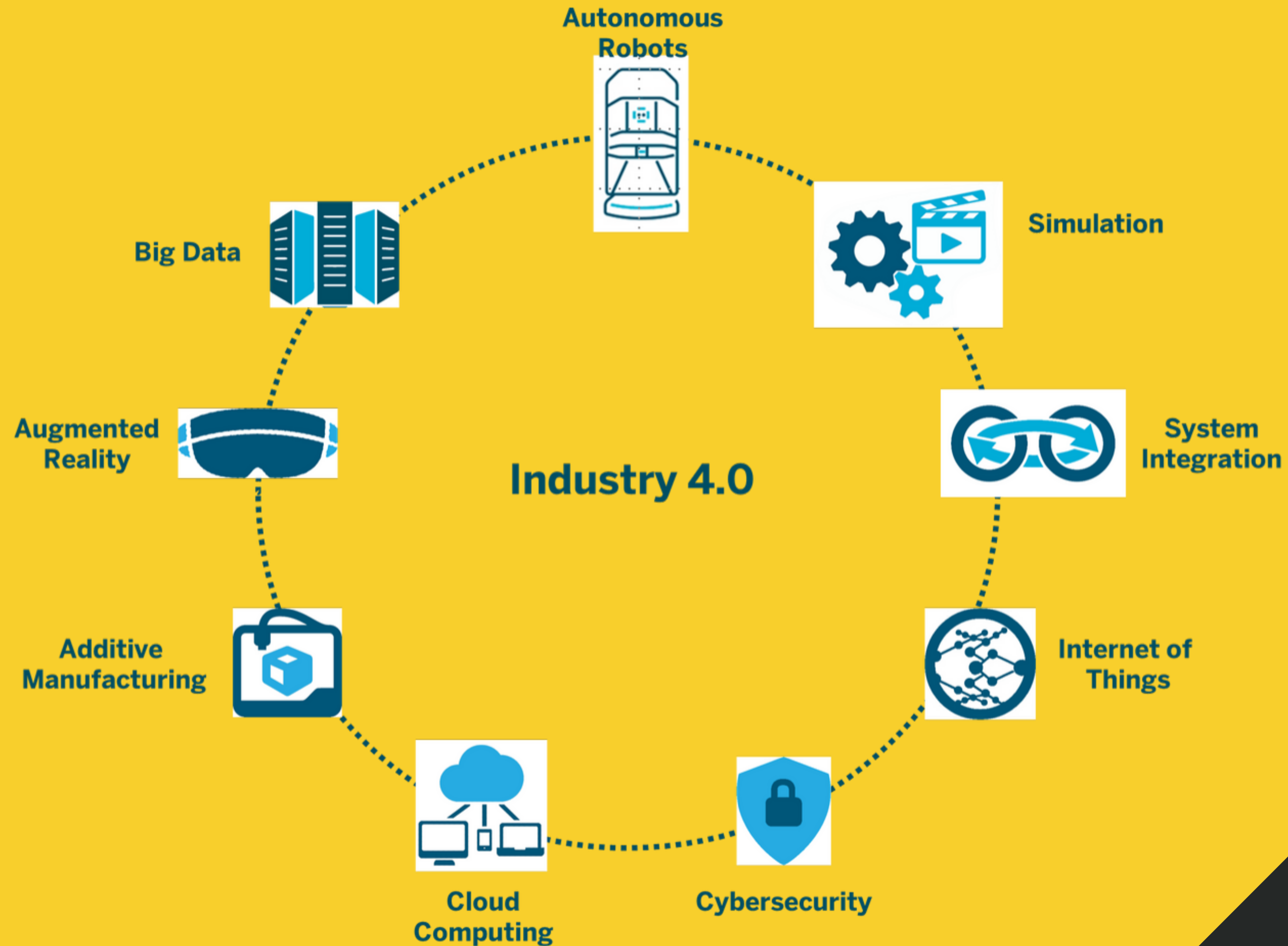


# INDUSTRIAL REVOLUTION 4.0





# 9 TECHNOLOGY PILLARS





# CONSTRUCTION INDUSTRY

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## SOCIO-ECONOMIC DEVELOPMENT

Educational institutions, government offices, tourist attractions, transportation infrastructure, housing and commercial properties are built and maintained by the construction industry

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## ESSENTIAL GROWTH ENABLER

Extensive linkages with other industries - manufacturing, energy sector, tourism etc.

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## SPILLOVER EFFECT

In 1998, Construction Industry growth at -23%, Metal Industry at -35.6%



# CONSTRUCTION INDUSTRY

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## FRAGMENTED

Knowledge, materials, technologies and skills are dispersed among many different organizations

## COMPLEX PRODUCT SYSTEMS

"Products that are customized, made up of many components, based on multiple technologies and produced in one-off projects"

## RISK AVERSE

Safety, compliance, standards & specifications

## LOW LEVEL OF INNOVATION

Matured industry and lack of dynamism  
"Among the six "low innovation" sector in UK"



# MALAYSIA'S CONSTRUCTION INDUSTRY

Sector	Share of GDP (%)							
	2011	2012	2013	2014	2015	2016	2017	2018
Construction	3.0	3.3	3.5	3.9	4.4	4.5	4.6	4.2
Agriculture	7.7	7.3	7.2	6.9	8.8	8.1	7.2	7.9
Mining	8.8	8.5	8.3	7.9	8.9	8.8	8.4	7.9
Manufacturing	25.1	25.0	25.0	24.6	23.0	23.0	23.0	22.8
Services	54.2	54.5	54.8	55.3	53.5	54.3	54.5	56.0



# MALAYSIA'S CONSTRUCTION INDUSTRY

YEAR	GROWTH (%)
2013	10.1
2014	11.6
2015	8.2
2016	7.1
2017	6.7
2018	5.2

- 10<sup>TH</sup> MALAYSIA PLAN – RM 138 BILLION
- 700,000 WORKFORCES
- 84,000 CONTRACTORS



# PROJECTS IN MALAYSIA

Year	Total Projects		Government Projects		Private Projects	
	Qty	Value (RM billion)	Qty	Value (RM billion)	Qty	Value (RM billion)
2011	7,725	102	1,954	23	5,771	79
2012	7,998	131	2,001	19	5,997	112
2013	8,199	137	1,971	23	6,228	114
2014	8,076	185	1,800	24	6,276	161
2015	7,555	142	1,902	25	5,653	117
2016	7,944	252	2,097	52	5,847	200
2017	7,548	163	2,099	42	5,449	121



# JKR's VISION

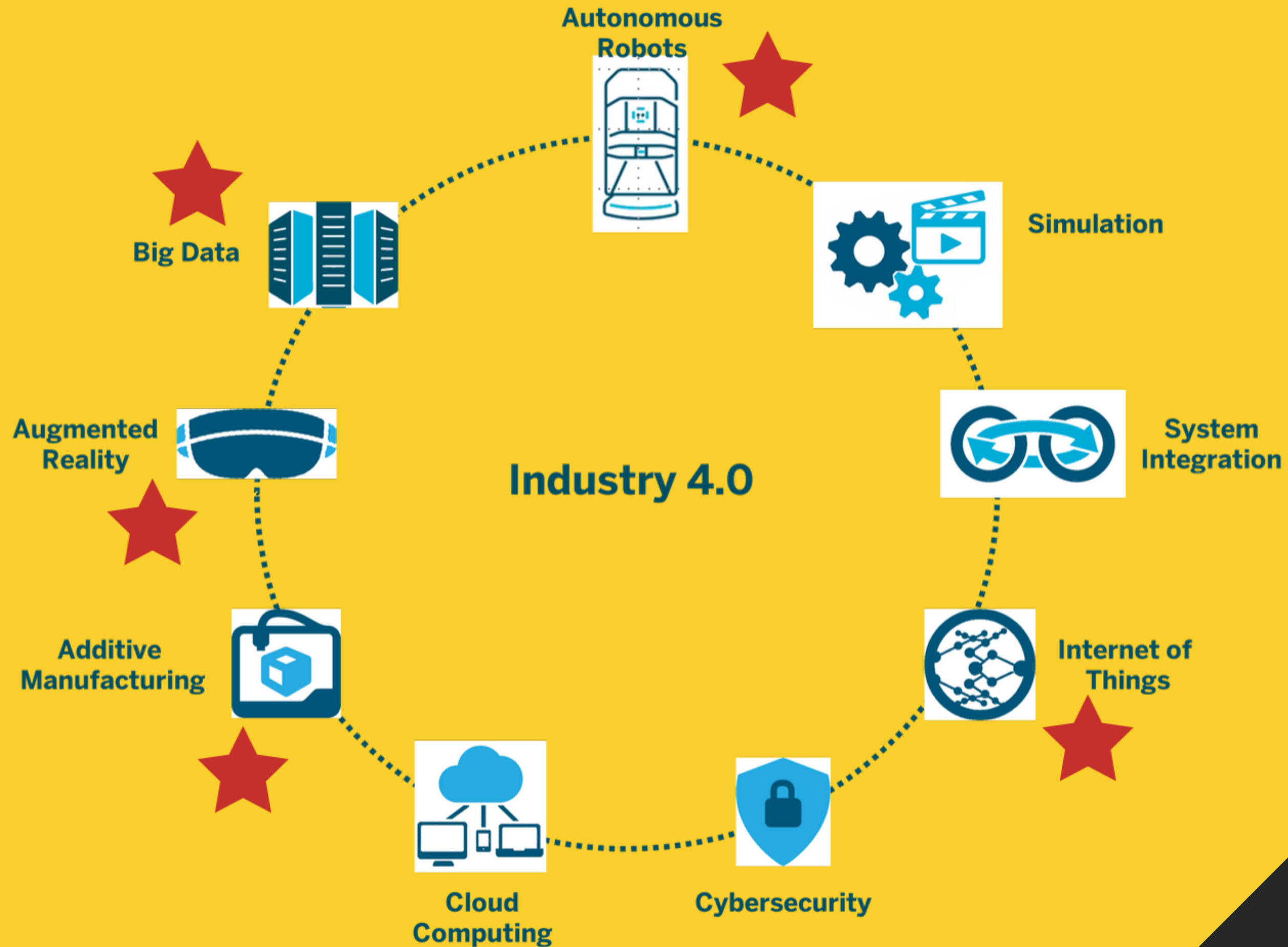
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TO BECOME A WORLD-CLASS SERVICE PROVIDER AND CENTRE OF EXCELLENCE IN ASSET MANAGEMENT, PROJECT MANAGEMENT AND ENGINEERING SERVICES FOR THE DEVELOPMENT OF THE NATION'S INFRASTRUCTURE THROUGH CREATIVE AND INNOVATIVE HUMAN CAPITAL AND STATE-OF-THE-ART TECHNOLOGY



# IR4.0 - 9 TECHNOLOGY PILLARS





# TECHNOLOGY CHARACTERISTICS

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## ICT AND CONNECTIVITY INTENSIVE

ICT based and demands high speed connectivity

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## CREATIVITY & INOVATIVENESS

Applications of the technology require user creativity and inovativeness

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## CHEAPER AND HIGH ADDED VALUE

Cheaper alternatives from the conventional system



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## CREATE

Center of Excellence in Technology  
and Engineering

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## STRATEGIC FRAMEWORK

Clear and measureable innovation  
objective and initiatives

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## IR4.0 TASK FORCE

A dynamic team of think tanks and  
change agents

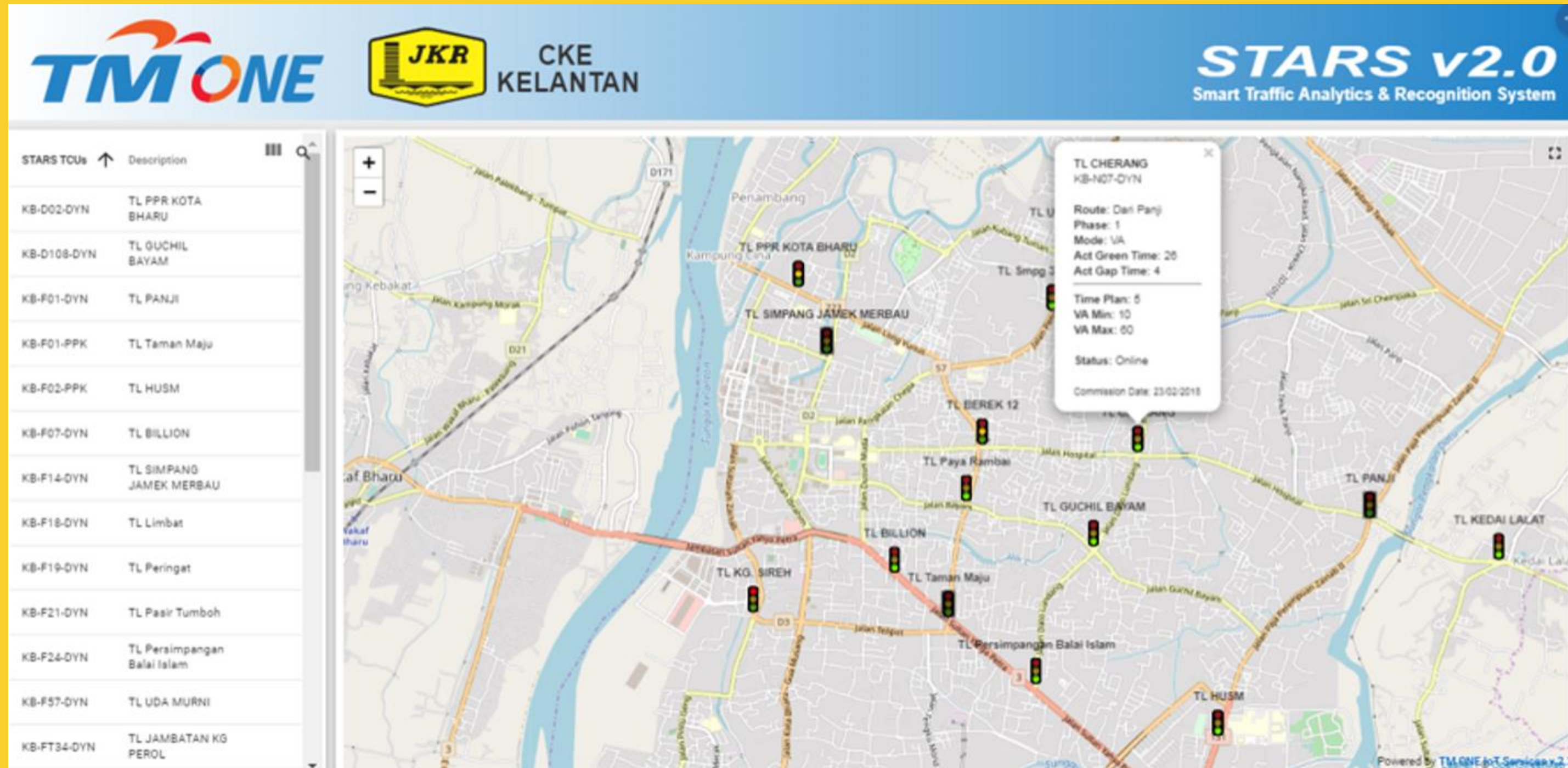
# OUR STRATEGIES

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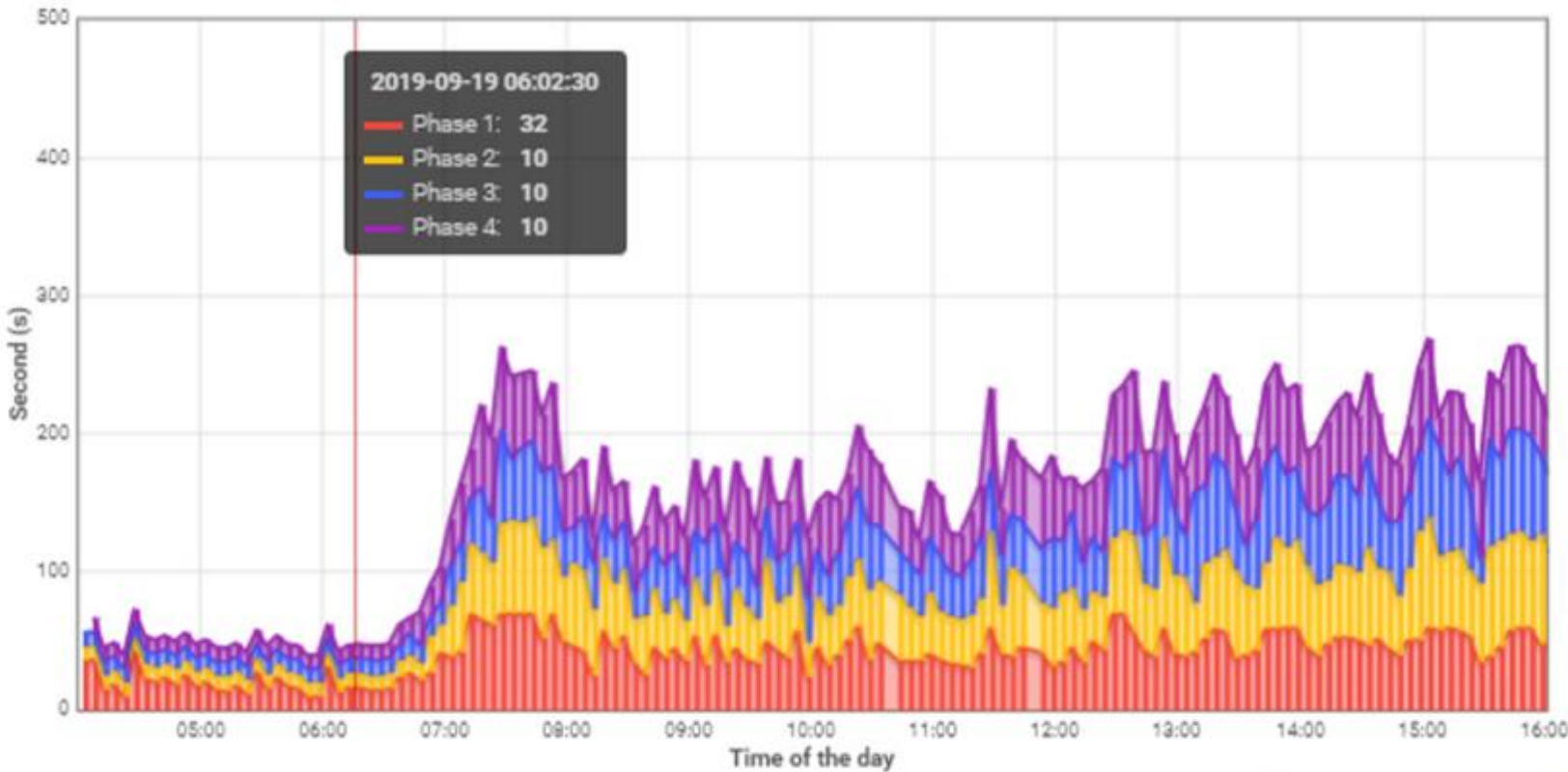


# SMART TRAFFIC ANALYTICS & RECOGNITION SYSTEM

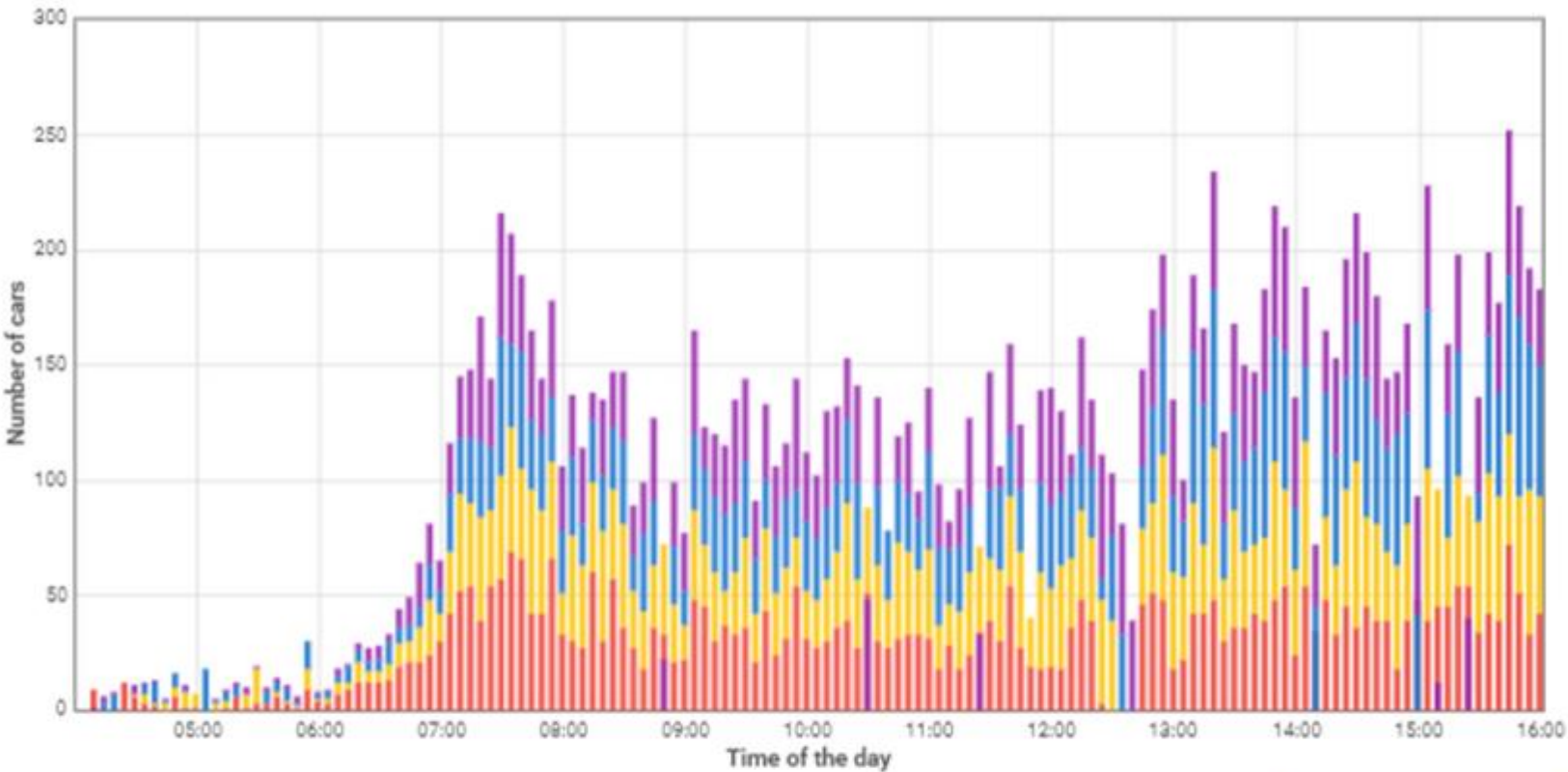




# SMART TRAFFIC ANALYTICS & RECOGNITION SYSTEM

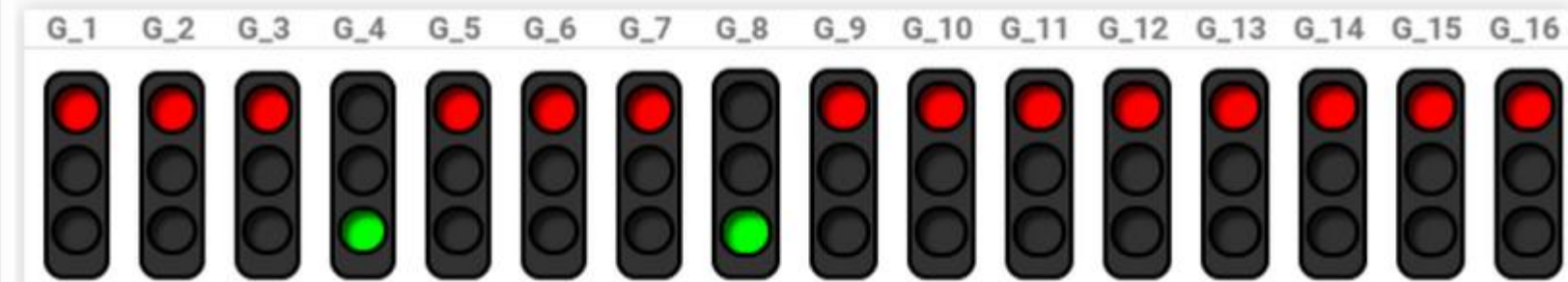


	min	max	avg	total
Phase 1	10	70	41	5863
Phase 2	10	80	41.48	5766
Phase 3	10	80	36.67	5207
Phase 4	10	60	38.44	5382
Phase 5				
Phase 6				
Phase 7				
Phase 8				

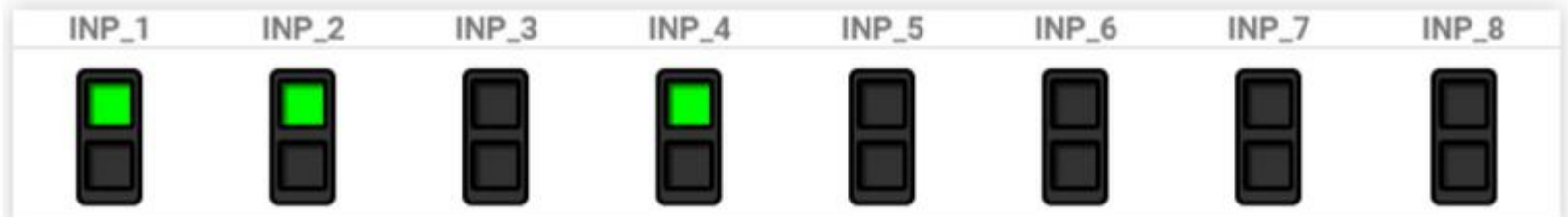


	min	max	avg	total
Phase 1	0	72	30.41	4227
Phase 2	0	72	29.24	4123
Phase 3	0	78	29.59	3935
Phase 4	0	63	27.14	3881
Phase 5				
Phase 6				
Phase 7				
Phase 8				

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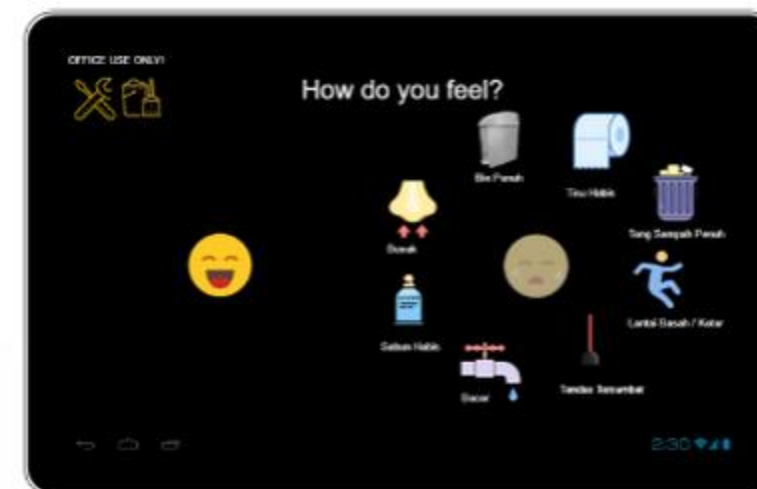
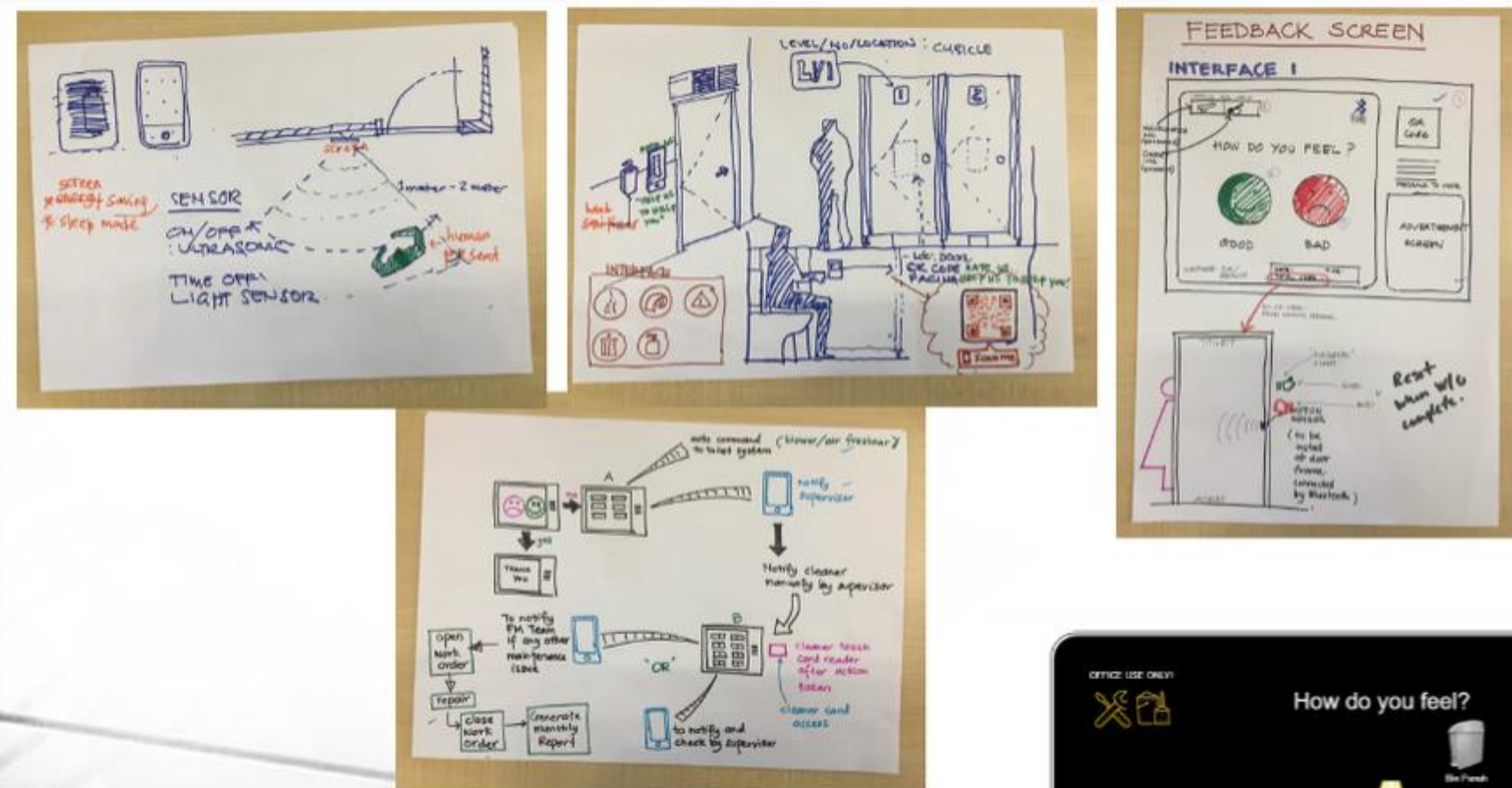


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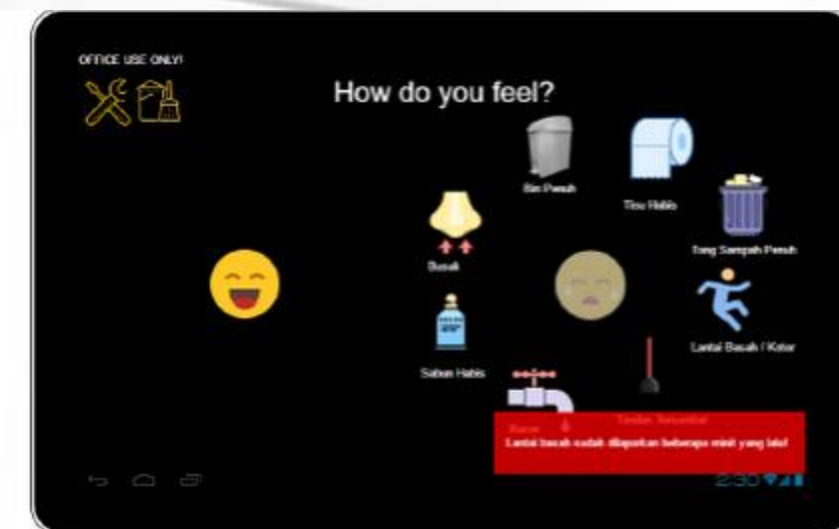




# SMART TOILET MANAGEMENT SYSTEM



Scan QR code to provide immediate feedback or use an Android tablet placed in high traffic area





# SIMPLIFIED RADAR TECHNOLOGY

IoT Radar device to sense and characterize traffic to replace the conventional loop sensor.



 11,000  
INTERSECTIONS

 110,000  
STREET LIGHTS



18 MILLION  
VEHICLES DAILY

## OPPORTUNITIES

Beyond Malaysia



# AUGMENTED REALITY SMART HELMET







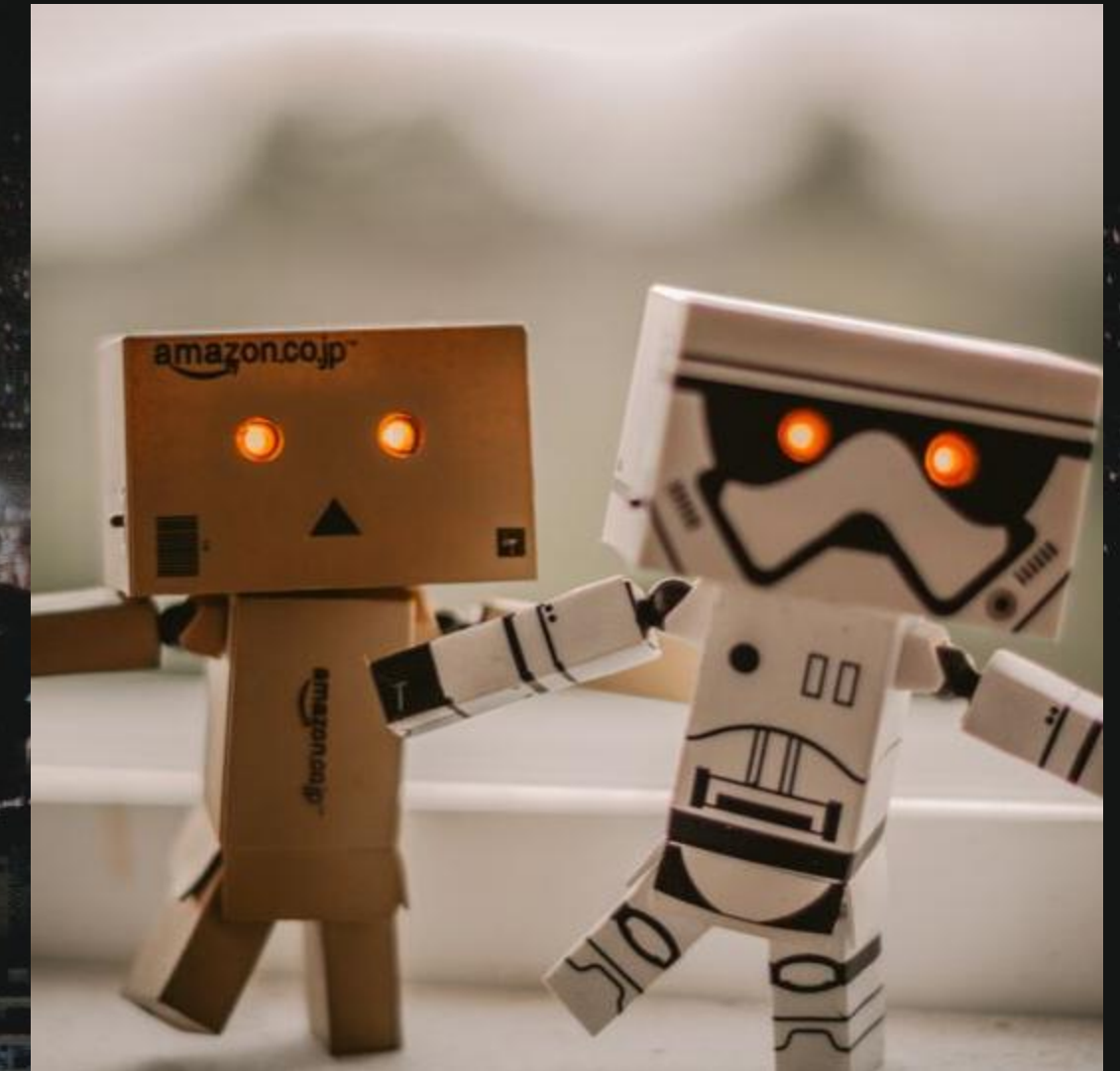
## **SMALL & FAST**

Implement ideas fast and  
in small scale



## **COLLABORATION**

Collaborate with  
technology partners



## **PROTOTYPING**

Build prototype and get  
feedbacks



## FUNDAMENTAL

External  
Networking

Leadership  
Style

INNOVATION

Organizational  
Performance





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## **EXTERNAL NETWORKING**

Collaboration with external parties.



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## **LEADERSHIP STYLES**

Leadership in Construction Industry



# EXTERNAL NETWORKING

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## UTILIZING OWN STRENGTH AND OTHERS

Fragmentation characteristics of the industry

## STRATEGIC PARTNERSHIP

ACADEMIC INSTITUTION

MANUFACTURERS

GOVERNMENT BODIES

INTERNATIONAL BODIES



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## TRANSFORMATIONAL LEADERSHIP

- Inspirational Motivation
- Intellectual Stimulation
- Idealized Behavior
- Individualized Characteristics

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## TRANSACTIONAL LEADERSHIP

- Contingent Reward
  - Active Management by Exception
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# LEADERSHIP STYLES

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# CHALLENGES

## •LEADERSHIP

- Fragmented industry makes leadership role complex
- Risk-averse and resistant to change nature of construction industry
- Demands transformational leaders among engineering professionals





# CHALLENGES

## •ENVIRONMENT AND CULTURE

- Fast-changing world due to technology advancement
- Industry's low in dynamism and technological laggard
- Highly fragmented and matured industry
- Broad representation of key players in the industry





# CHALLENGES



## •PEOPLE

- Resistance to change
- Preserving the status quo
- IR4.0 demands drastic transformation
- Fast incremental improvement



# CHALLENGES



## • **ELIMINATION OF ROUTINE WORKS**

- Transfer of repetitive work to machines and external parties
- Demands for higher level competencies among workforces
- Dynamic competency models
- Aggressive knowledge management approaches



## LEAP

IR4.0 challenges the industry to leap from its maturity zone

## EXPLOIT

Exploits the technologies

## ACCELERATE

The need to accelerate technical strength development among workforces

## TRANSFORM

Transforming into a highly dynamic organization



An aerial, high-angle photograph of a city. A multi-lane highway with many cars is visible, running diagonally across the frame. To the right of the highway are several tall, modern skyscrapers with glass facades. The image has a dark, muted color palette, with the text 'THANK YOU' overlaid in a bright yellow color. Below the text is a short yellow horizontal line.

THANK YOU

