

### BACKGROUND

- **Change** is inevitable, **Ability to adapt** the changes make human successful creature on earth.
- **Business Intelligence** Domain is **no different**, changes on the business and technology impact the practice.
- The **promise** of **Normalized System Theory** developed by University of Antwerp to have an evolvable software system that are able to cope with changes has bring an attention.
- Ability to reduce **the combinatorial effect** of the changes to the system by introducing **theorems** and **elements**.
- **To research the practice** of **business intelligence** on **main issues on change using the theory** that answering the issue of changes

### OBJECTIVES

1. To **contribute** to the **shortcomings** in the existing **Business Intelligence Architecture practices** in **designing the artifact** that are **evolvable** to the anticipated continuous changes.
2. To **contribute** to the existing **scientific knowledge** on Information System field specifically on **application of Normalized System**

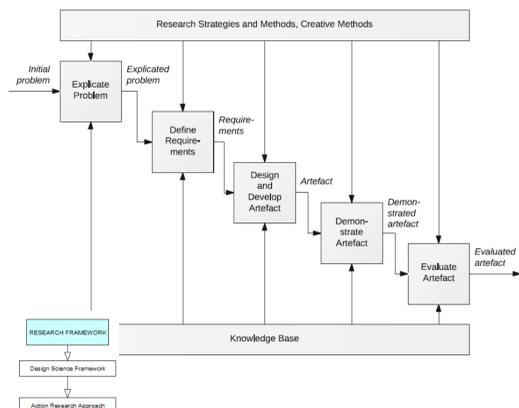
### RESEARCH QUESTIONS

1. **What new BI architecture** artifacts look like if **normalized system theory** will be **apply** to overcome the issues of change
2. **How well** the **new BI architecture** artifacts base on normalized system theory will **fulfil it main purpose** for **anticipating changes**

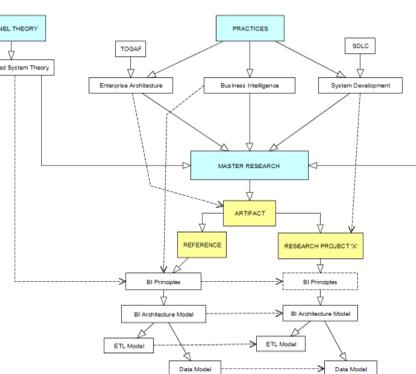
### METHODOLOGY

#### Design Science Framework Method.

Focus on Demonstration and Evaluation of Artifacts



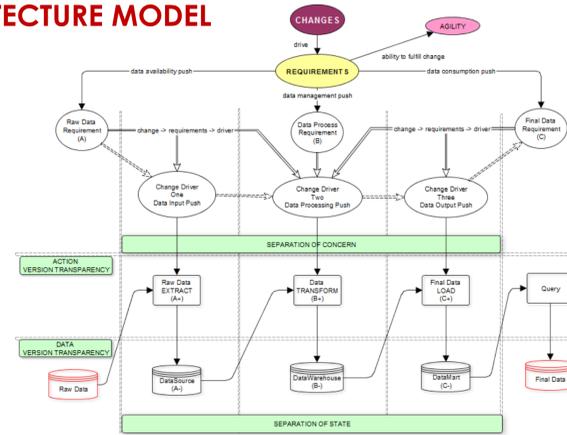
**Research MetaModel**  
Experiment on Reference Architecture and Action Research on Project 'X' Architecture



### ARTIFACTS DEMONSTRATION

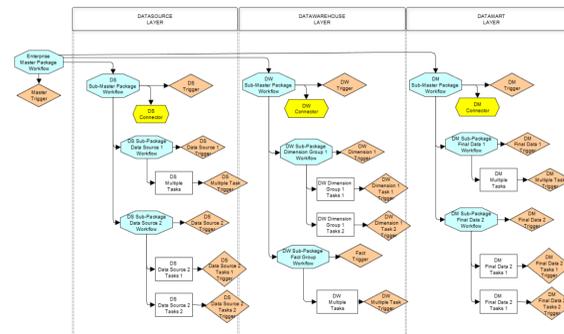
#### BI REFERENCE ARCHITECTURE MODEL

On High level, different architecture elements are created to fulfil NS Theorem on **Separation of Concern (SOC)**, **Separation of State (SOS)**, **Data Version Transparency (DVT)**, **Action Version Transparency (AVT)**



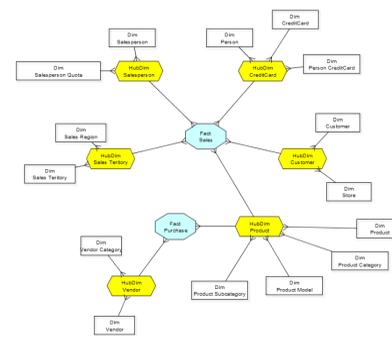
#### BI REFERENCE ETL MODEL

On Action level, different architecture elements are created to fulfil NS Theorem on **Workflow, Action, Trigger & Connector**



#### BI REFERENCE DATA MODEL (DW)

On Data level, different architecture elements are created to fulfil NS Theorem on **Data** and within **Separation of Concern**



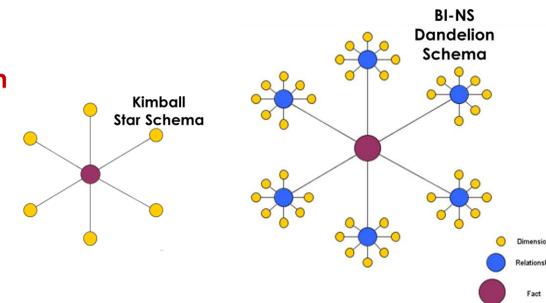
#### BI PROJECT 'X' ARCHITECTURE ARTIFACTS

Several artifacts on the real project has been created base on the reference Architecture.

### ARTIFACTS EVALUATION

#### EX-ANTE EVALUATION

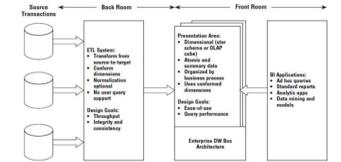
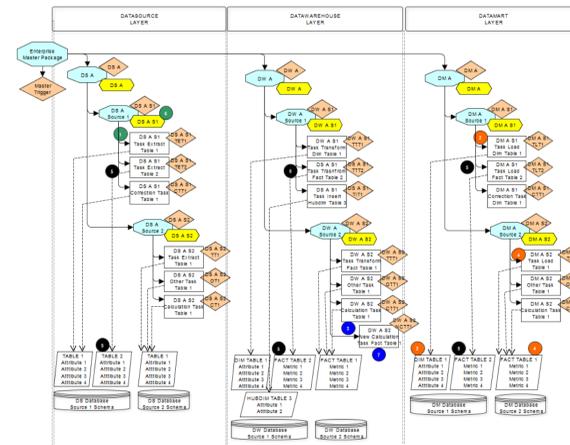
**Data Model Comparison** with Kimball Star Schema and New Data Model 'Dandelion Schema'



### ARTIFACTS EVALUATION

#### EX-ANTE EVALUATION

**Architecture Comparison** With Kimball Bus Architecture



**Combinatorial Effect Scenario**  
Minimal Impact on Changes on all elements

#### EX-POST EVALUATION

- Two major changes during the project 'X' shown amount of changes due to modular structure.
- Other significant impact are reduce time to redesign, redevelop and retest.
- Quality of changes also improve as less break-fix to the changes.

### CONCLUSION

#### ANSWER TO RQ 1

The new BI architecture artifact are develop and describe. Includes reference architecture and project architecture artifact with detail component such as principles, architecture model, ETL model and data model with different abstraction level conceptual, logical and physical.

#### ANSWER TO RQ 2

Two examples of significant changes during the project is evaluated to see the ability to anticipate the changes with positive result. New artifact has improved the quality in SDLC process specifically in testing. The time & risk has been reduced while quality and satisfaction is increase

### REFERENCES

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