6th Malaysia Statistics Conference

19 November 2018
Sasana Kijang, Bank Negara Malaysia

2018

Embracing Data Science and Analytics to Strengthen
Evidence-Based Decision Making

1st Plenary Session: Data Science & Analytics: A New Skillset for Digitalised World and Big Data Era

HARNESSING DATA SCIENCE FOR
DATA DRIVEN PUBLIC SERVICE DELIVERY

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AGENDA

1 Introduction

2 Background

3 Public Sector Big Data Analytics (DRSA) Initiatives

4 Issues & Challenges

5 Critical Success Factor

INTRODUCTION

BUZZWORDS THAT GIVES YOU A BUZZ!

DEFINITION

Big Data is high-volume, high-velocity and high-variety data that requires cost-effective and innovative information processing to gain insights and make decisions. (Source: Gartner)


Big Data Analytics is the process of analyzing data to uncover hidden patterns and unknown relationships from relevant information. (Source: Whalts.com)

Data Science is a multi-disciplinary field to extract knowledge from data that involves identification of business case to answer questions / issues; data collection, data cleaning, data analysis, data visualization; and presentation of insights to target groups
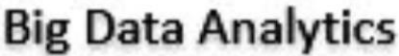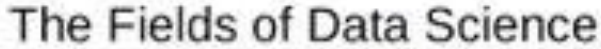
FIELDS OF DATA SCIENCE
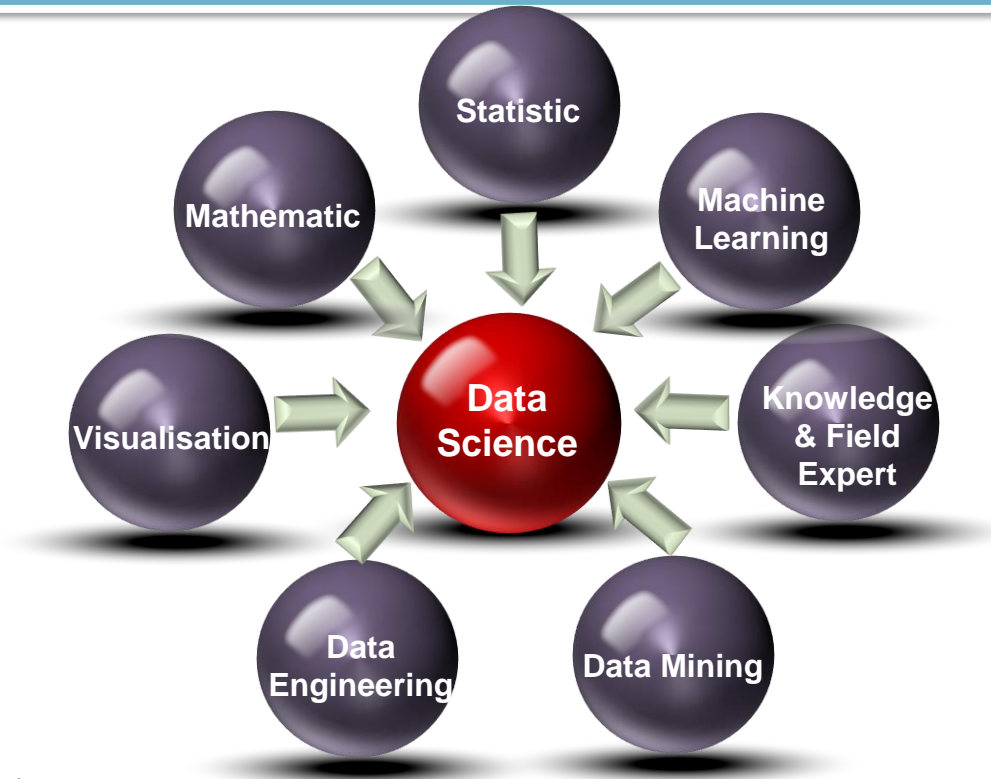
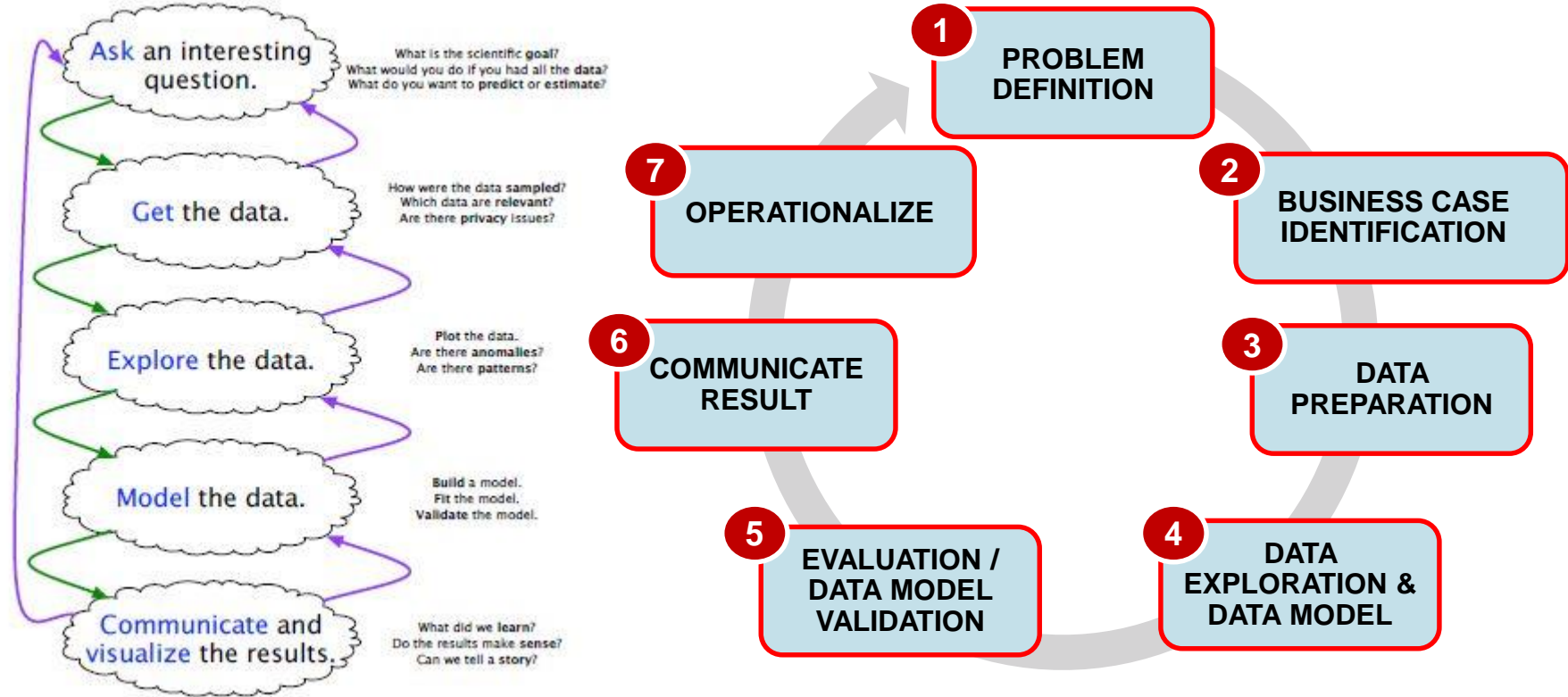Source: Data Science Knowledge Exploration from Big Data (Abdul Razak, Azuraliza & Mohd Zakree, 2018)

Source: Fundamental of Data Science (Azuraliza, 2018)

PROCESS OF DATA SCIENCE

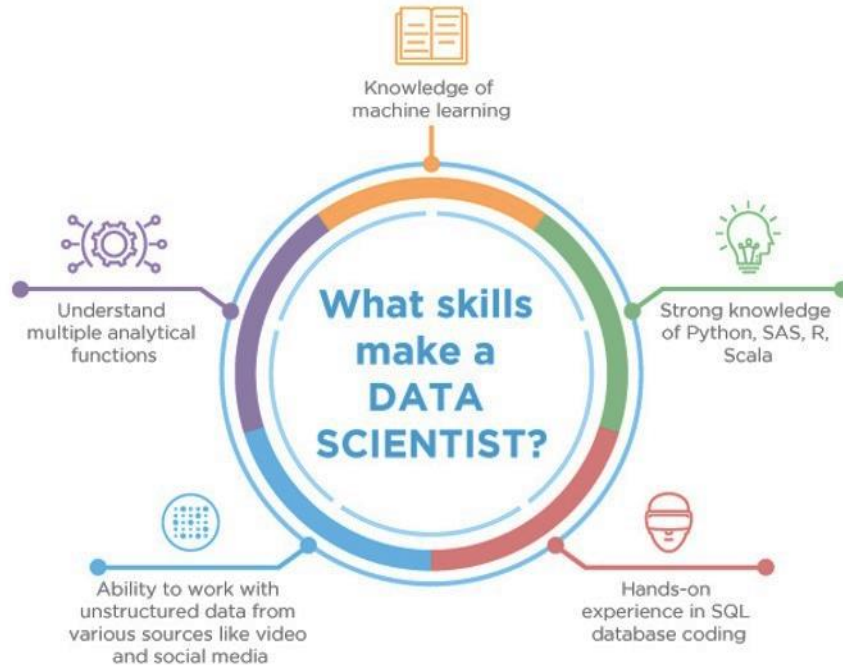# DATA SCIENTIST

Technical skills, obviously!

BACKGROUND

DATA GROW EXPONENTIALLY
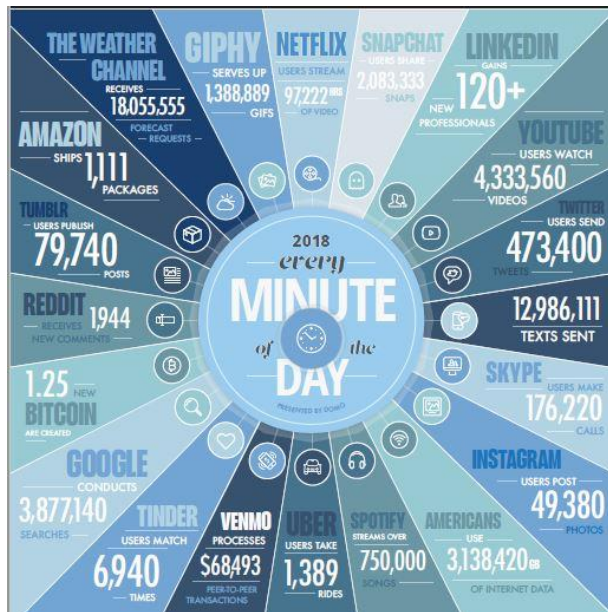
- **1.7MB of data created every second**
- **Crucial to turn data into useful insights**
  - ✓ Better business problem solution
  - ✓ More competitive advantage
  - ✓ Increase efficiency & effectiveness
  - ✓ Better informed decisions
  - ✓ Generate value
  - ✓ Impact on citizen well being

MANDATE

JITIK BIL.1/2014 (28 March 2014)

All agencies identify suitable big data analytics initiatives related to core services

CABINET MEETING (20 August 2014)

Public sector agencies implement **Big Data Analytics (BDA) :**

- Ministry of Communications and Multimedia (KKMM) together with MAMPU and MDEC develop the National Big Data Framework.
- MAMPU and MDEC collaborate to implement 4 goverment BDA pilot projects.
- MDEC to lead the private sector BDA initiative while **MAMPU to lead the public sector BDA.**

MPA MEETING BIL. 1/2016 (30 March 2016)

Agressive data sharing among ministries/agencies is required to ensure that resulting analytics are accurate and holistic.

11th MALAYSIAN PLAN (2016-2020)

5 Focus Areas of Chapter 9 : Transforming Public Service for Productivity

5 **Enhancing project management for better and faster outcomes**

1 **Strengthening talent management for the public service of the future**

4 **Capitalising on local authorities for quality services at the local level**

2 **Enhancing service delivery with citizens at the centre**

3 **Rationalising public sector institutions for greater productivity and performance**
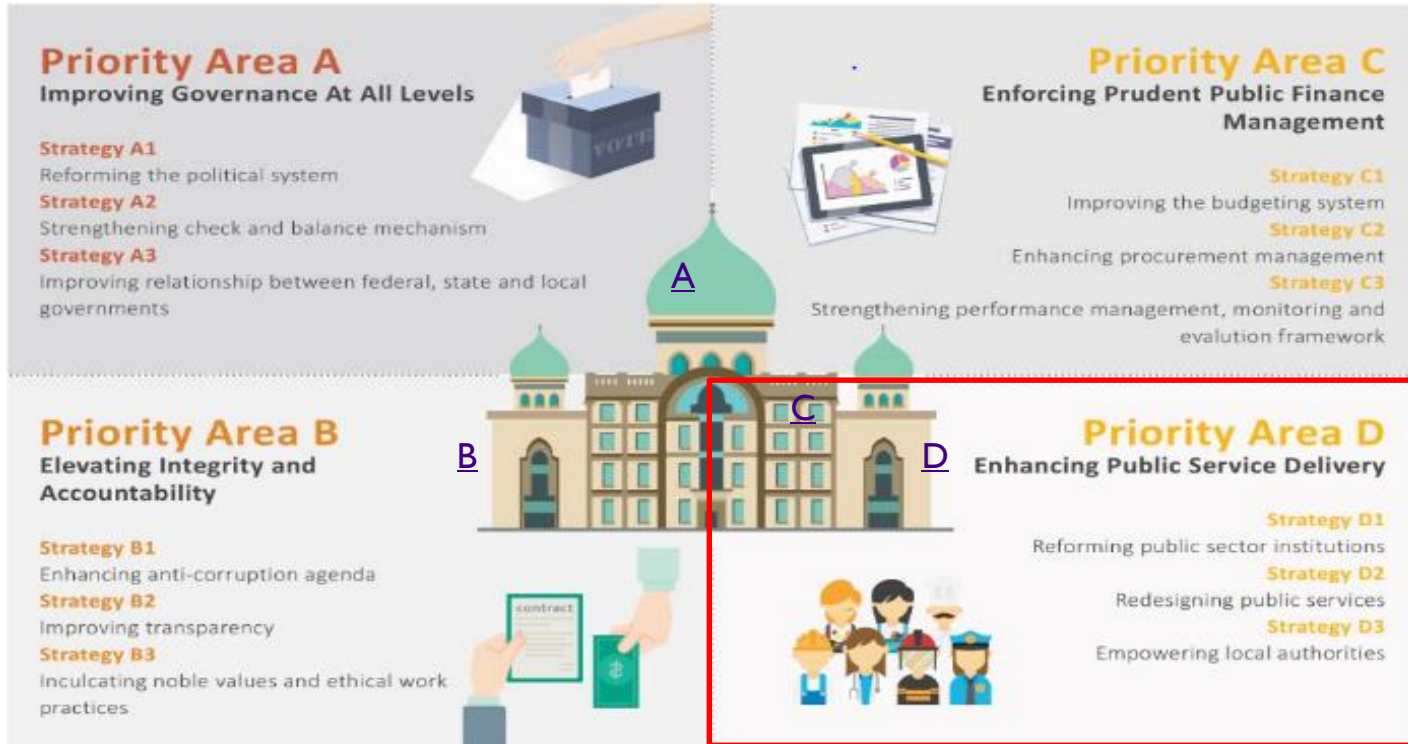
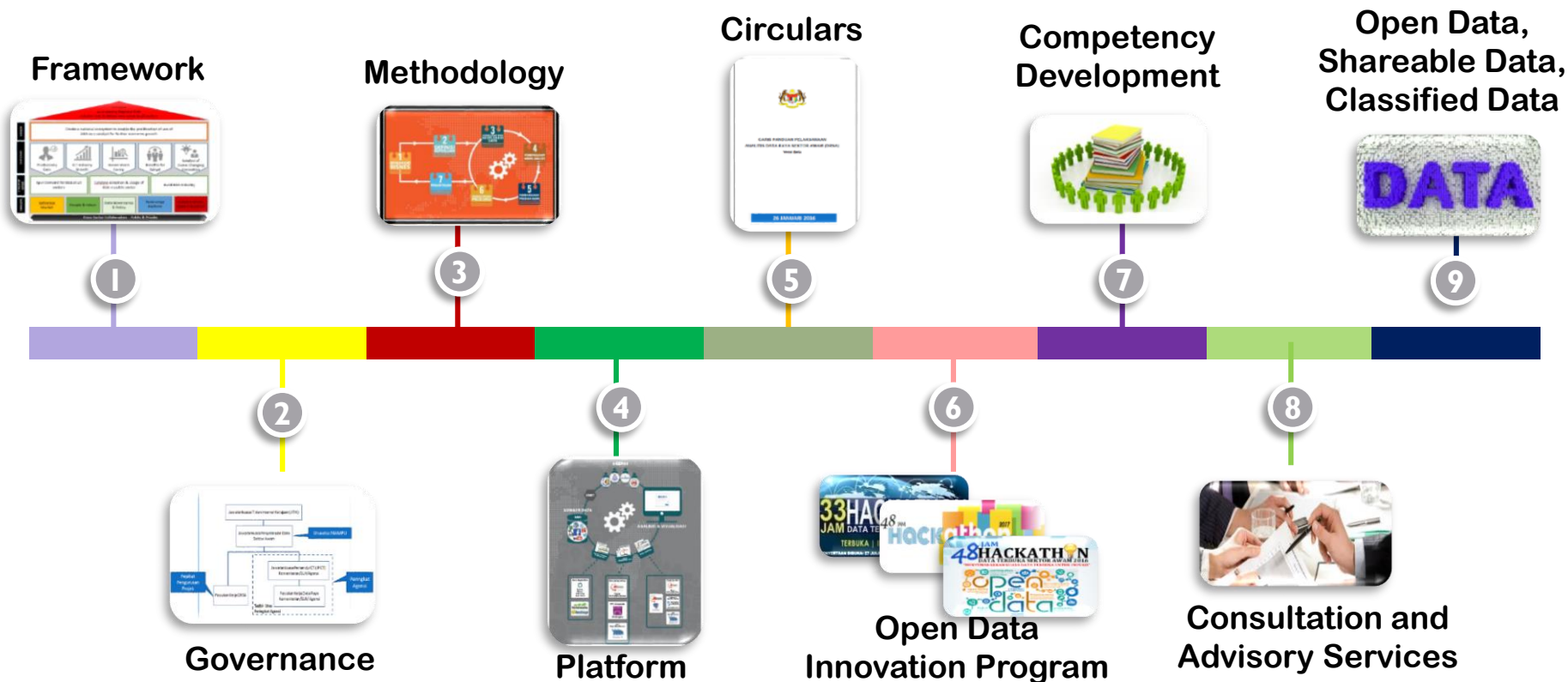**Leveraging data to enhance outcomes and lower costs**

MTR 11th MALAYSIAN PLAN (2016-2020)

Pillar I: Reforming Governance towards Greater Transparency and Enhancing Efficiency of Public Service
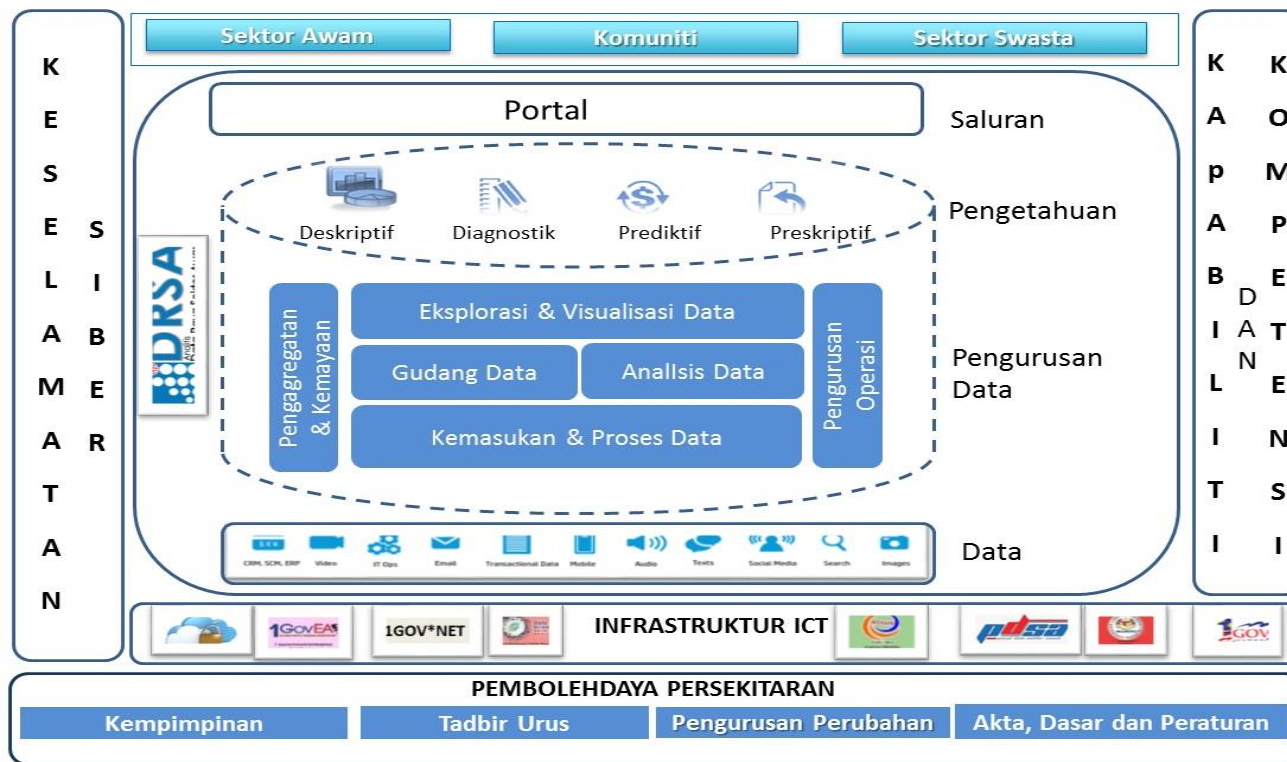
Priority Area A
Improving Governance At All Levels

Strategy A1
Reforming the political system
Strategy A2
Strengthening check and balance mechanism
Strategy A3
Improving relationship between federal, state and local governments

Priority Area C
Enforcing Prudent Public Finance Management

Strategy C1
Improving the budgeting system
Strategy C2
Enhancing procurement management
Strategy C3
Strengthening performance management, monitoring and evalution framework

Priority Area B
Elevating Integrity and Accountability

Strategy B1
Enhancing anti-corruption agenda
Strategy B2
Improving transparency
Strategy B3
Inculcating noble values and ethical work practices

Priority Area D
Enhancing Public Service Delivery

Strategy D1
Reforming public sector institutions
Strategy D2
Redesigning public services
Strategy D3
Empowering local authorities

A

C

B

D

DATA DRIVEN PROGRAMS

Framework

①

Methodology

③

Circulars

⑤

Competency Development

⑦

Open Data, Shareable Data, Classified Data

⑨

②

Governance

④

Platform

⑥

Open Data Innovation Program

⑧

Consultation and Advisory Services

PUBLIC SECTOR BIG DATA ANALYTICS (DRSA) FRAMEWORK

DRSA GOVERNANCE

DRSA METHODOLOGY

Beginning of new project or system upgrading cycle

1 Understanding Business

Identify business case, objective, users and requirements for big data analytics

7 Monitoring

Monitoring based on business needs

2 Requirements Definition

Problem statement, business questions and business needs

6 Implementation

3 Exploratory Data Analysis

Data cleaning and exploratory data analysis

5 Data Product Development

Dashboard and Visualization

4 Data Model Development

Data model development and analysis

PROJECT CYCLE

DRSA PLATFORM

Hardware
Virtualization Server
SAS VA/LASR Master
Hadoop Slave Node
Postgres-XL Data Node
Gluster Node
40GbE network switch

Software
Red Hat Enterprise Linux
Red Hat Enterprise for Virtual Data Center
Red Hat Enterprise
Hortonworks Data Platform Standard
SAS Visual Analytics
Red Hat Storage Standard
JBOSS Data Virtualization
Postgres-XL
Mi-Morphe
Mi-Intelligence
Mi-CLIP
OpenRefine
Mod Security Web Application
R Studio

DRSA CIRCULAR & GUIDELINES

KERAJAAN MALAYSIA

PEKELILING TRANSFORMASI PENTADBIRAN AWAM
BIL. 1 TAHUN 2017

PELAKSANAAN ANALITIS
DATA RAYA SEKTOR AWAM (aDRSA)

KANDUNGAN

3 JANUARY 2017

PUBLIC SECTOR
BIG DATA ANALYTICS INITIATIVES

DRSA PROJECTS (2015-2018)

BDA-Digital Government Open Innovation Network (BDA-GDOIN)

Data Optimization Transformation Services (GDOTS)

Public Sector Big Data Analytics (DRSA) Pilot Projects

Public Sector Big Data Analytics (DRSA) Coaching

Data Analytics Digital Transformation (TDDA)
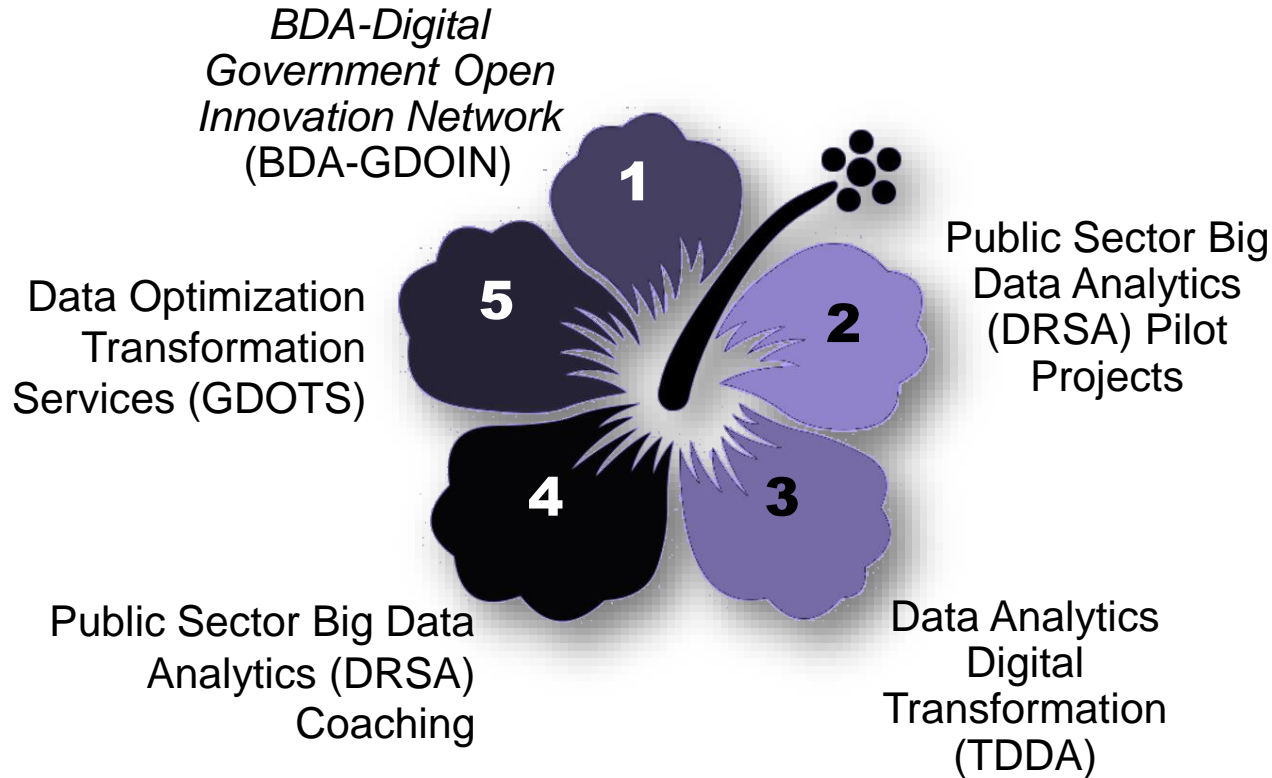
BDA-OPEN INNOVATION NETWORK (BDA-DGOIN)

- Implemented as *Proof Of Concept* (POC) from **29 Jan 2015 – 28 Jan 2016 (12 months)**
- Strategic collaboration between MAMPU-MDEC-MIMOS and MOF, JAKIM, JPS and NAHRIM (5 business cases)

Insight on Islamic extremism among citizens

Analyse dan build Fiscal Economy Model

Develop flood knowledge base based on combination of sensor data and social media data
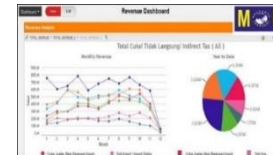
Sentiment analysis on cost of living based on social media data
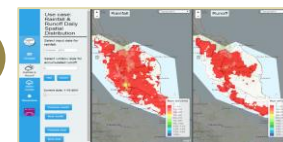
Exploration for 90 years of rainfall based on riverbank overflow data

MDEC — Management
MAMPU — Facilitator
MIMOS — Technology and Platform

DRSA PILOT PROJECT

- Implemented as pilot project from **10 March 2015 – 9 March 2016 (12 months)**
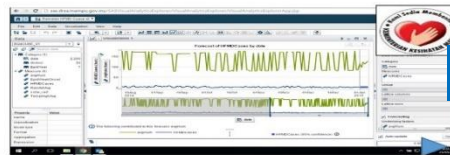- Four (4) agencies involved: MAMPU, KPDNKK, KKM and PDRM (4 business cases)

Framework ① — MAMPU DRSA — ② Platform located at PDSA within 1Gov*Net

③ Methodology

Governance ⑤ — ④ Guideline
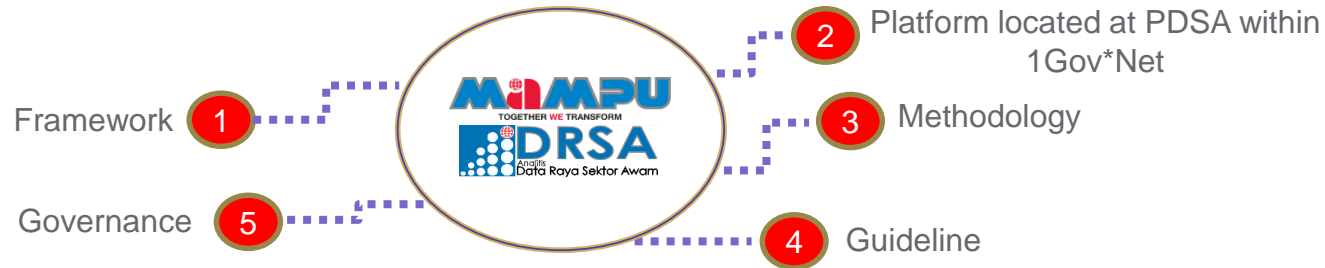
Development of 4 Data Analytics

Crime Prevention
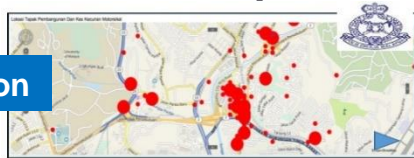
Infectious Disease Prediction

Price Monitoring

Sentiment Analysis

DATA ANALYTICS DIGITAL TRANSFORMATION (TTDA)

- Implemented as p*roof of concept* (POC) from **1 October 2015 – 31 December 2015 (3 months)**
- Strategic collaboration between MAMPU and KPDNKK, MOA, LKIM, FAMA, MOF, DOSM for *Price of Goods* business case
- Display goods price trends according to weather (rain), GST implementation, festive seasons, petrol price increase, and toll increase.
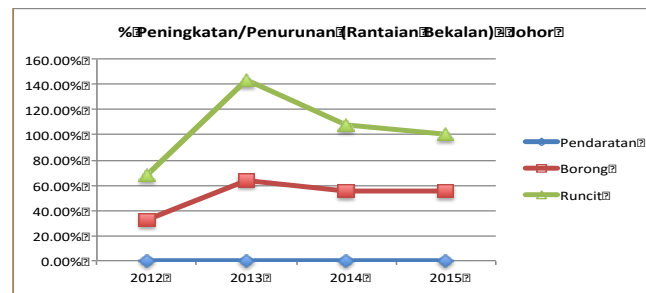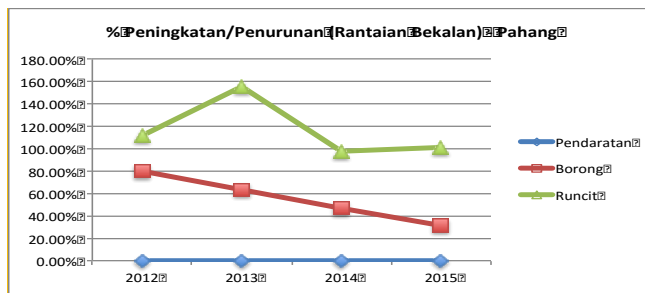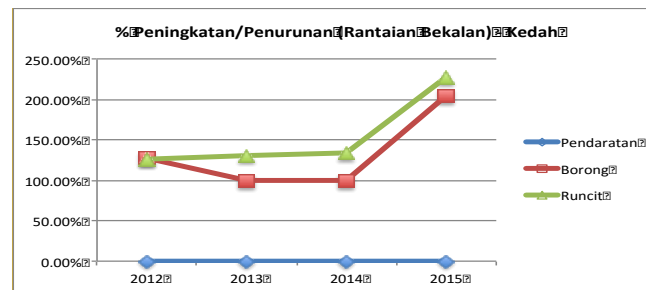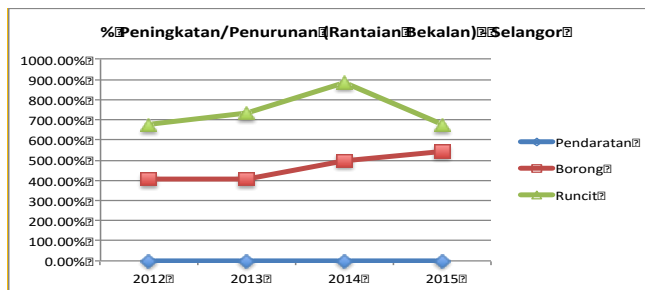
DRSA THROUGH COACHING

- Data product development via coaching method by company and MAMPU with public sector agencies from **23 Nov 2016 – 22 Nov 2017 (12 months)**.
- Consists of hands-on training for in-house data product/BDA development using R Studio analytics tool.

BIL.	MINISTRY/AGENCY	*BUSINESS CASE*
1.	Kementerian Kewangan Malaysia (MOF)	MOF Related Social Media Monitoring
2.	Kementerian Sumber Manusia (KSM)	Increasing Marketability for Job Seekers
3.	Suruhanjaya Perkhidmatan Awam (SPA)	Seamless Job Recruitment
4.	Kementerian Pengangkutan Malaysia (MOT)	Competitive and Efficient Port Klang Services
5.	Kementerian Pendidikan Malaysia (MOE)	Solution for Student Dropout from Malaysian Education System
6.	Jabatan Perikanan Malaysia (DOF), Kementerian Pertanian dan Industri Asas Tani (MOA)	Aquaculture Location Selection
7.	Institut Penyelidikan dan Kemajuan Pertanian Malaysia (MARDI)	Paddy Quality and Productivity Increase
8.	Kementerian Tenaga, Teknologi Hijau dan Air (KeTTHA)	Domestic Water Use in Malaysia
9.	Kementerian Perdagangan Antarabangsa dan Industri (MITI)	Halal Production Industry Issue Management
10.	Jabatan Audit Negara	Audit Finding (Financial)
11.	MAMPU	MyCC Service Improvement
12.	Bahagian Penyelidikan, JPM	Citizen Sentiment

DRSA THROUGH COACHING

Kementerian Perdagangan Antarabangsa dan Industri (MITI)
- Halal Development Corporation (HDC)

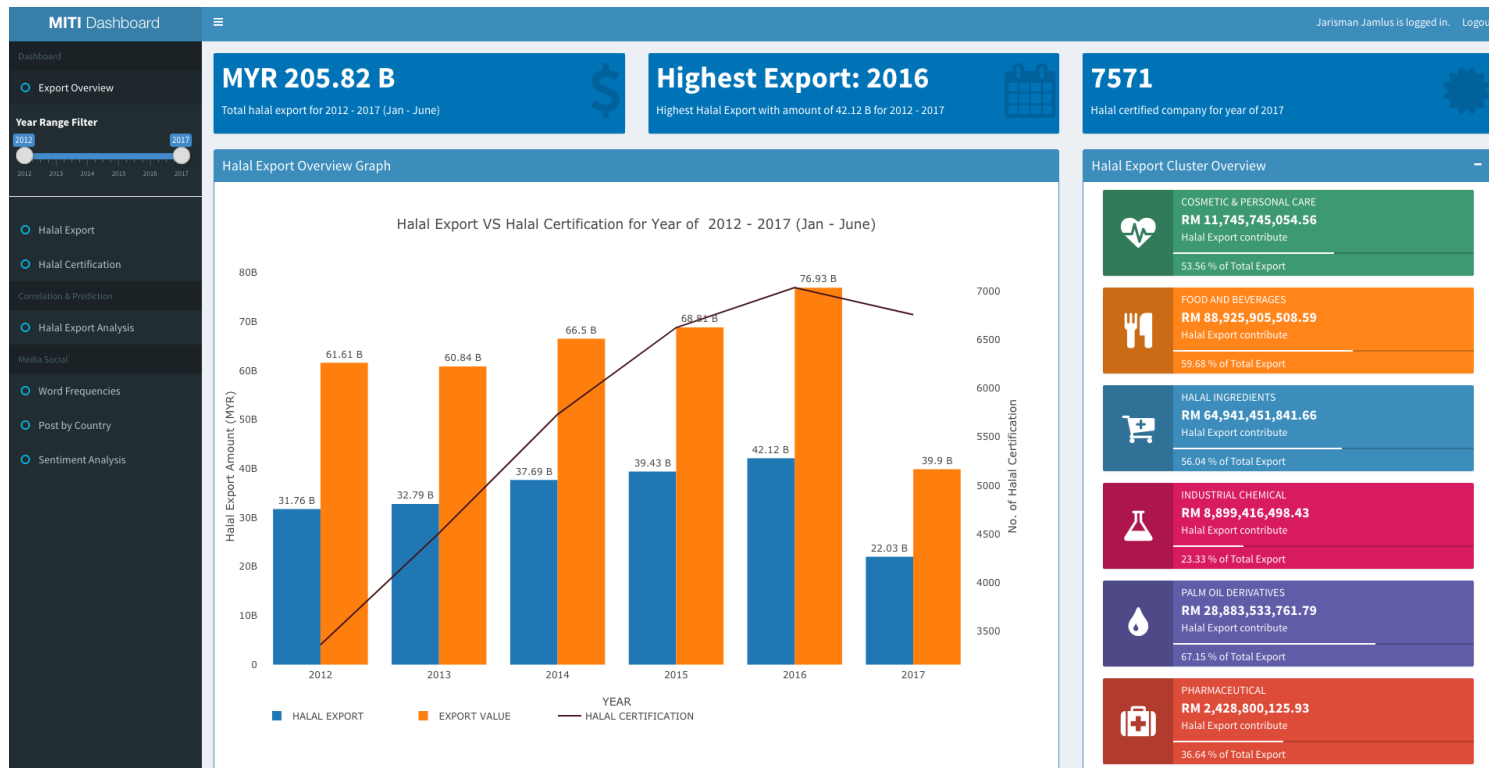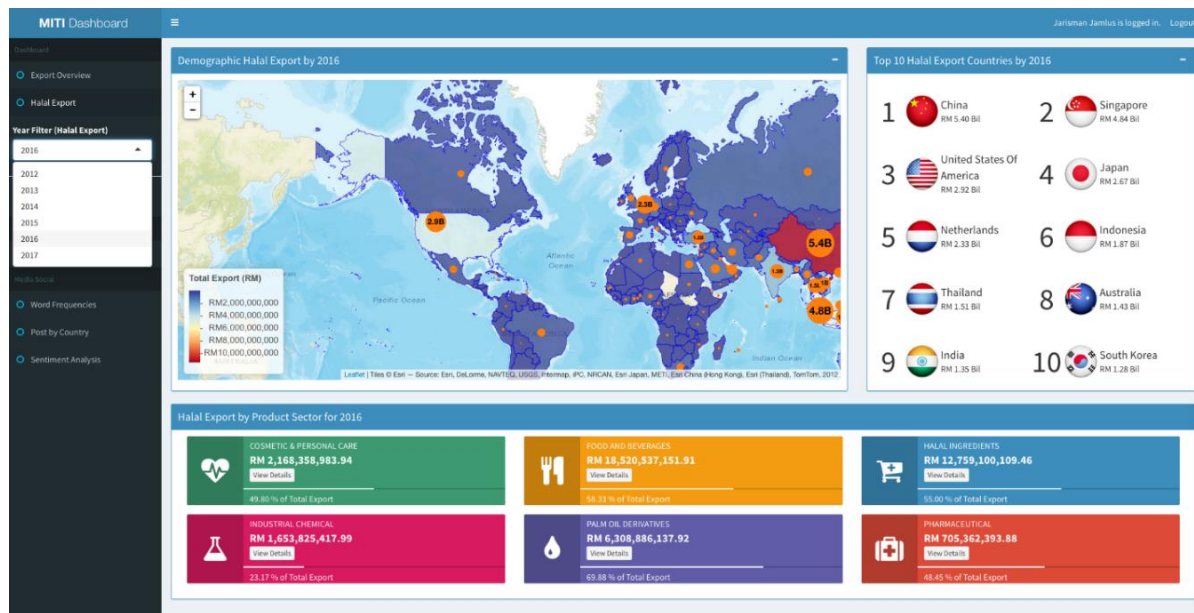| Business Case	Halal Production Industry Issue Management
Objective	Improve nation's trade value through development of small and medium industries (SMI) focusing on halal industry.

HDC

HALAL

BIG DATA ANALYTICS (BDA)

WITH COLLABORATION

MATRADE

Jabatan Perangkaan MALAYSIA

JAKIM

FAMA

SME CORP MALAYSIA

moa INCORPORATED
KEMENTERIAN PERTANIAN DAN INDUSTRI ASAS TANI

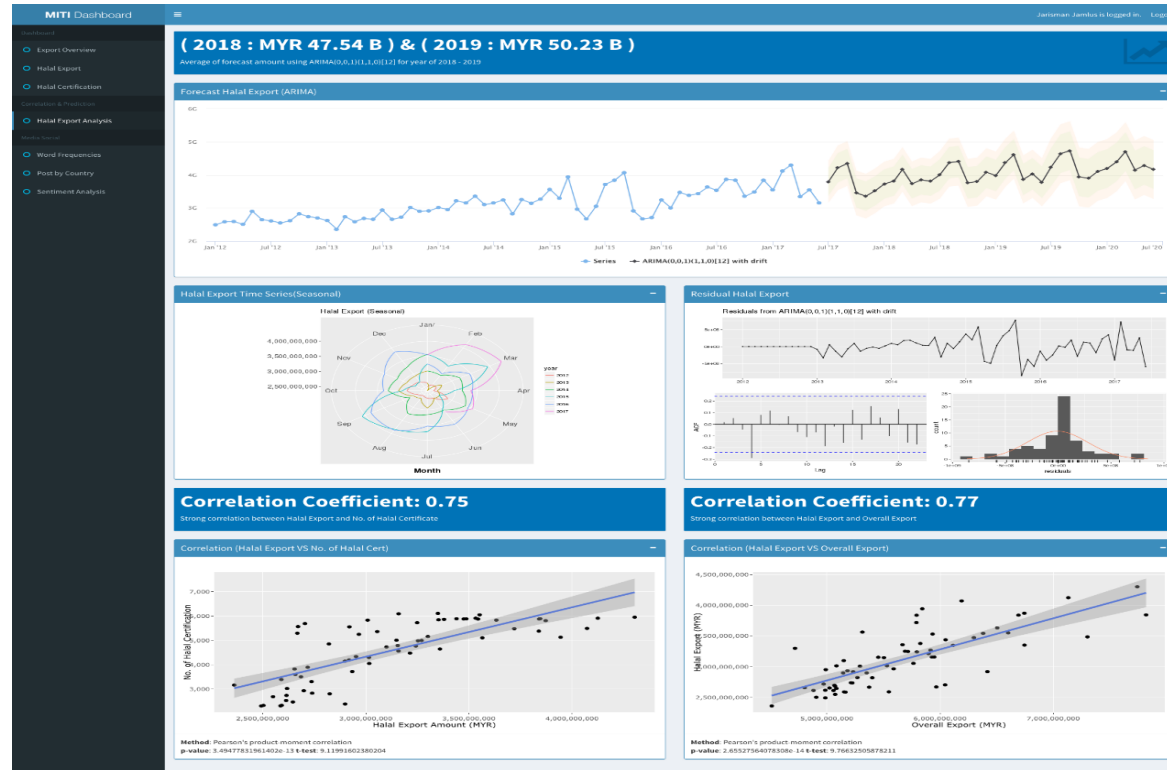# HDC DASHBOARD: OVERALL VIEW

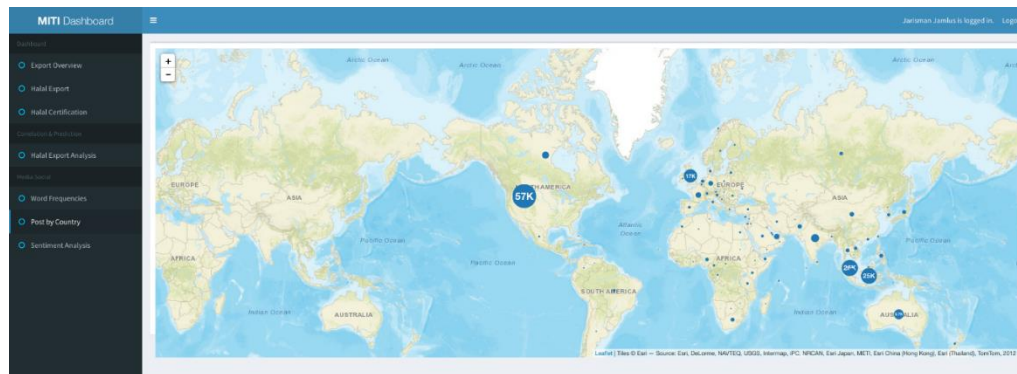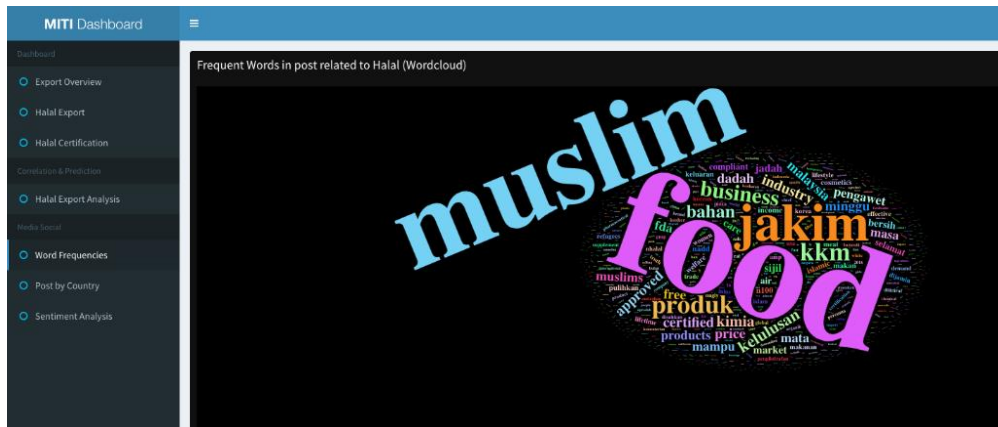# HDC DASHBOARD: HALAL EXPORTS

HDC DASHBOARD : HALAL CERTIFICATION
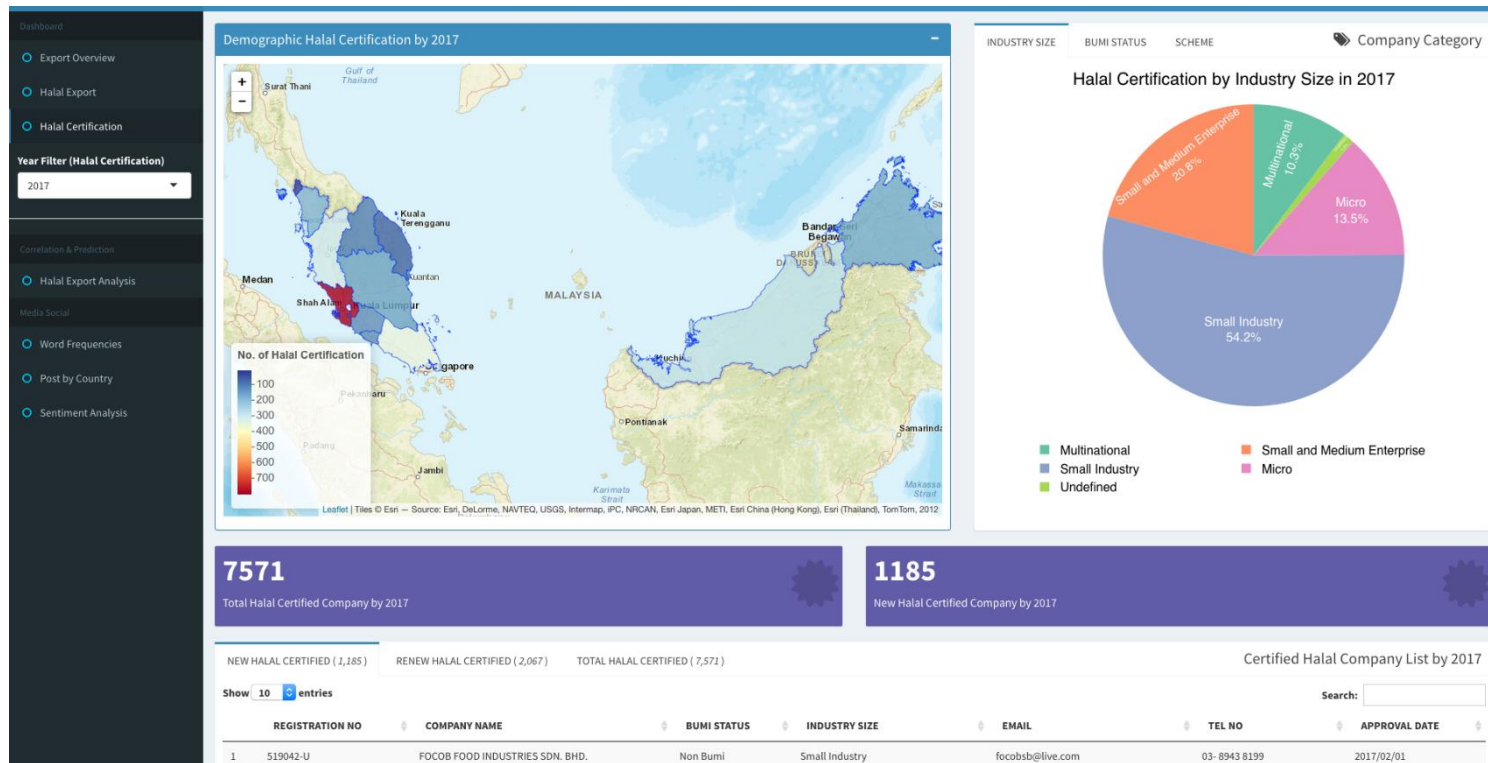
HDC DASHBOARD: PREDICTION ANALYTICS

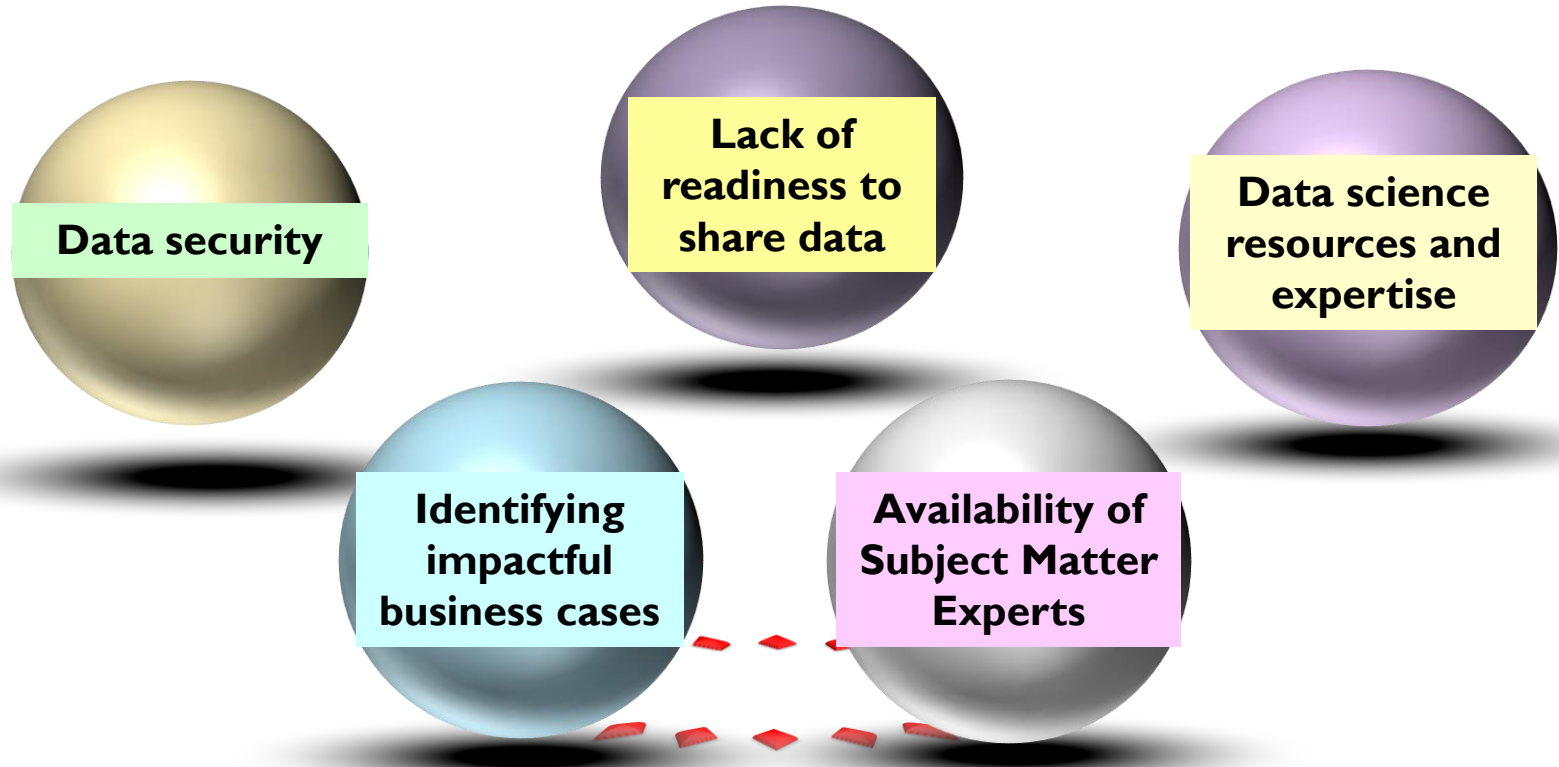# HDC DASHBOARD : SENTIMENT ANALYSIS

CHALLENGES

ISSUES AND CHALLENGES

Data security

Lack of readiness to share data

Data science resources and expertise

Identifying impactful business cases

Availability of Subject Matter Experts

CRITICAL SUCCESS FACTOR

Top management support and commitment

Readiness of agencies to share data

Commitment of respective domains' *Subject Matter Expert*

Knowledge and competency in data science

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