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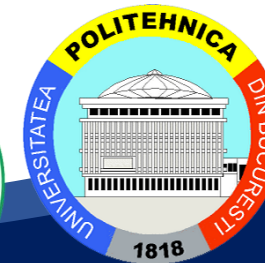


# Course 15: Customer Experience-Driven Design

**Module 2:** Customer Experience Value Creation

**Topic 3:** Product-Service System [1/2]

Pisut Koomsap (AIT), Duangthida Hussadintorn Na Ayutthaya (AIT)



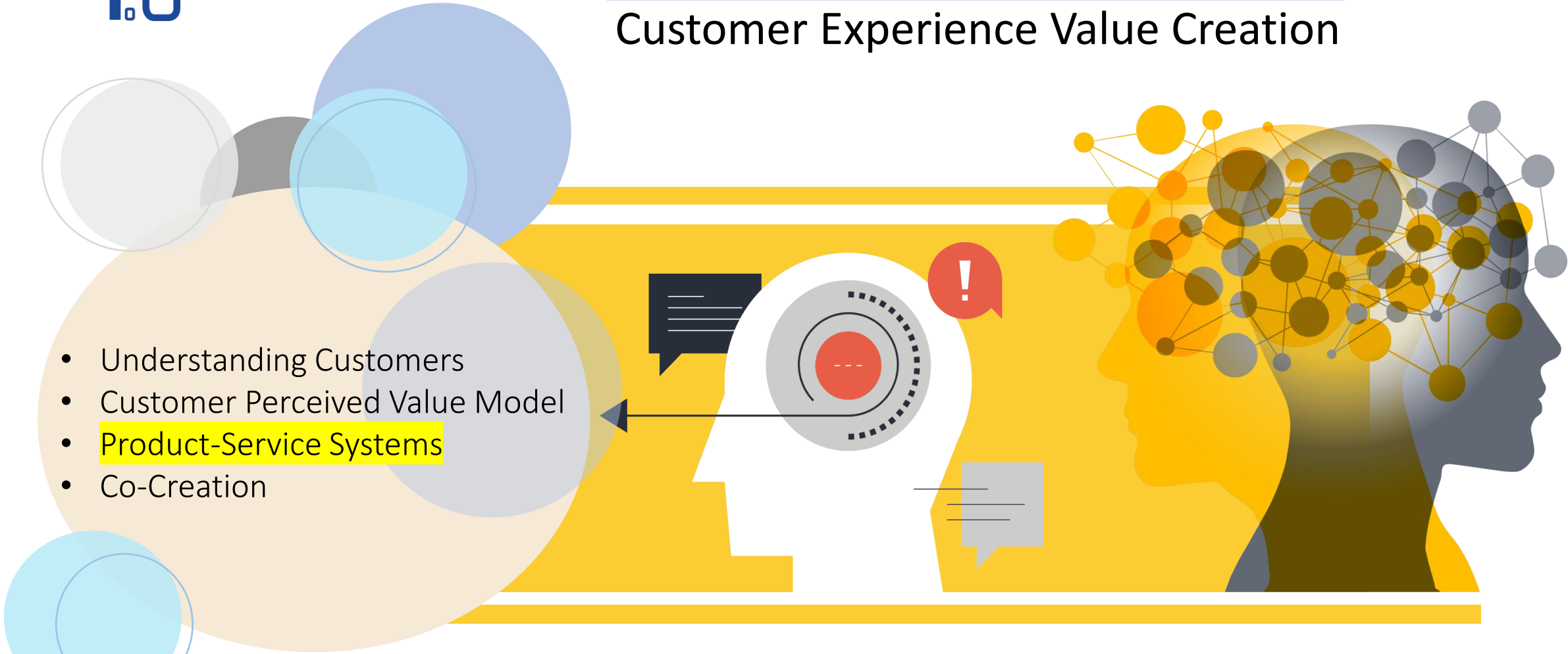
Curriculum Development  
of Master's Degree Program in

Industrial Engineering for Thailand Sustainable Smart Industry

## Module II

### Customer Experience Value Creation

- Understanding Customers
- Customer Perceived Value Model
- **Product-Service Systems**
- Co-Creation



# Introduction



# Product-Service System



## Product-Service System

Product-Service System (PSS) is a system of products, services, that continuously strives to be competitive, satisfy customer needs and have a lower environmental impact (Goedkoop et al. 1999)

PSS

Product Oriented  
*(Service with the Product)*

Use Oriented  
*(Sells usage or functions)*

Result Oriented  
*(Shift from buying product to buying services)*



Buying a Vehicle



Renting a Vehicle



Acquiring a taxi service



MSE 4.0

Vehicles



Cleaning



PSS  
Examples

Transportation



Dining



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# Challenges in Providing PSS



Customer



Manufacturers/ service providers fails to provide the desired service/ product due to **diversified customer demand**  
*(Tsai and Chiu, 2017)*



Co-Creation

Vehicles



Dining



Why Co-Creation?

Allowing the customer design the PSS or letting the customer design the product as a Product Service will **increase customer satisfaction** (*Tran and Park, 2015*)

Providing **personalized PSS** by letting customers decide the expected service characteristics will drastically **increase customer satisfaction** (*Tsai and Chiu, 2017*)

Even in failed outcome, customer will be **unhappy with themselves** with guilt (*Heidenreich et al., 2015*)



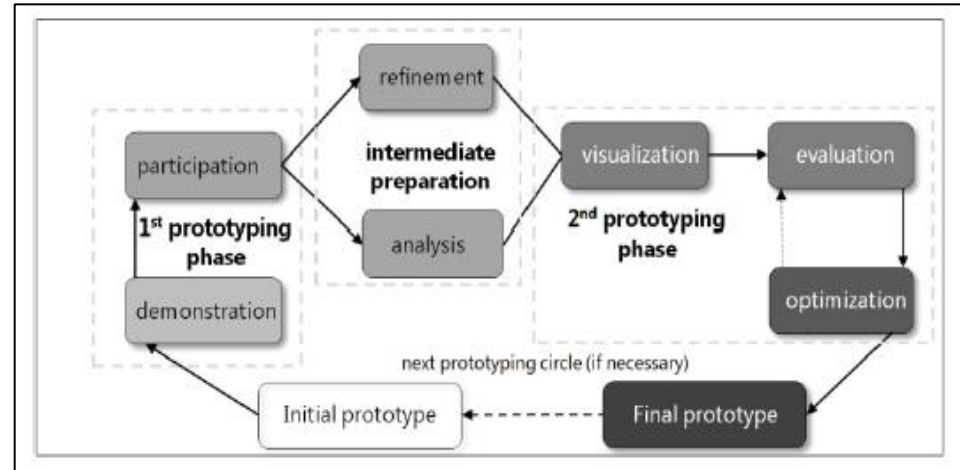




# Why Co-Creation?

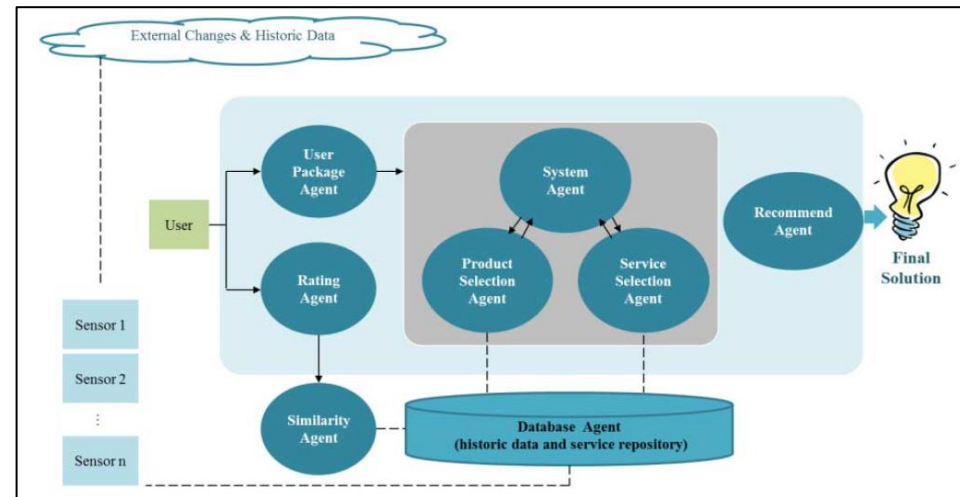
To design a complete PSS

- by, Tuananh Tran, 2015



Allowing only to select service characteristics

- by, Tsai and Chiu, 2017



Vehicles

# Challenges in Co-Creation



Customer failing to obtain the desired product/service due to **lack of knowledge** (Heidenreich et al., 2015)

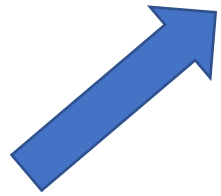


Dining



Vehicles

## Challenges of Co-Creation in PSS



Focus on product service systems as a whole **without considering the characteristics** of different types of PSS types.



Selection of the **suitable PSS** has not been discussed



Negative effect on customers with **lack of knowledge** has not been considered



Dining



## Personalized PSS Process

### Personalized Product Service System Using Analytic Hierarchy Process

#### Content Based on:

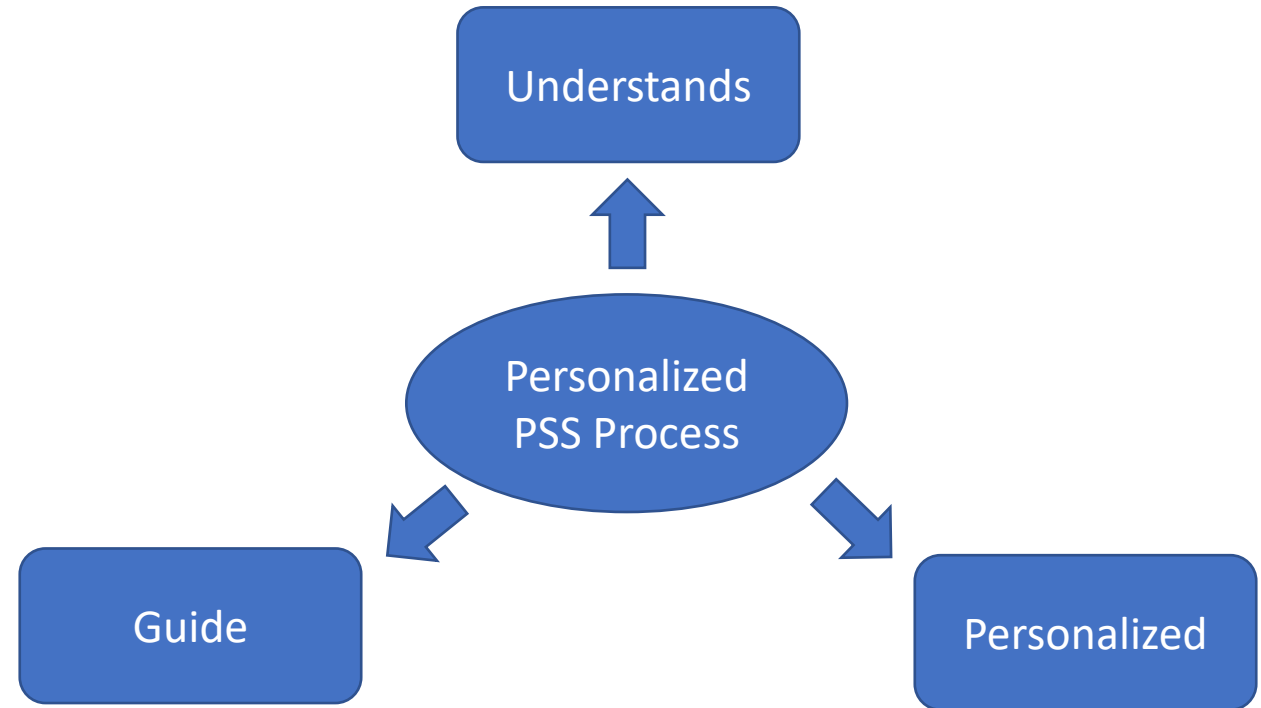
Pemasiri, M. A. J. Y. (2018, May). *Design of Personalized Product Service System Using an Analytic Hierarchy Process* (Master's thesis). Pathumthani, Thailand: Asian Institute of Technology.



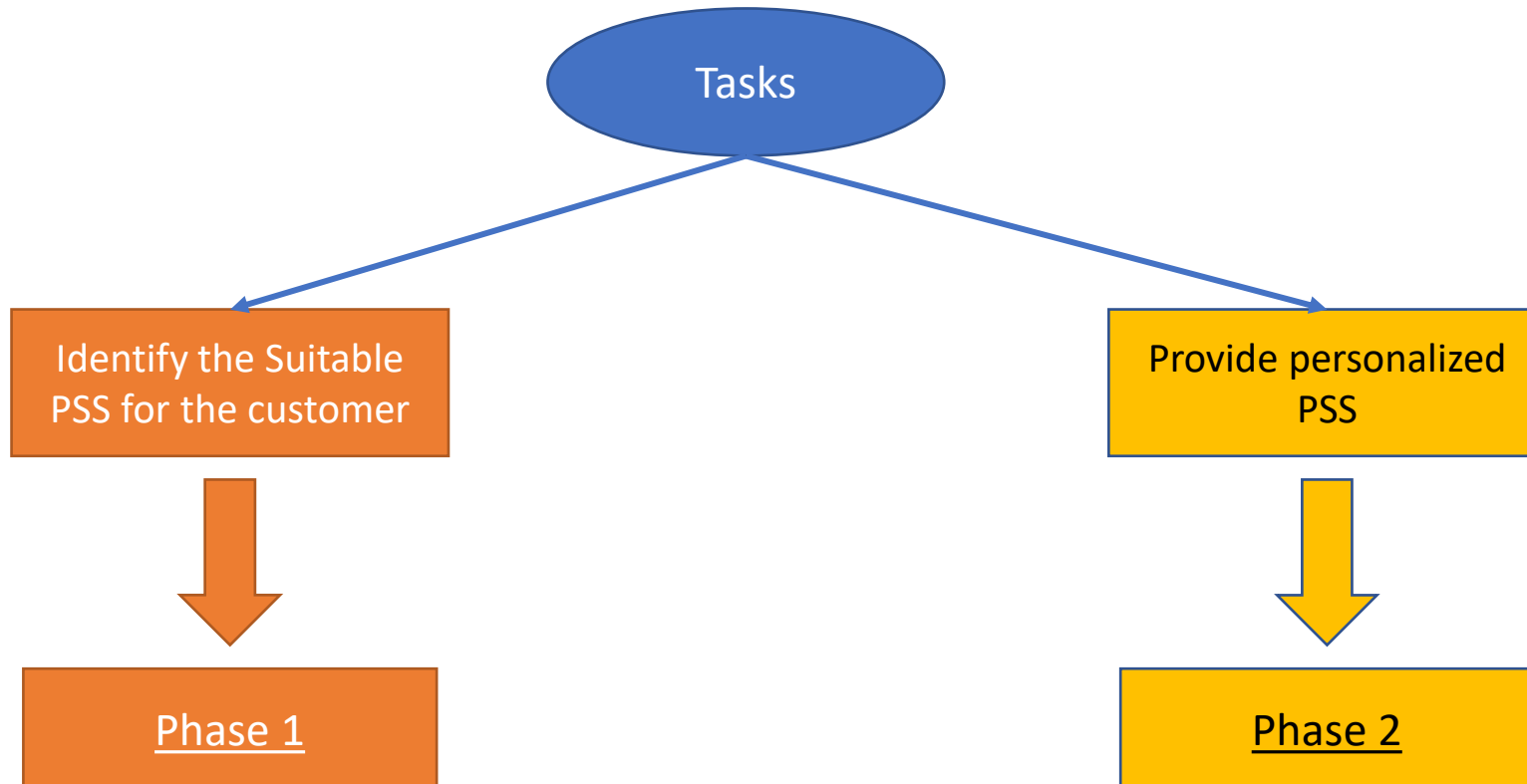
# Personalized PSS Process

## Objective of the Process:

To provide personalized product service system and to guide the customer to select the most suitable product service system

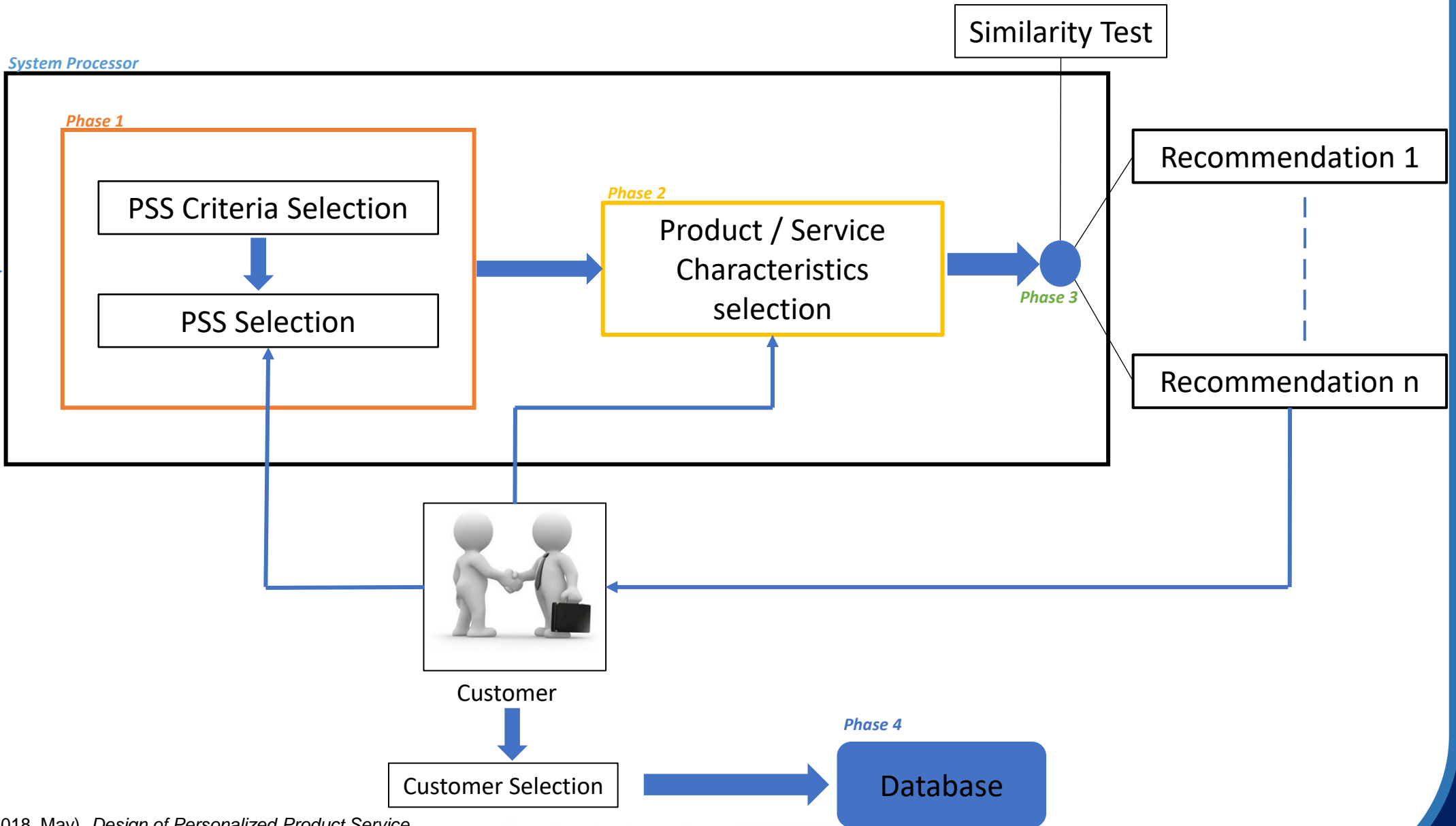


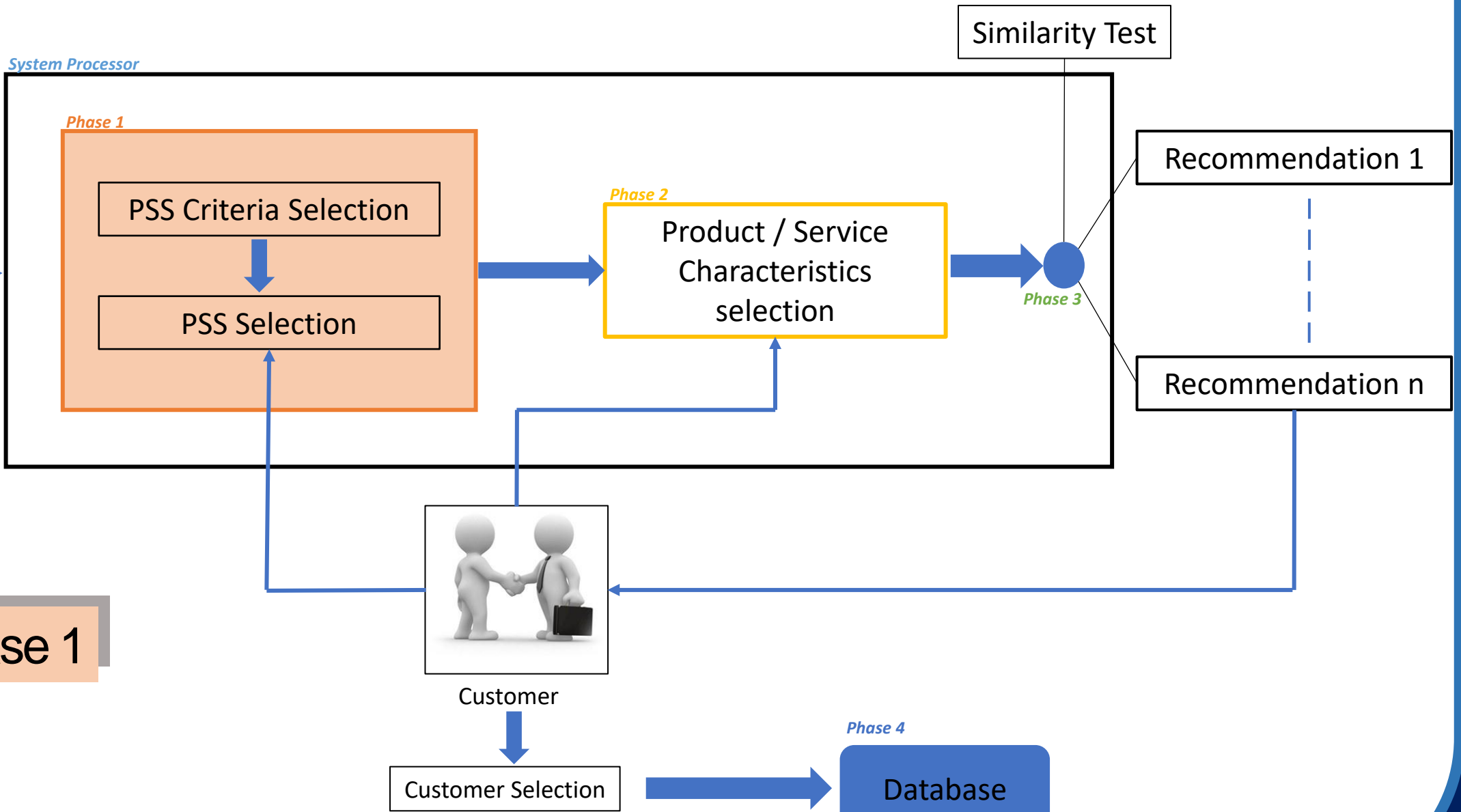
# Personalized PSS Process





Manufacturer



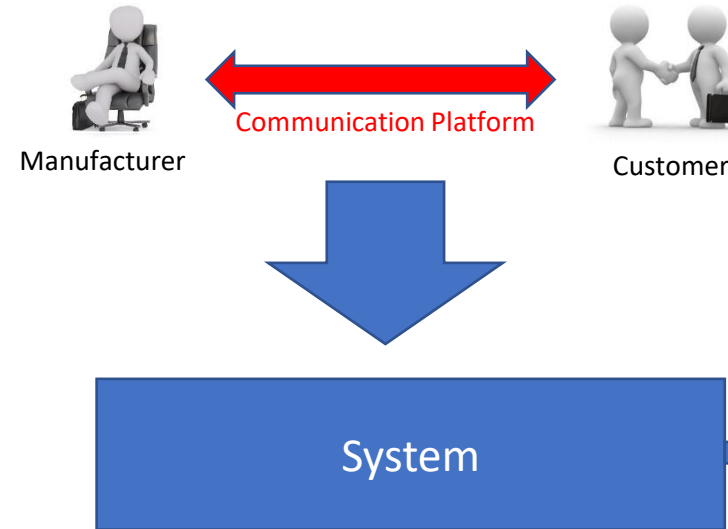
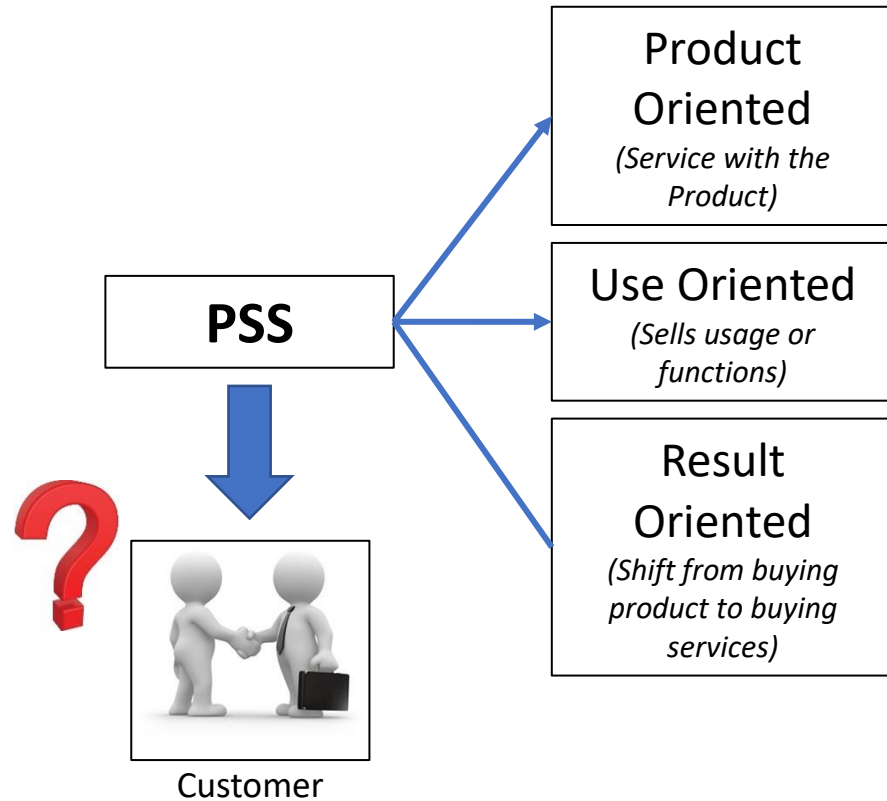


Phase 1



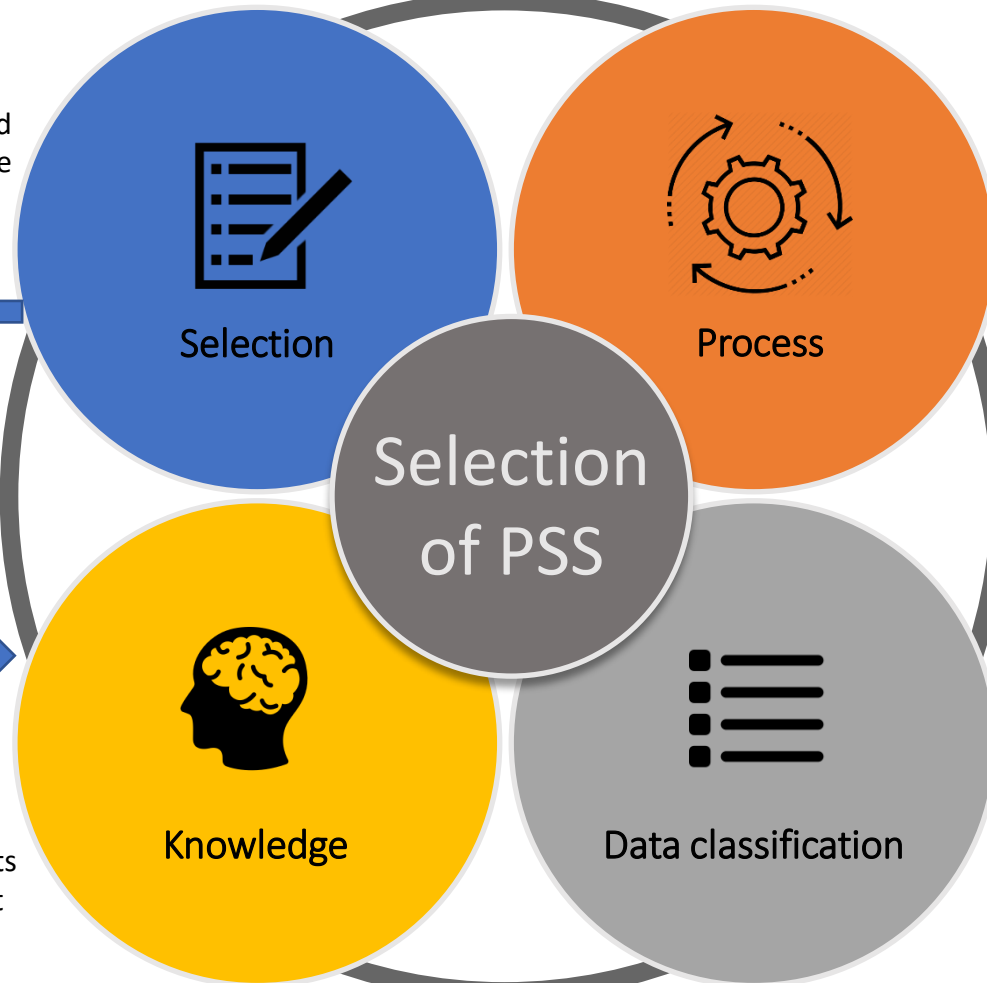


# Phase 1 : Identify the best-fit PSS



## Phase 1 : Identify the best-fit PSS

Select the appropriate PSS and send results to phase two to customize the PSS



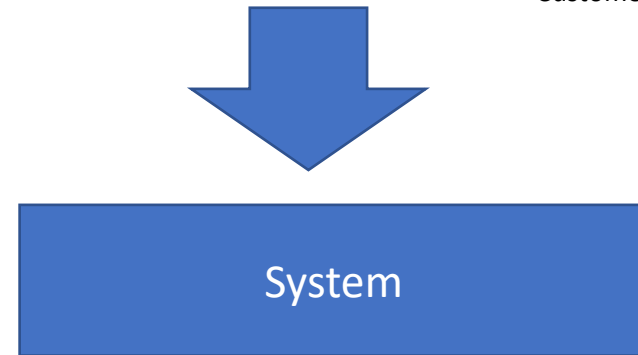
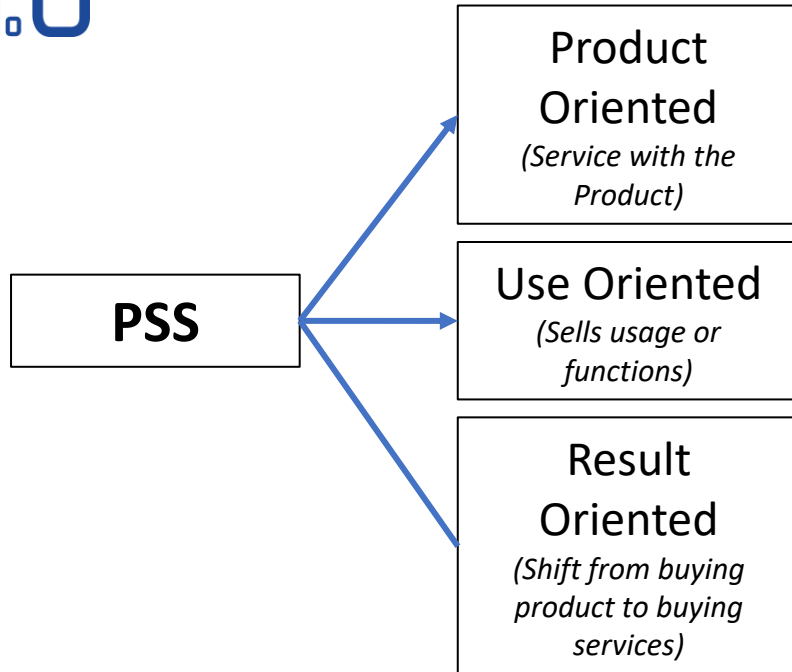
By using AHP tool to determine the weights for each PSS to determine priorities

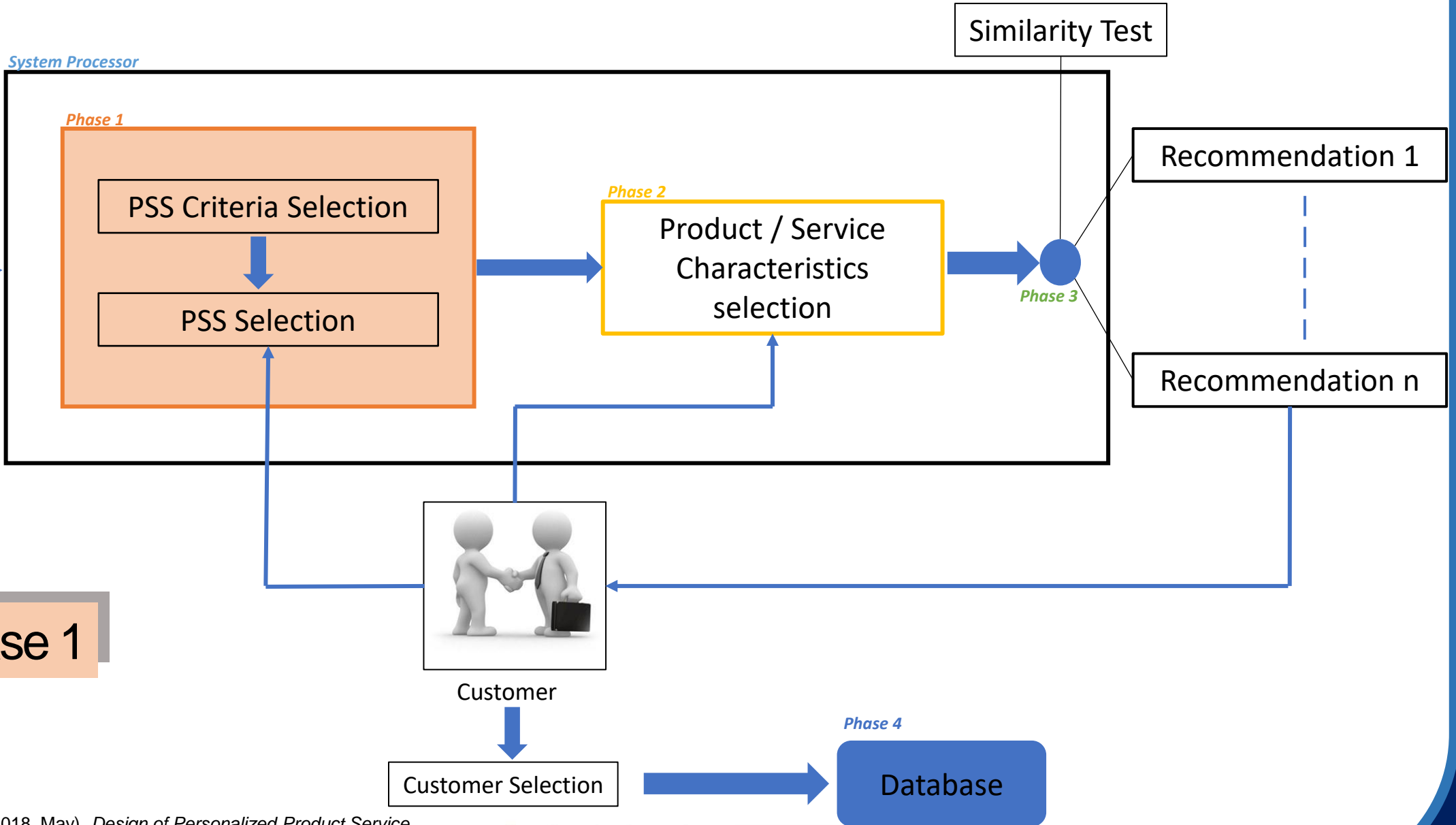
Knowledge of purpose and requirements of using PSS and the factors related to it

Determine the measurement components and appropriate scales for AHP calculations



# Phase 1 : Identify the best-fit PSS



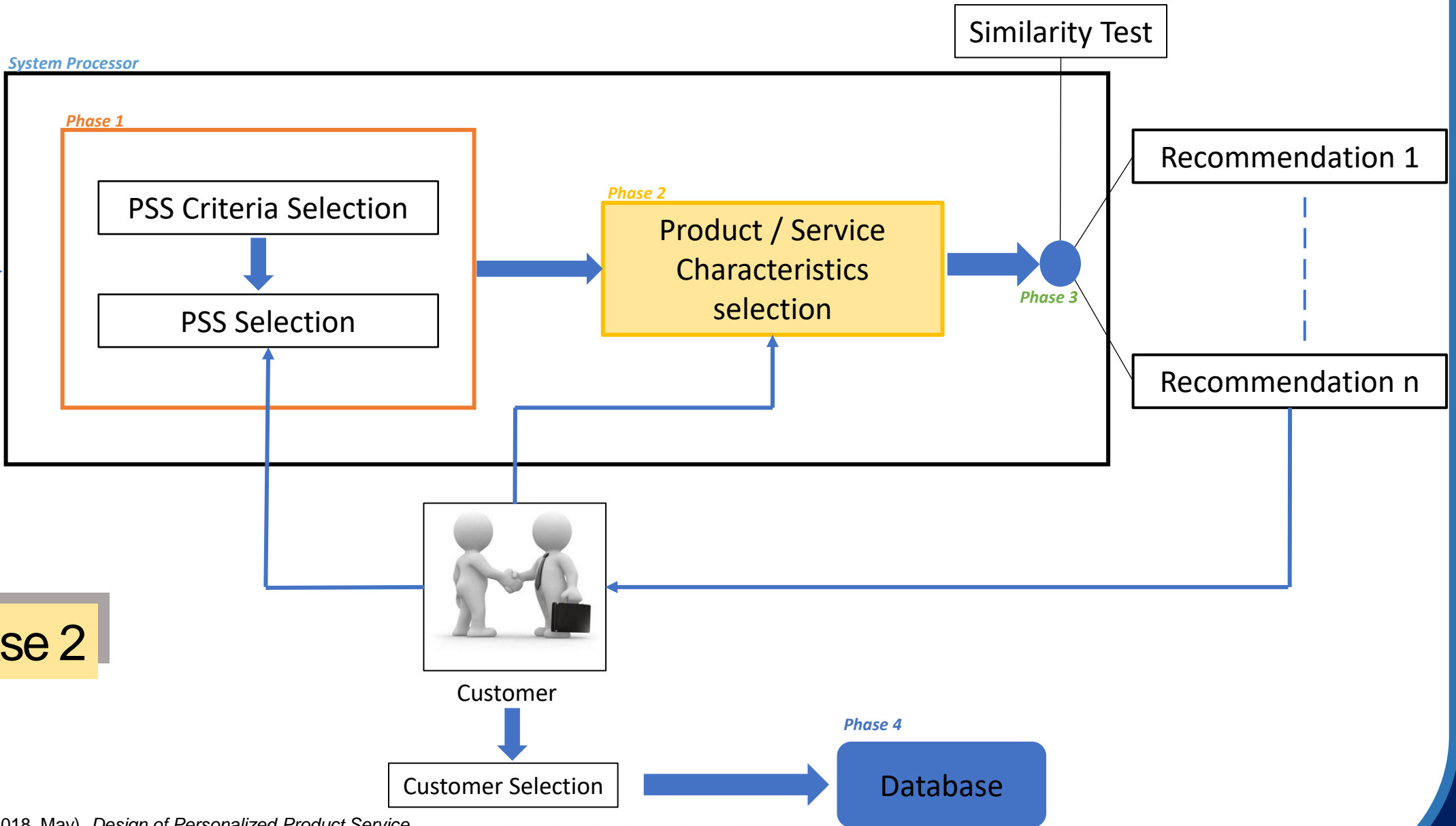


# Phase 1





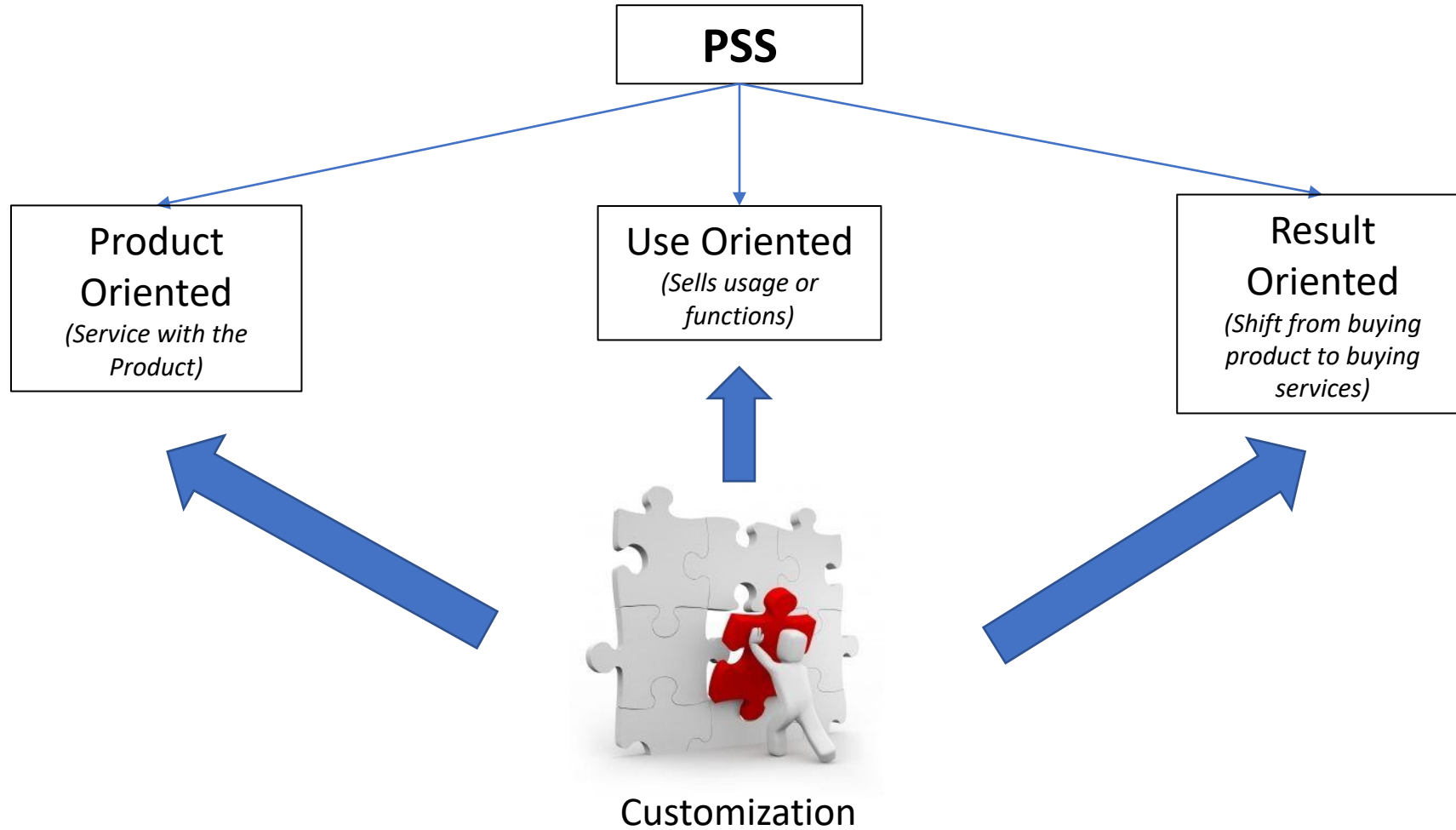
Manufacturer



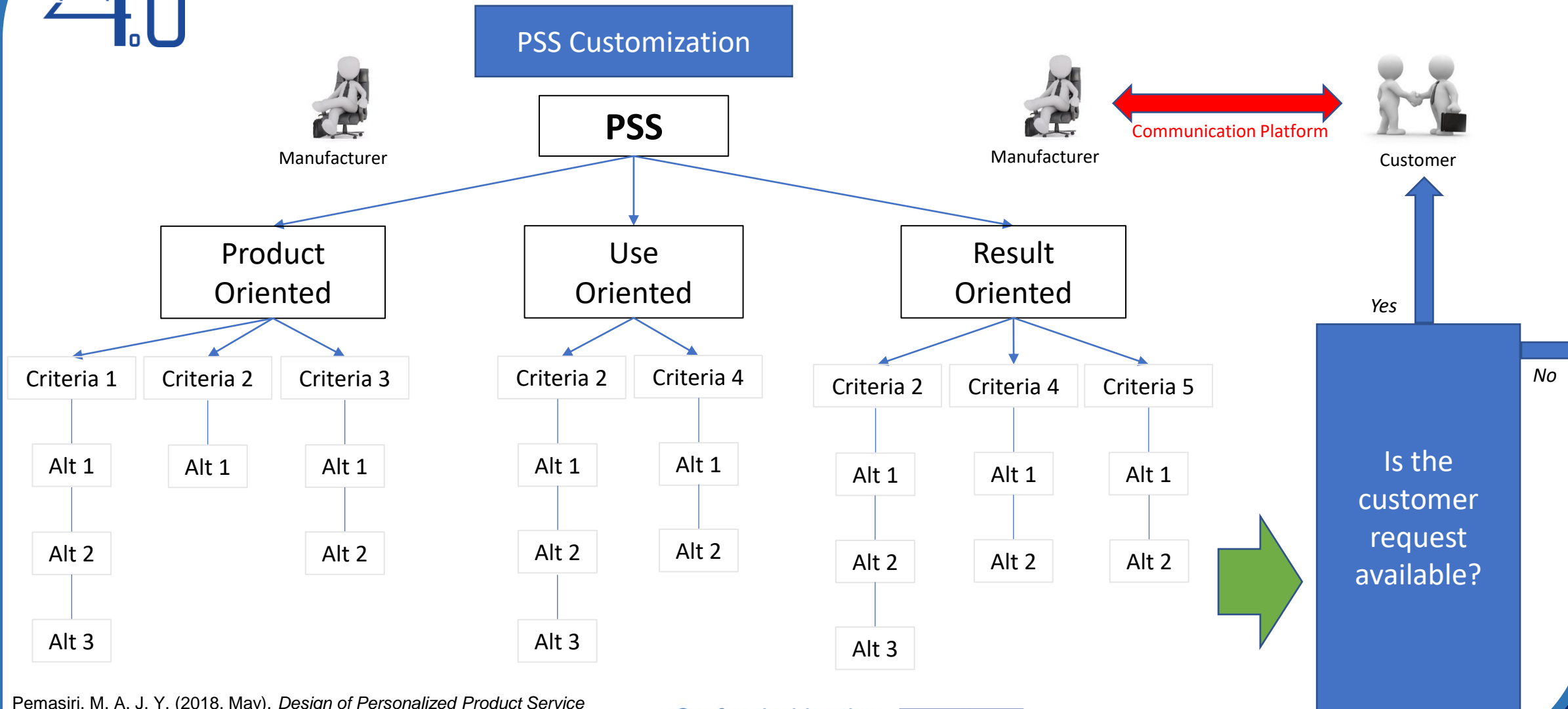
Phase 2



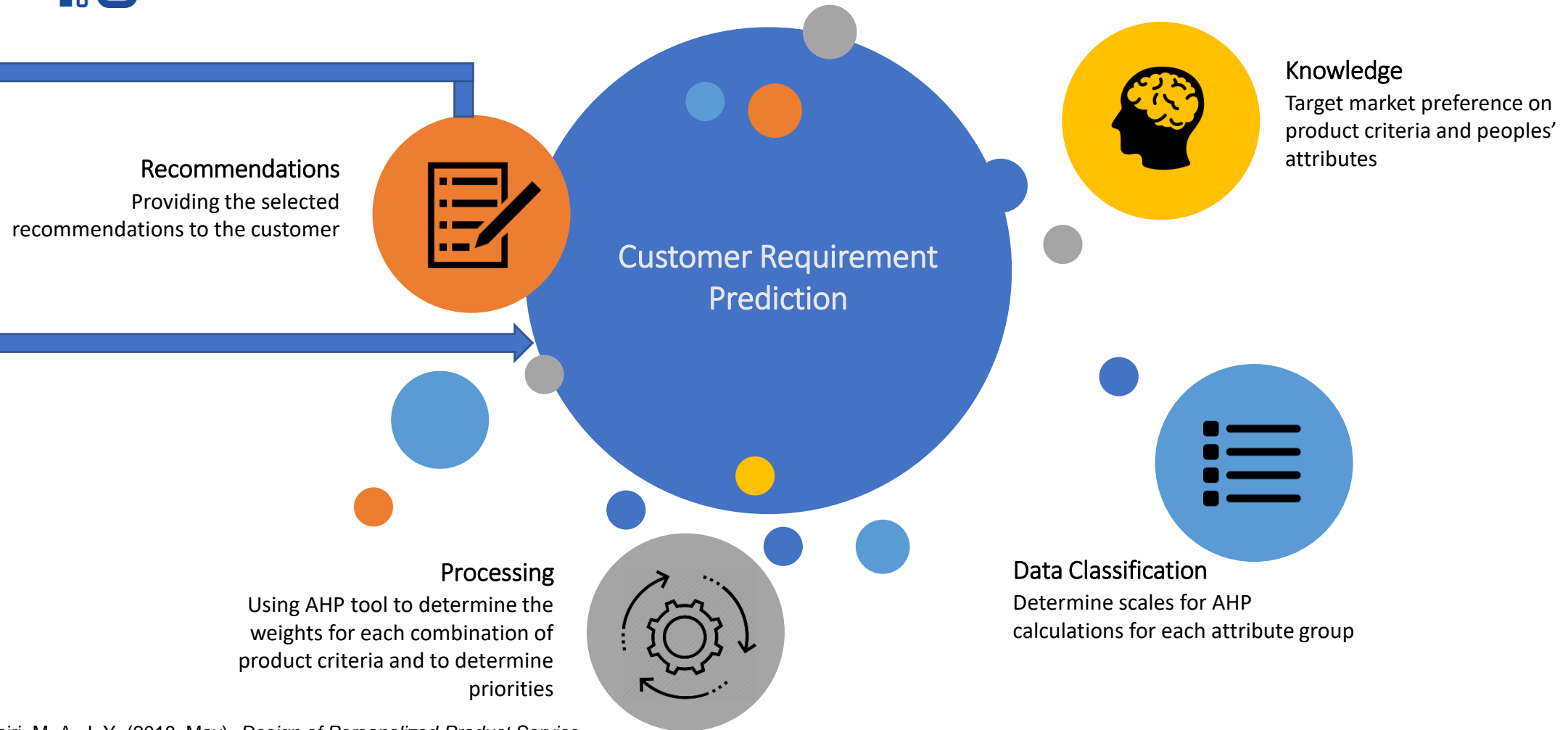
## Phase 2 : Provide personalized PSS



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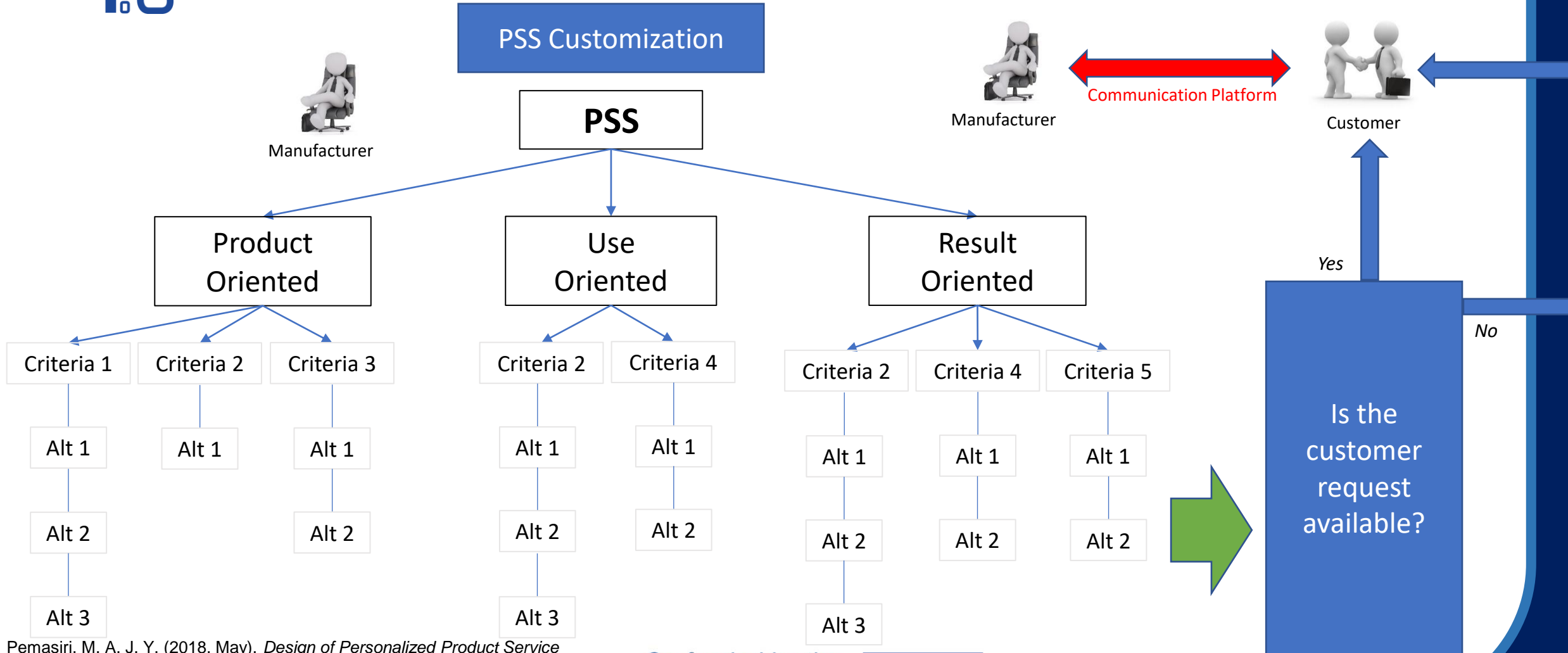


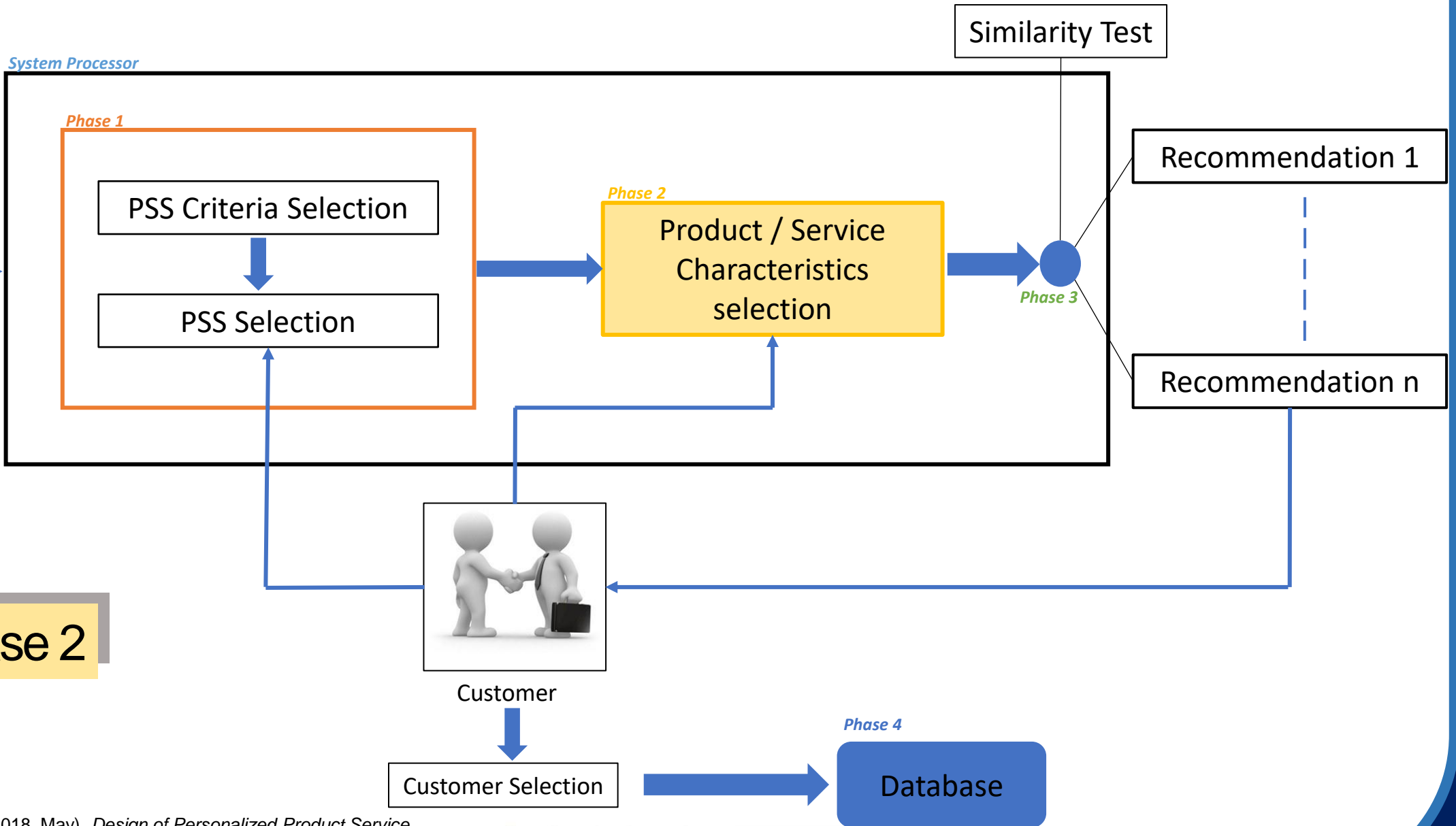
## Phase 2 : Provide personalized PSS





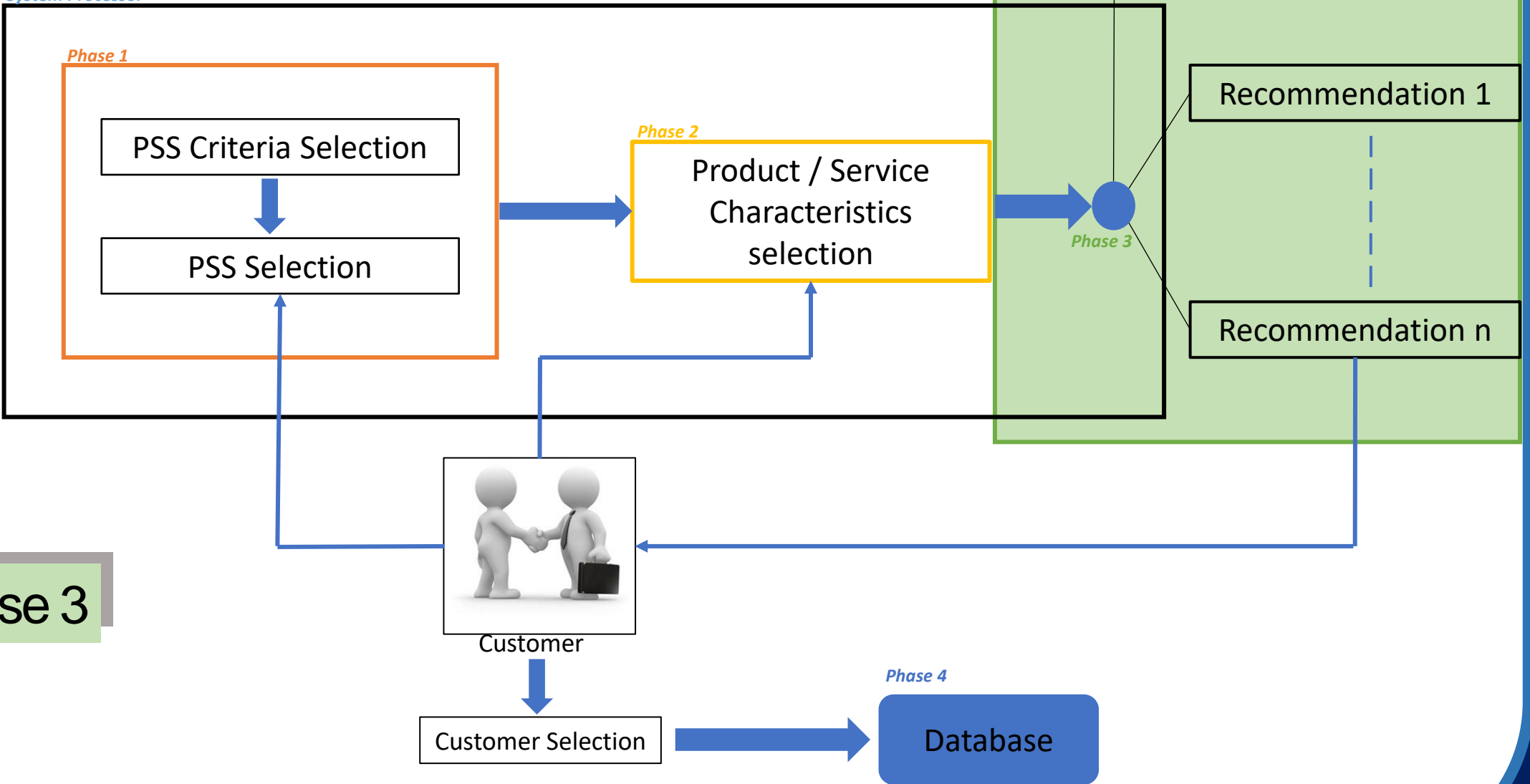
# Phase 2 : Provide personalized PSS





Phase 2

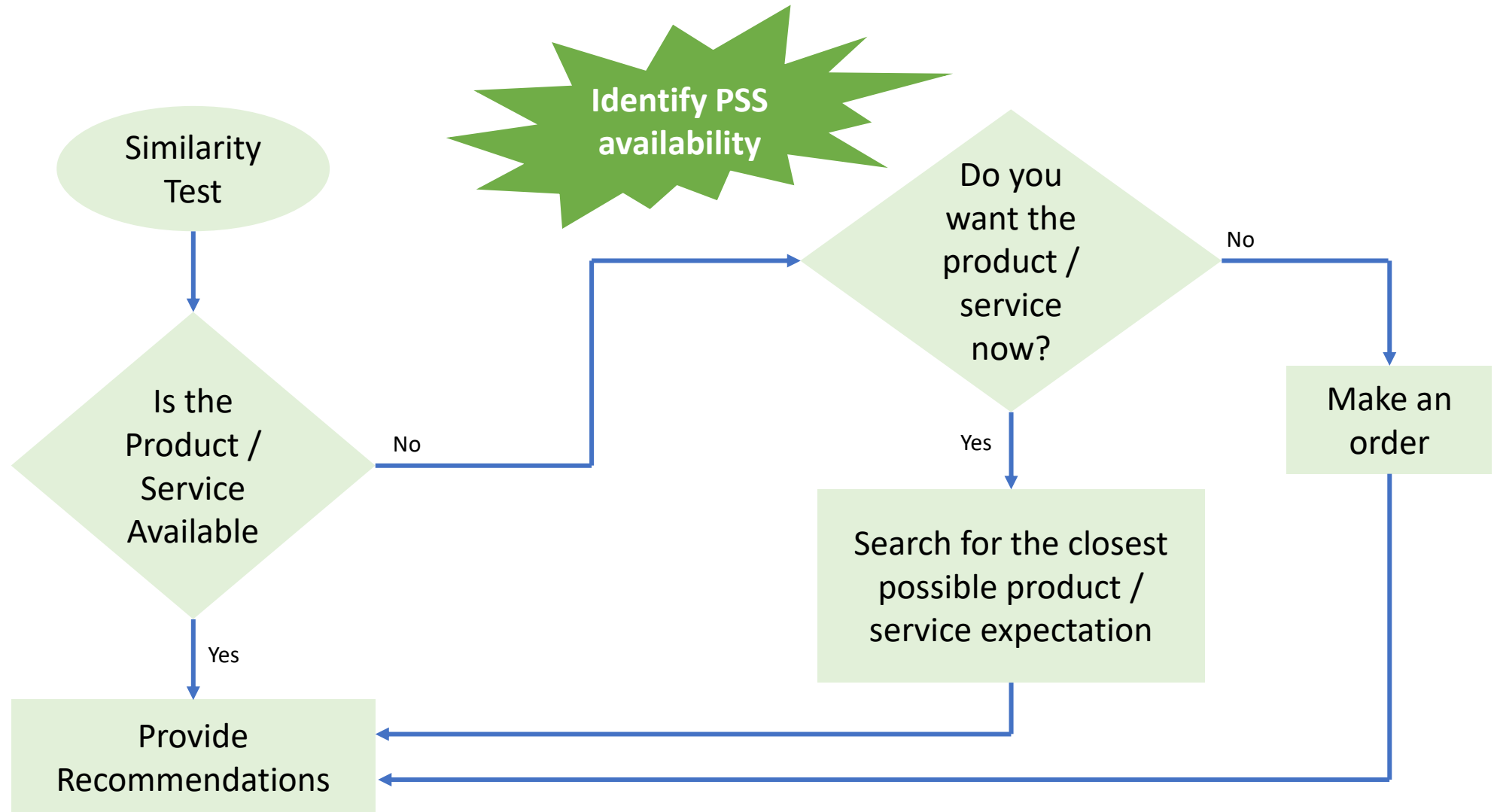


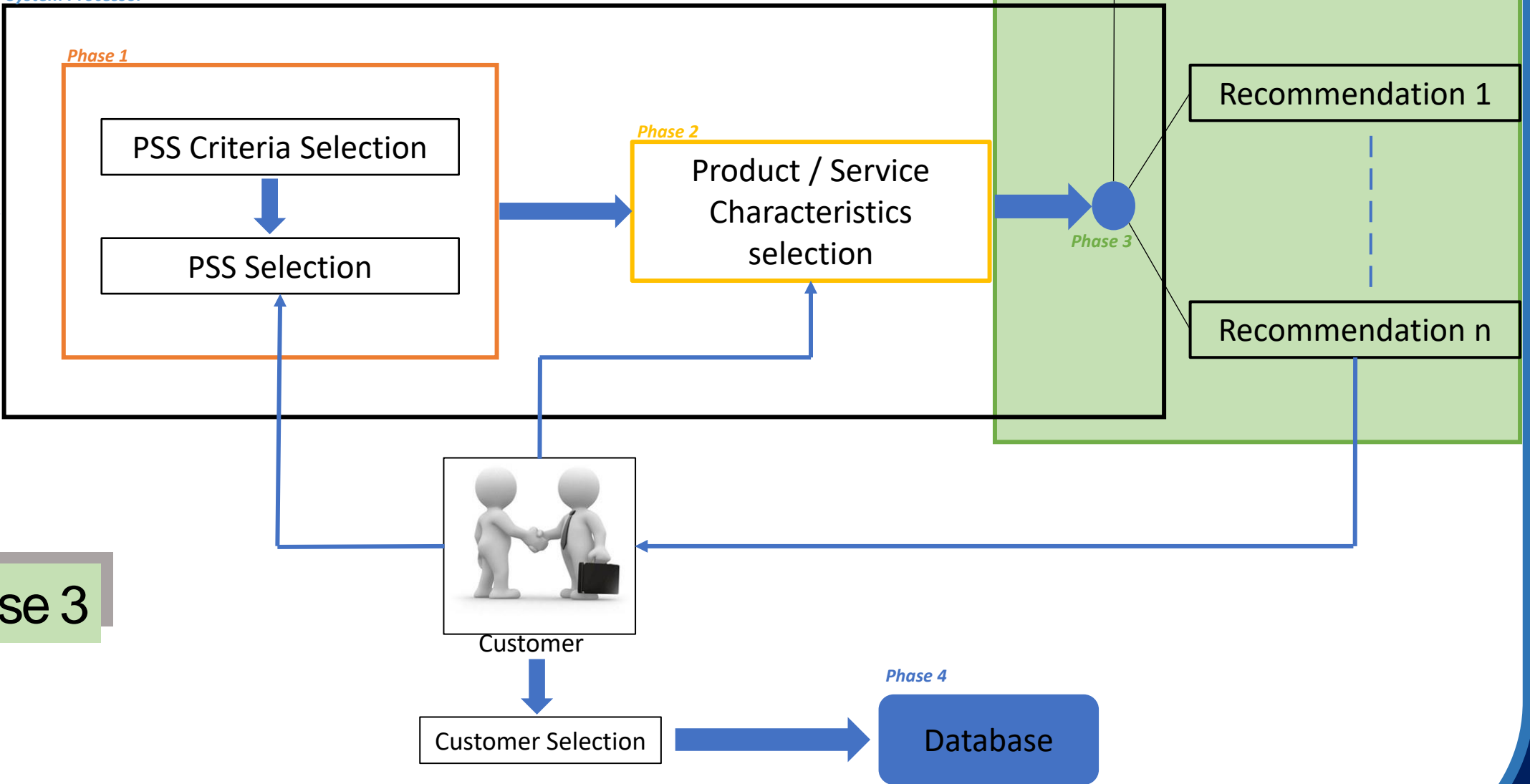


# Phase 3



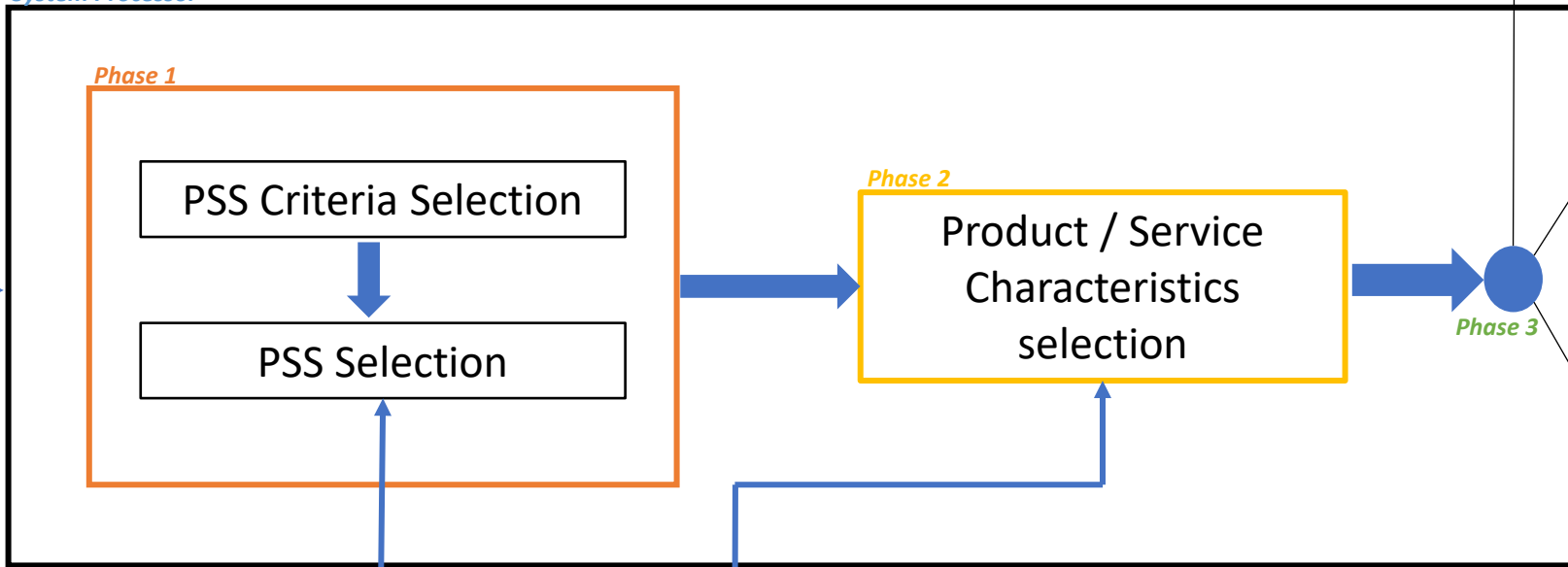
# Phase 3 : Similarity Test and Recommendations





Phase 3





Similarity Test

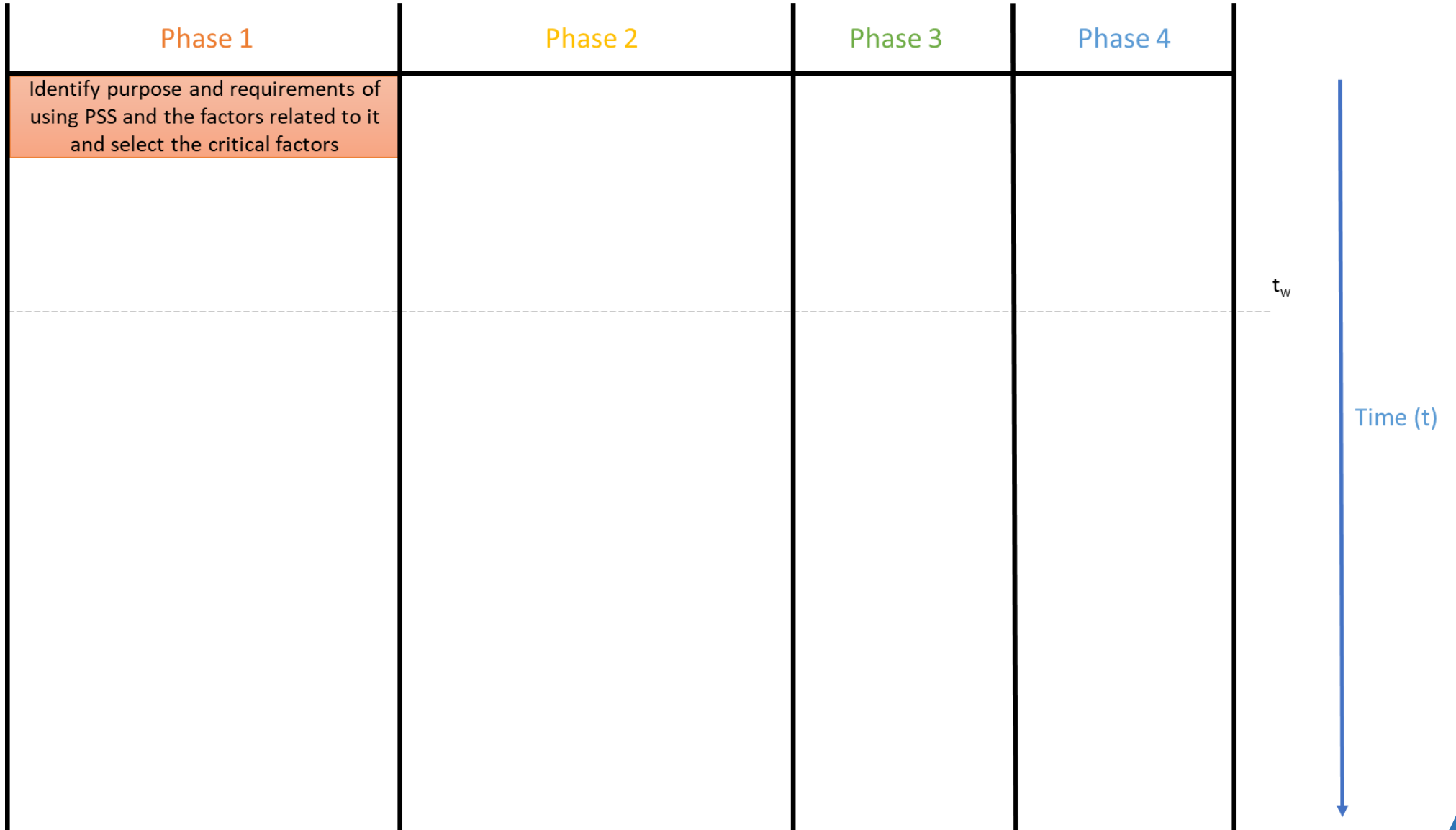
Recommendation 1

Recommendation n



Phase 4



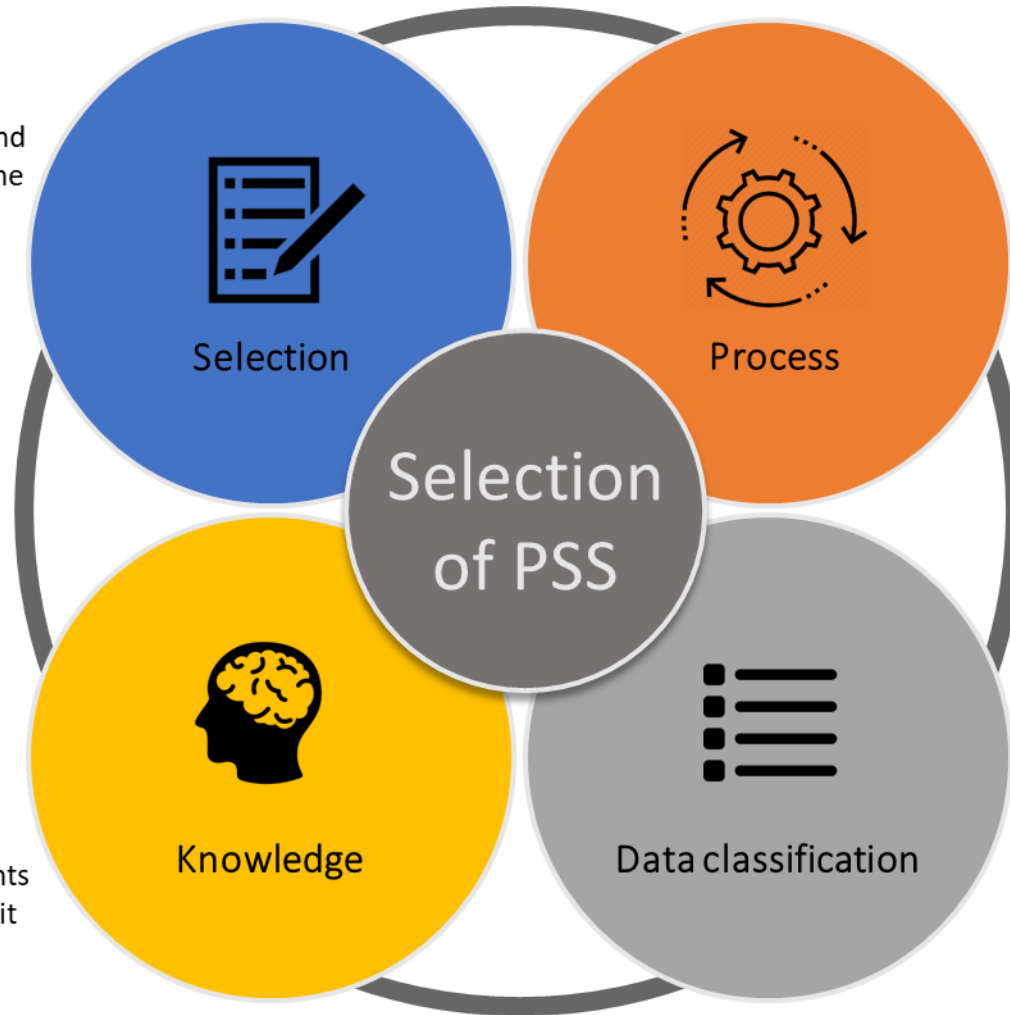


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Select the appropriate PSS and send results to phase two to customize the PSS

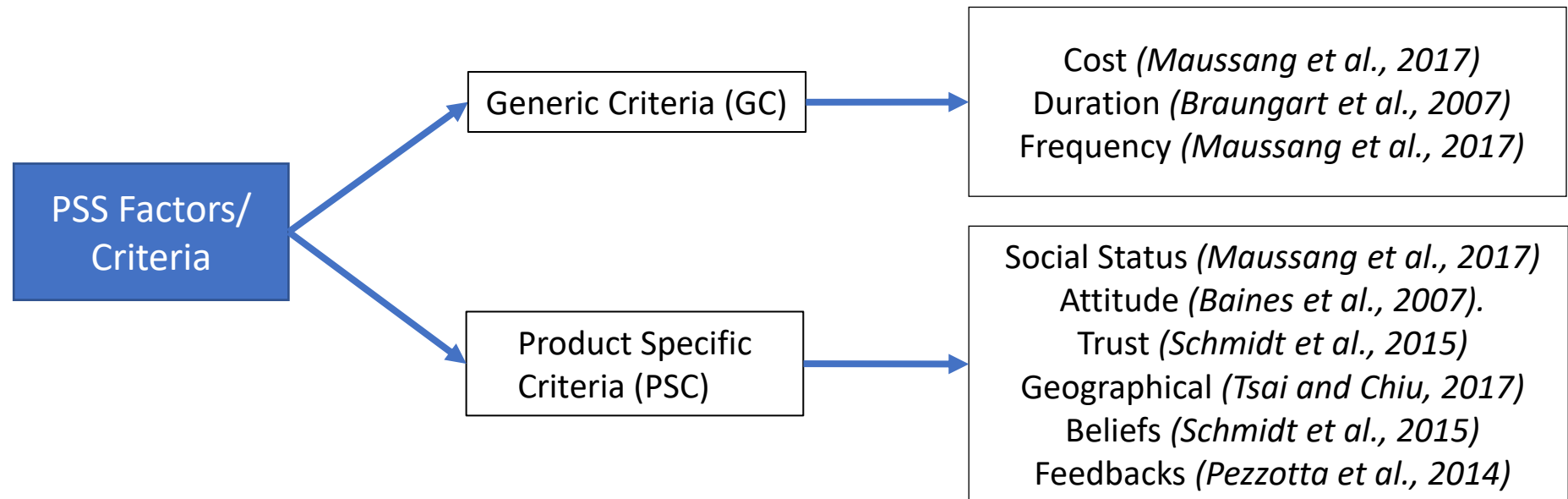
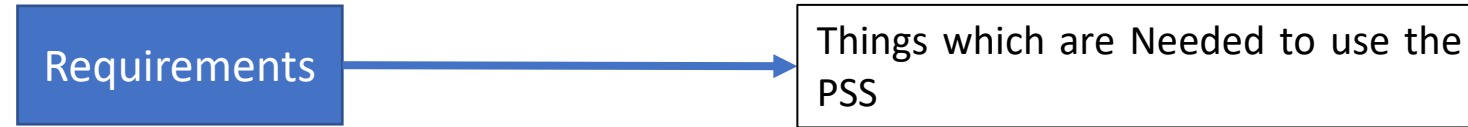
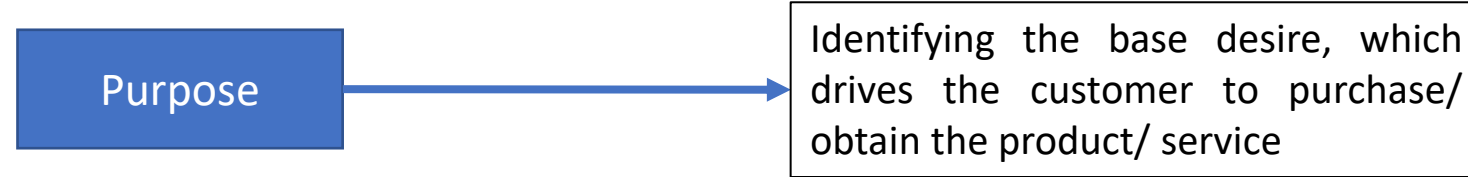


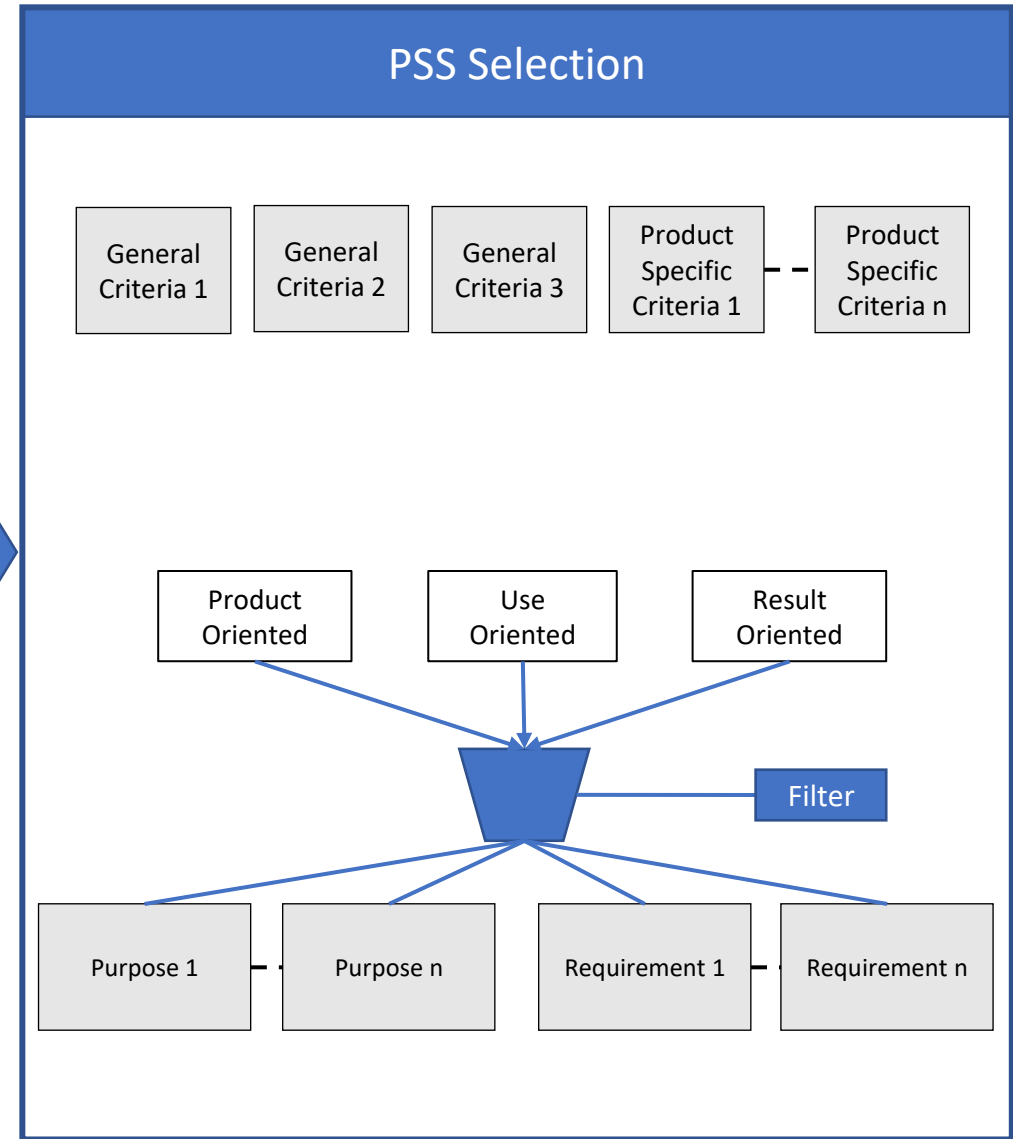
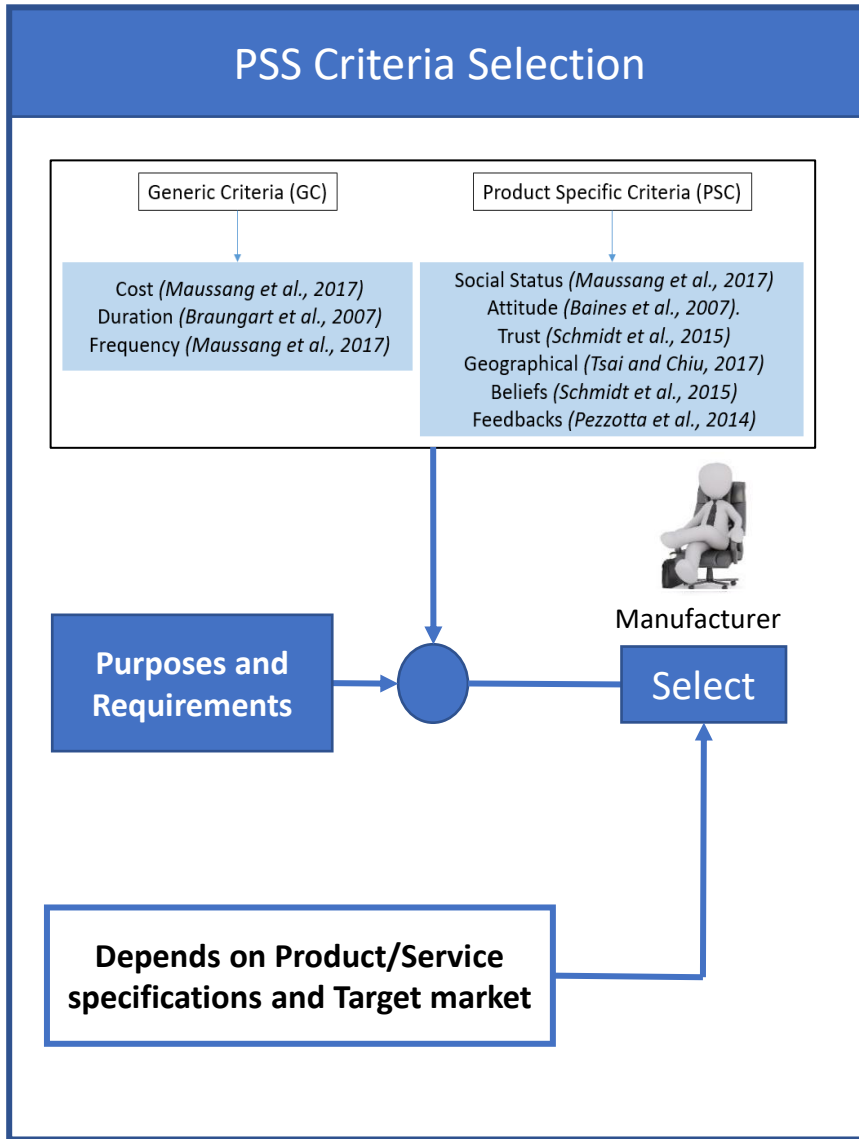
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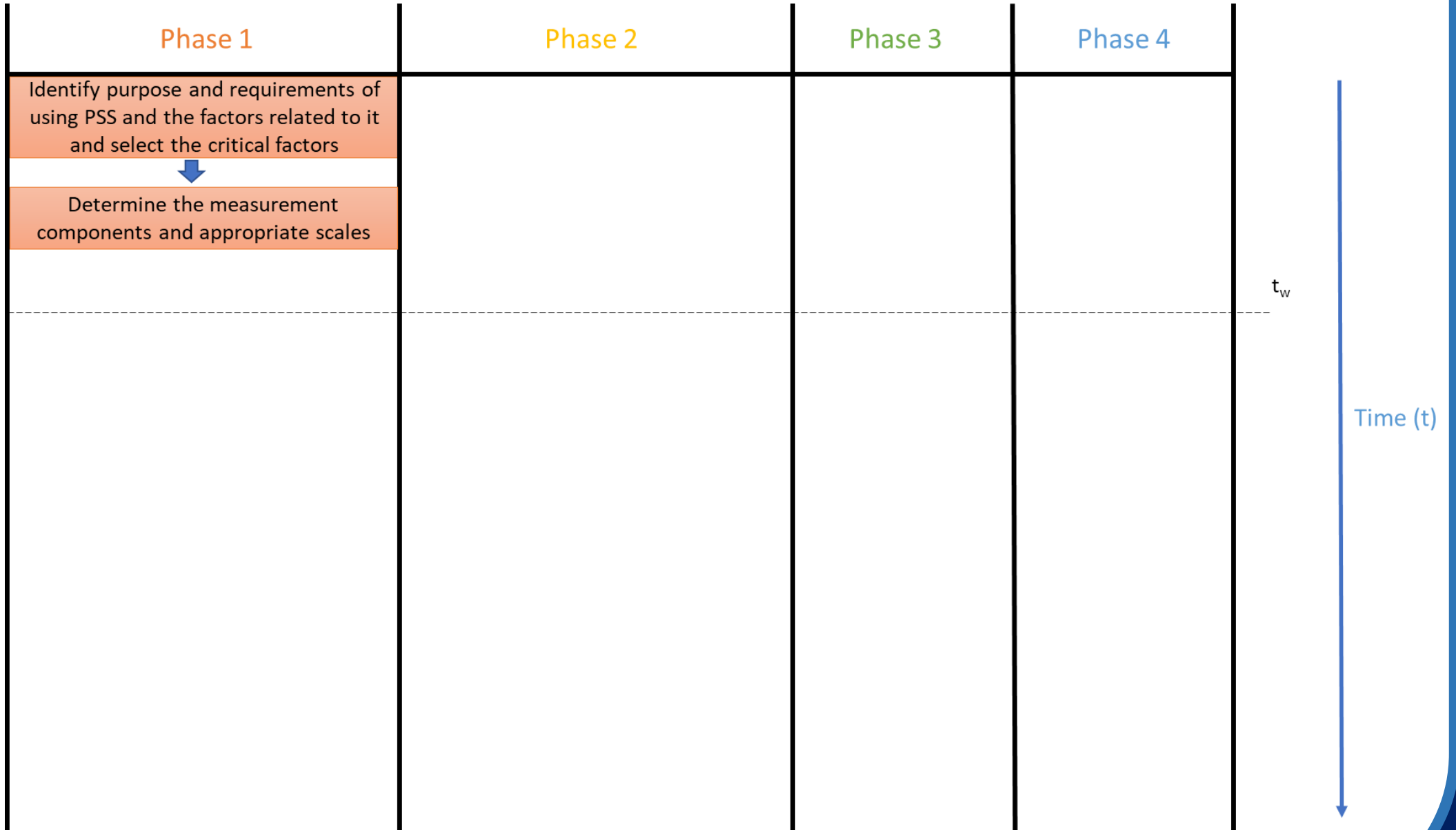
Knowledge of purpose and requirements of using PSS and the factors related to it

Determine the measurement components and appropriate scales for AHP calculations







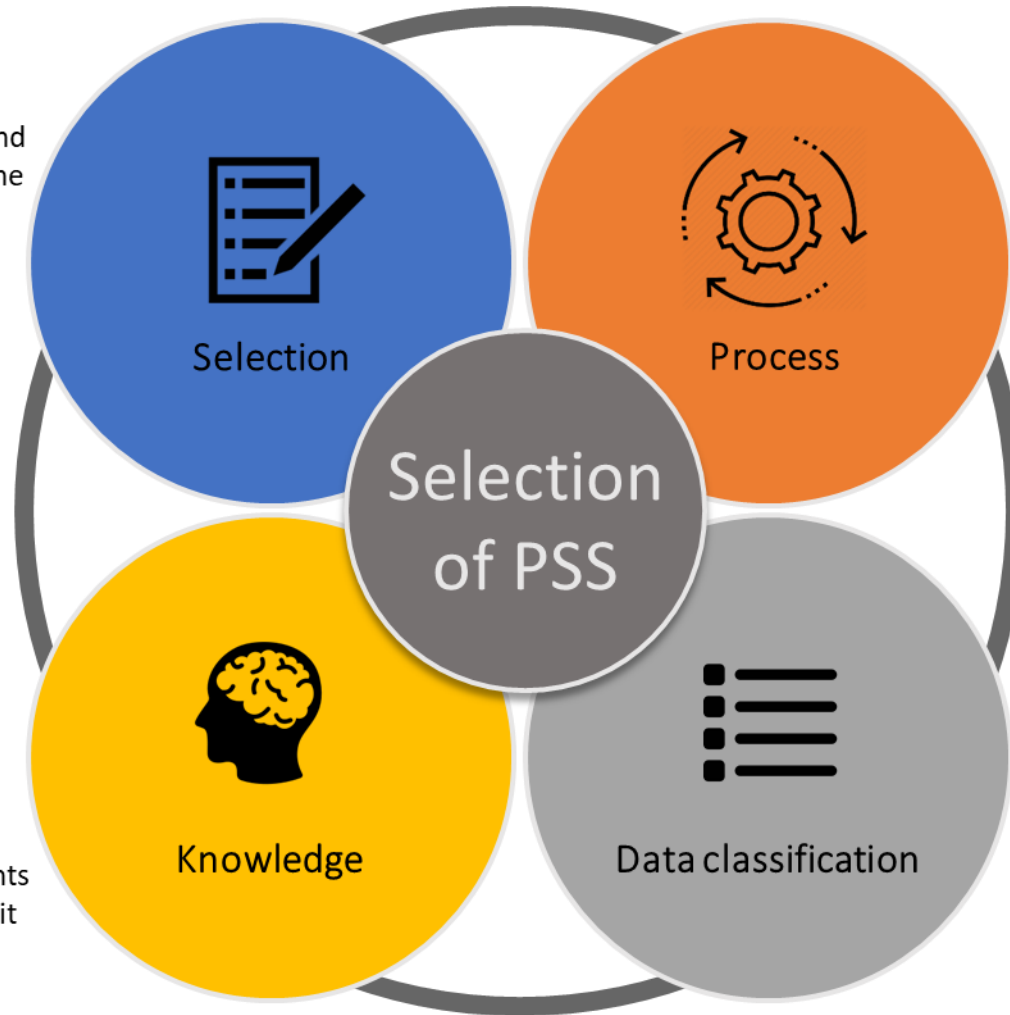


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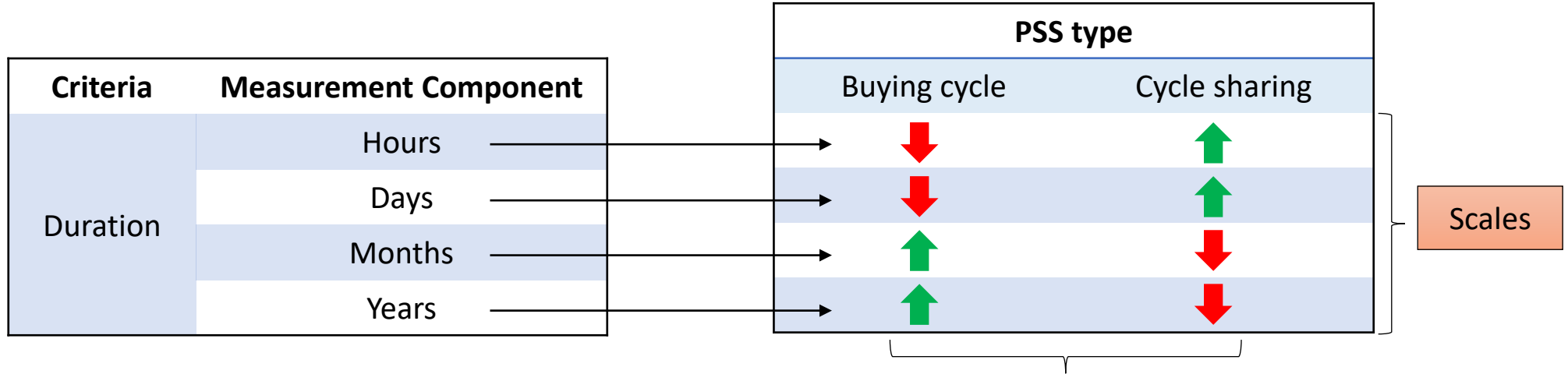


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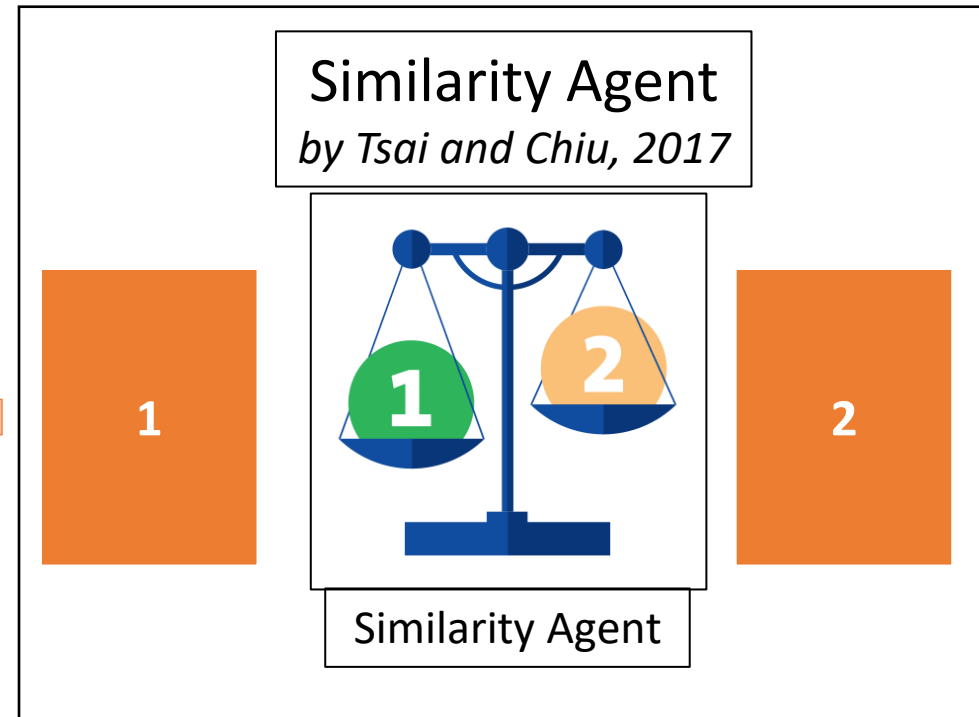
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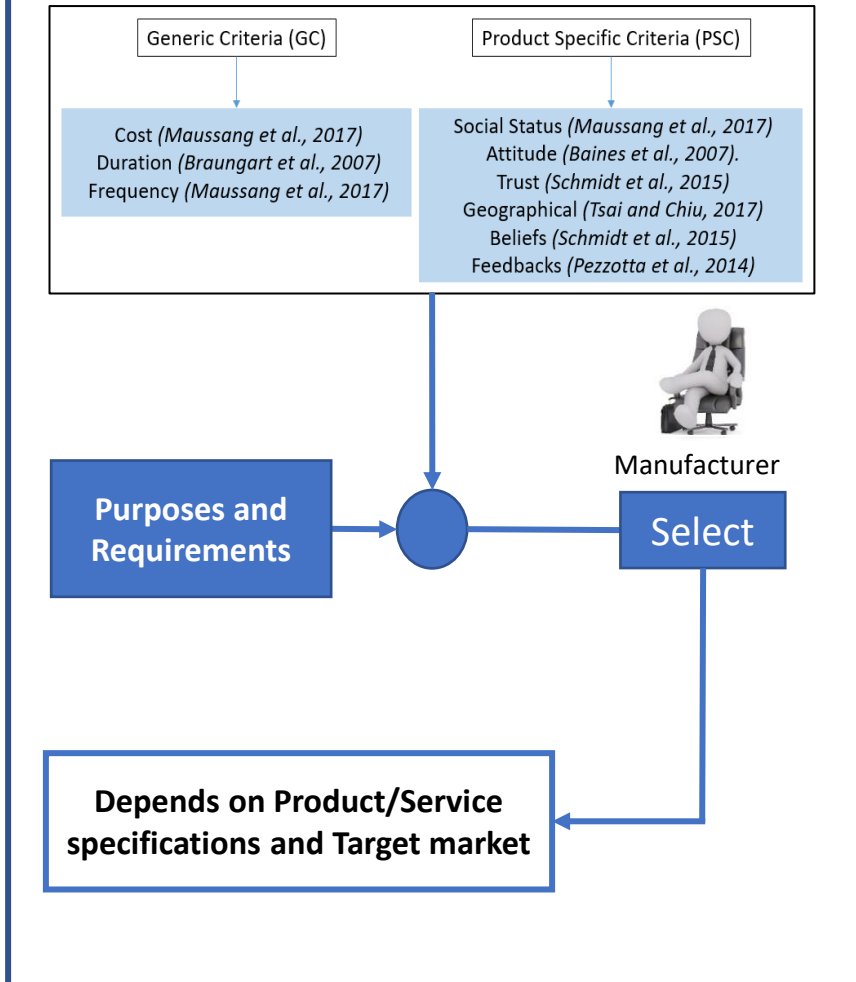


$$S_{i,j} = \frac{\sum_{u \in U} (R_{u,i} - \bar{R}_u)(R_{u,j} - \bar{R}_u)}{\sqrt{\sum_{u \in U} (R_{u,i} - \bar{R}_u)^2} \sqrt{\sum_{u \in U} (R_{u,j} - \bar{R}_u)^2}}$$

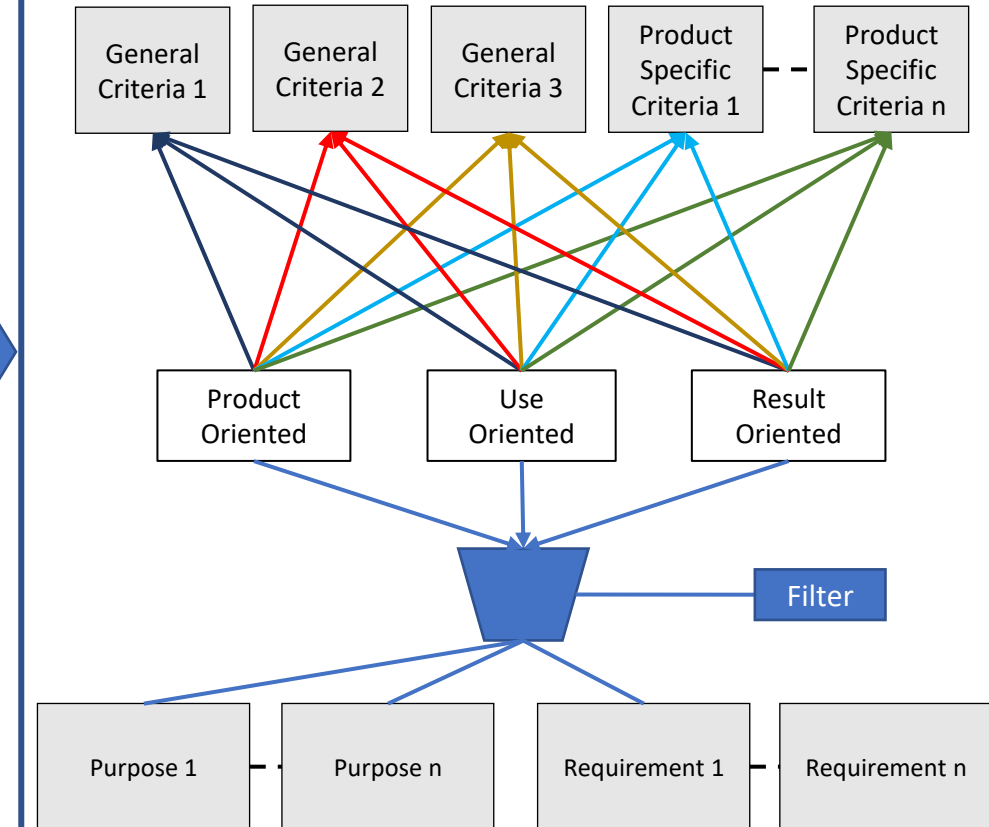
By, *Cacheda et al., 2011*

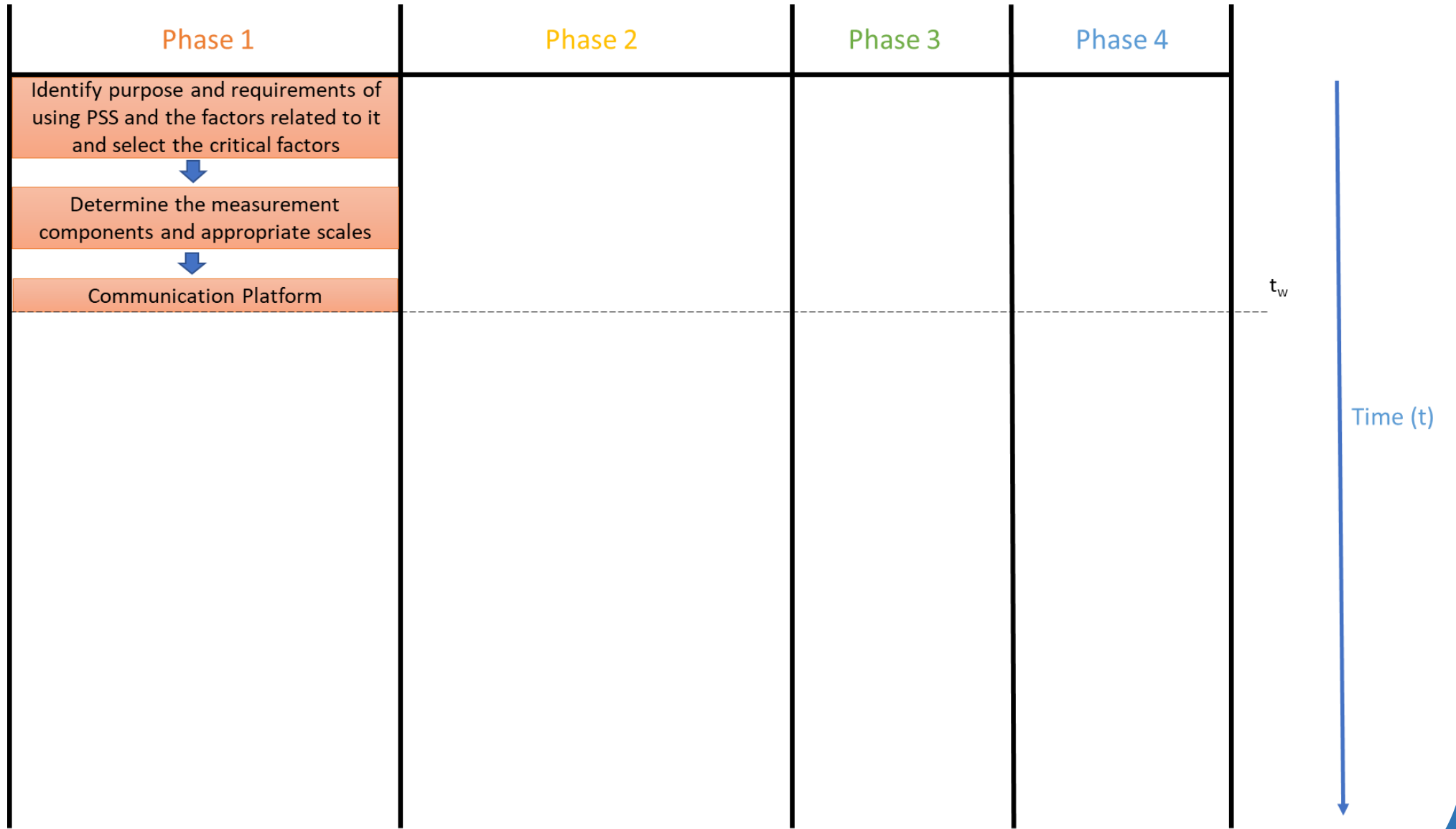


## PSS Criteria Selection



## PSS Selection

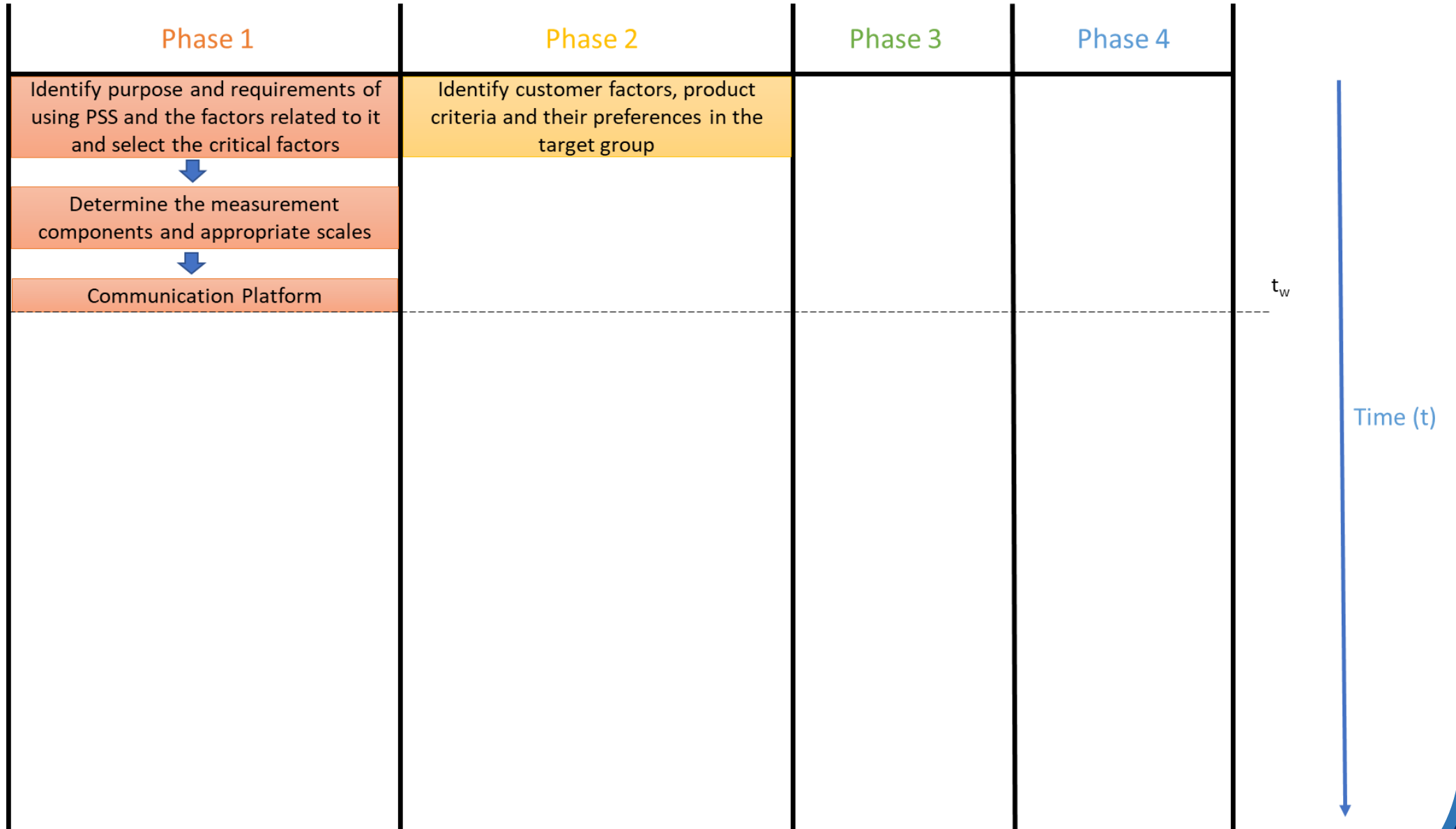




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**Recommendations**  
Providing the selected recommendations to the customer



## Customer Requirement Prediction

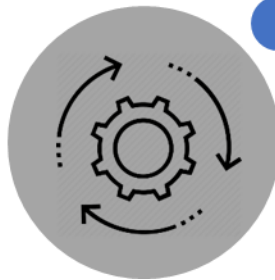


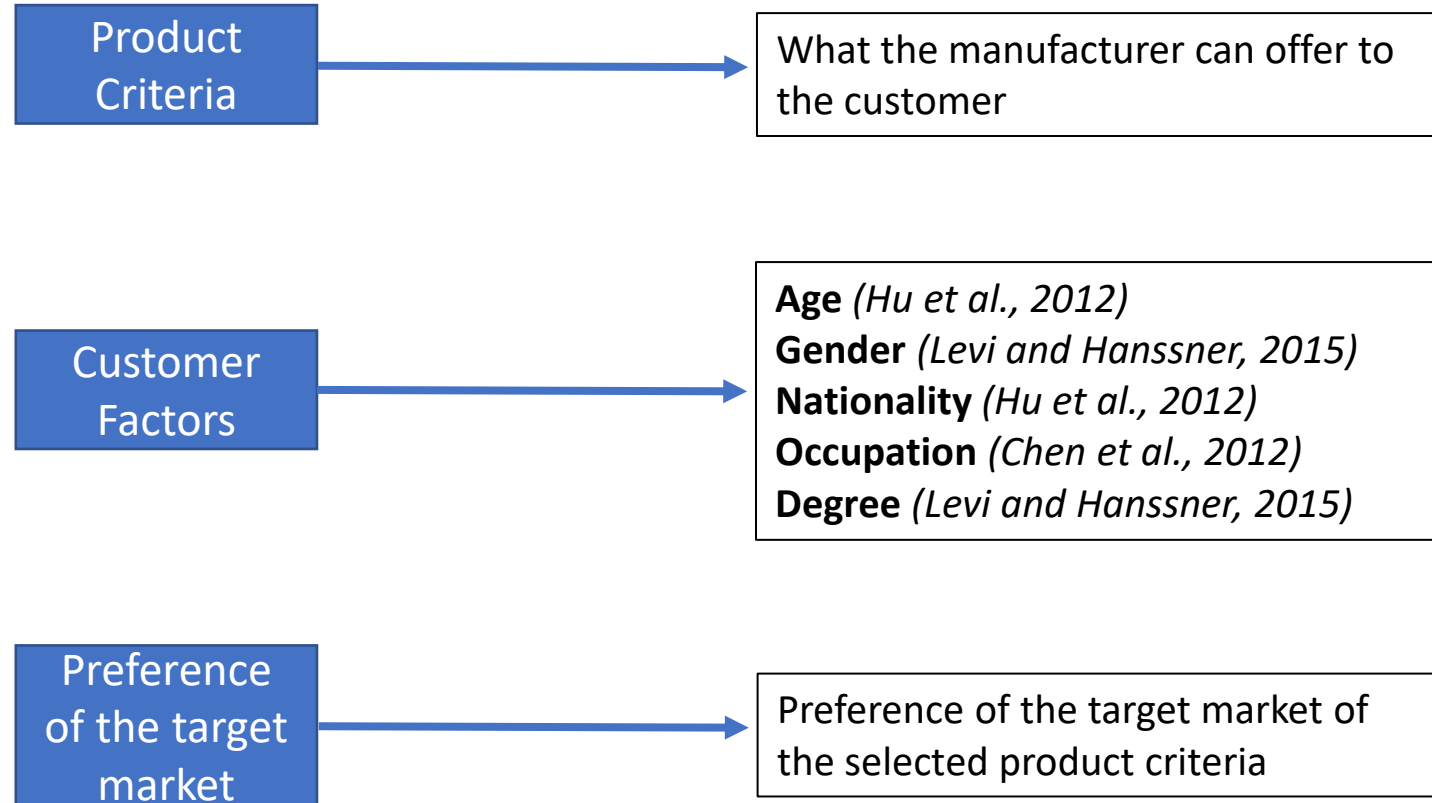
**Knowledge**  
Target market preference on product criteria and peoples' attributes

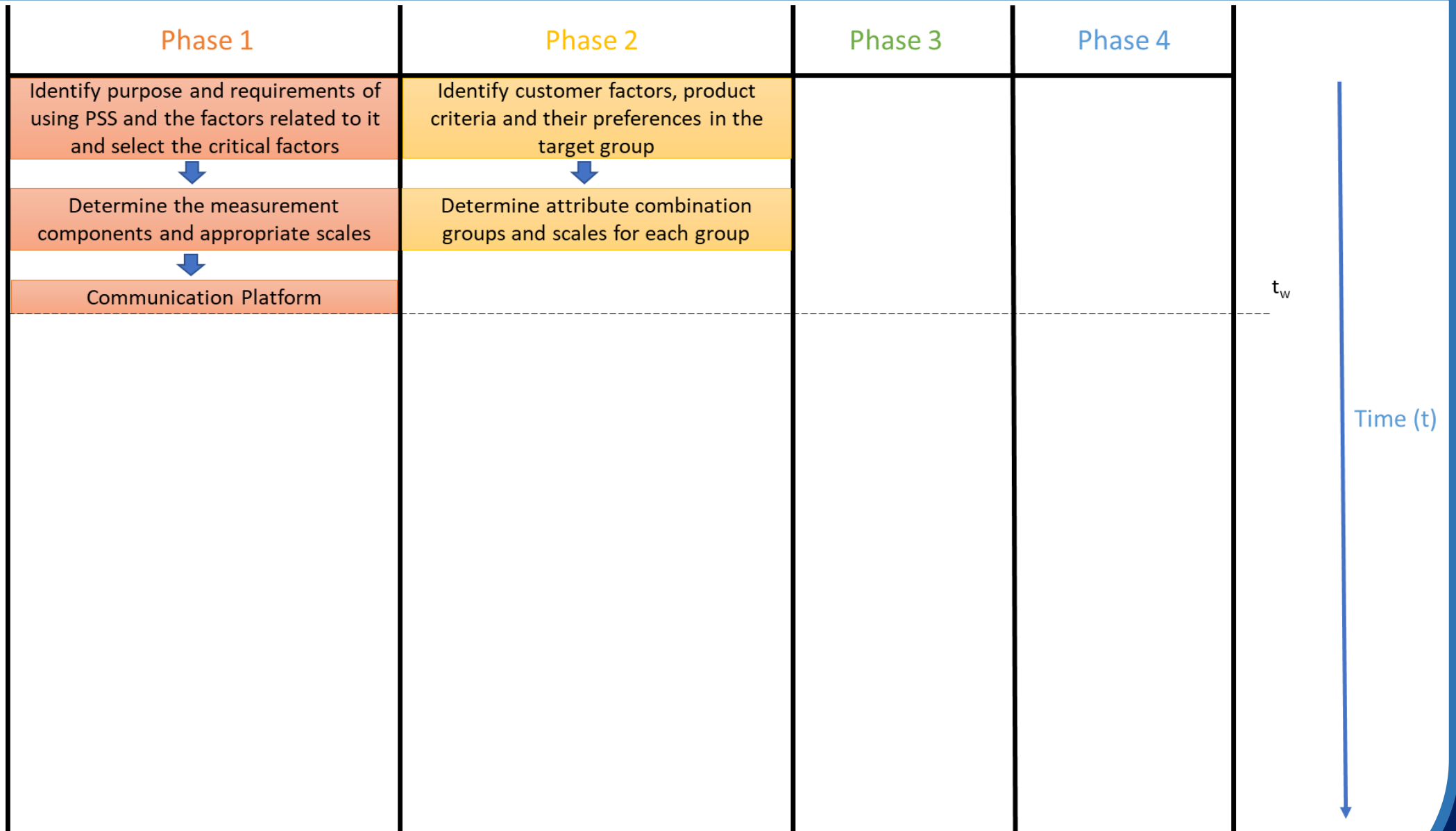


**Data Classification**  
Determine scales for AHP calculations for each attribute group

**Processing**  
Using AHP tool to determine the weights for each combination of product criteria and to determine priorities







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**Recommendations**  
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Customer Requirement Prediction

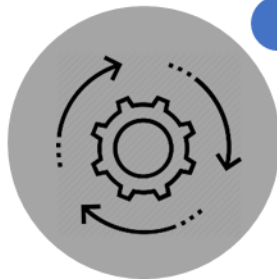


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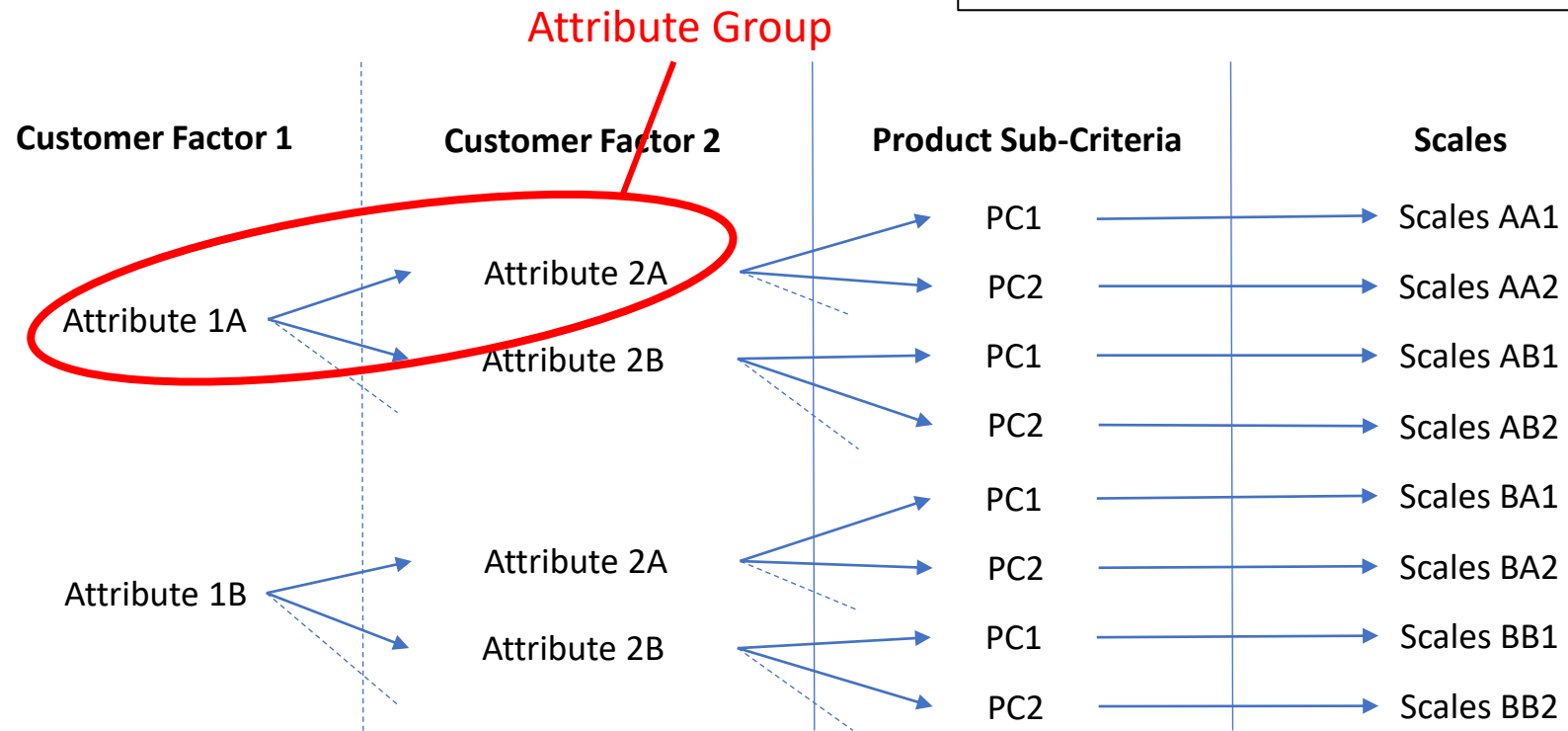
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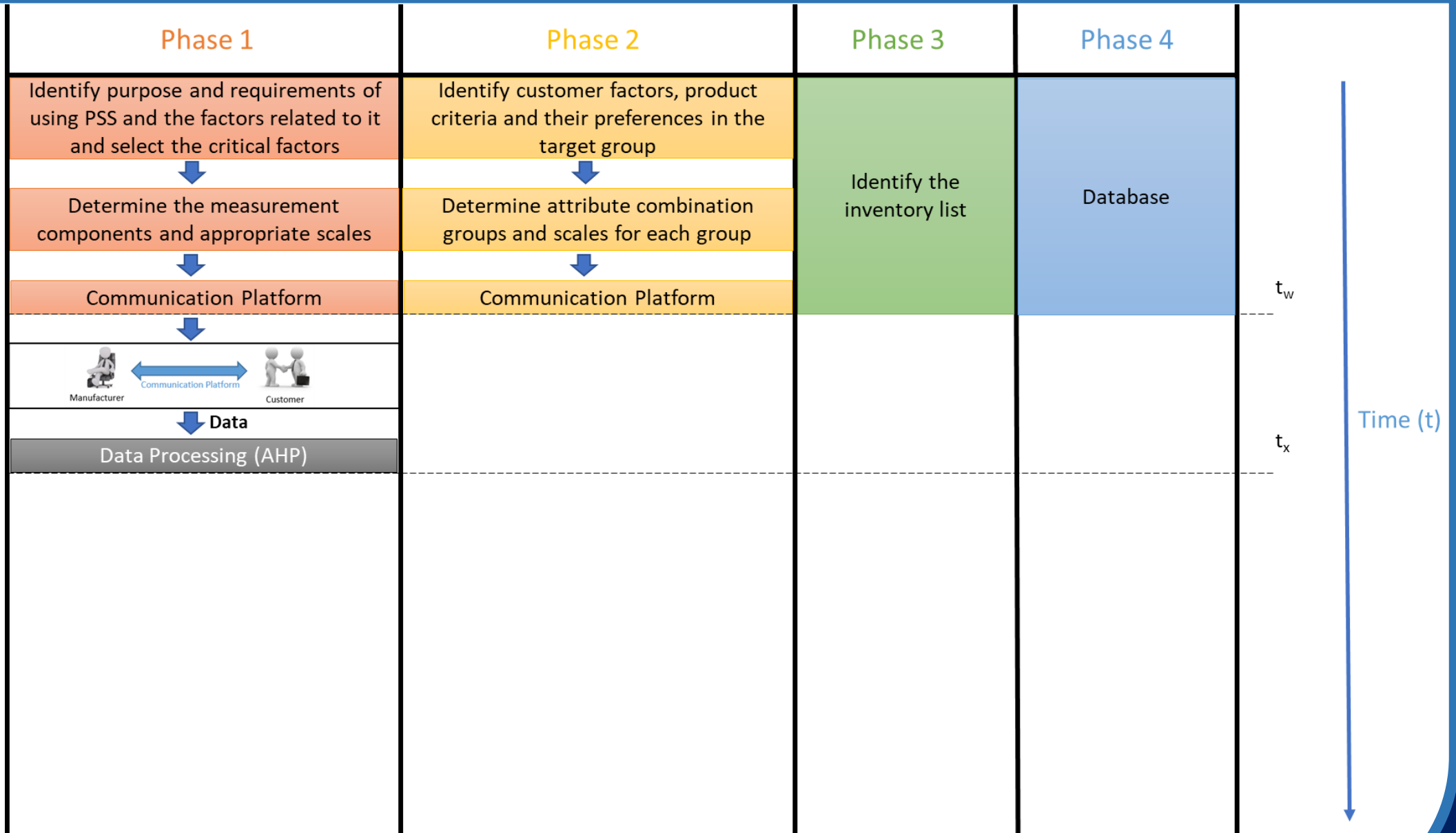
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Customer Factors

- Age (Hu et al., 2012)
- Gender (Levi and Hanssner, 2015)
- Nationality (Hu et al., 2012)
- Occupation (Chen et al., 2012)
- Degree (Levi and Hanssner, 2015)



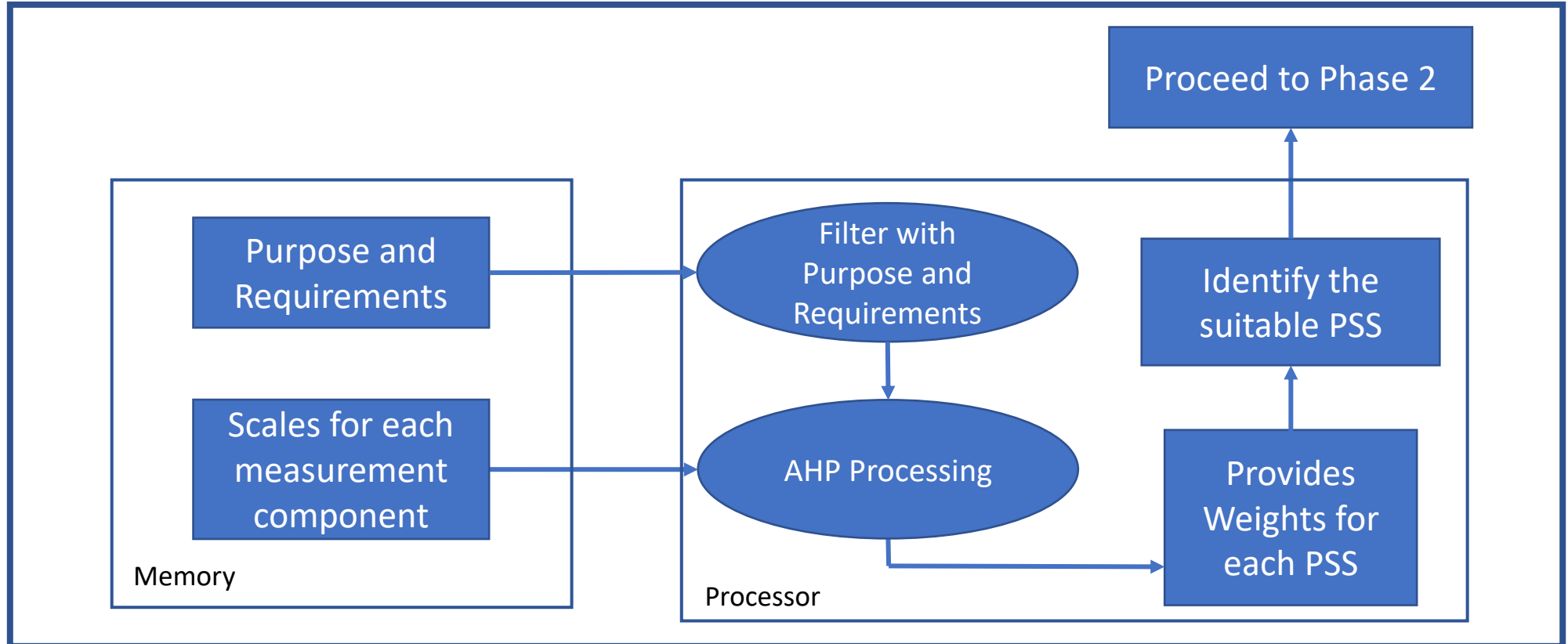


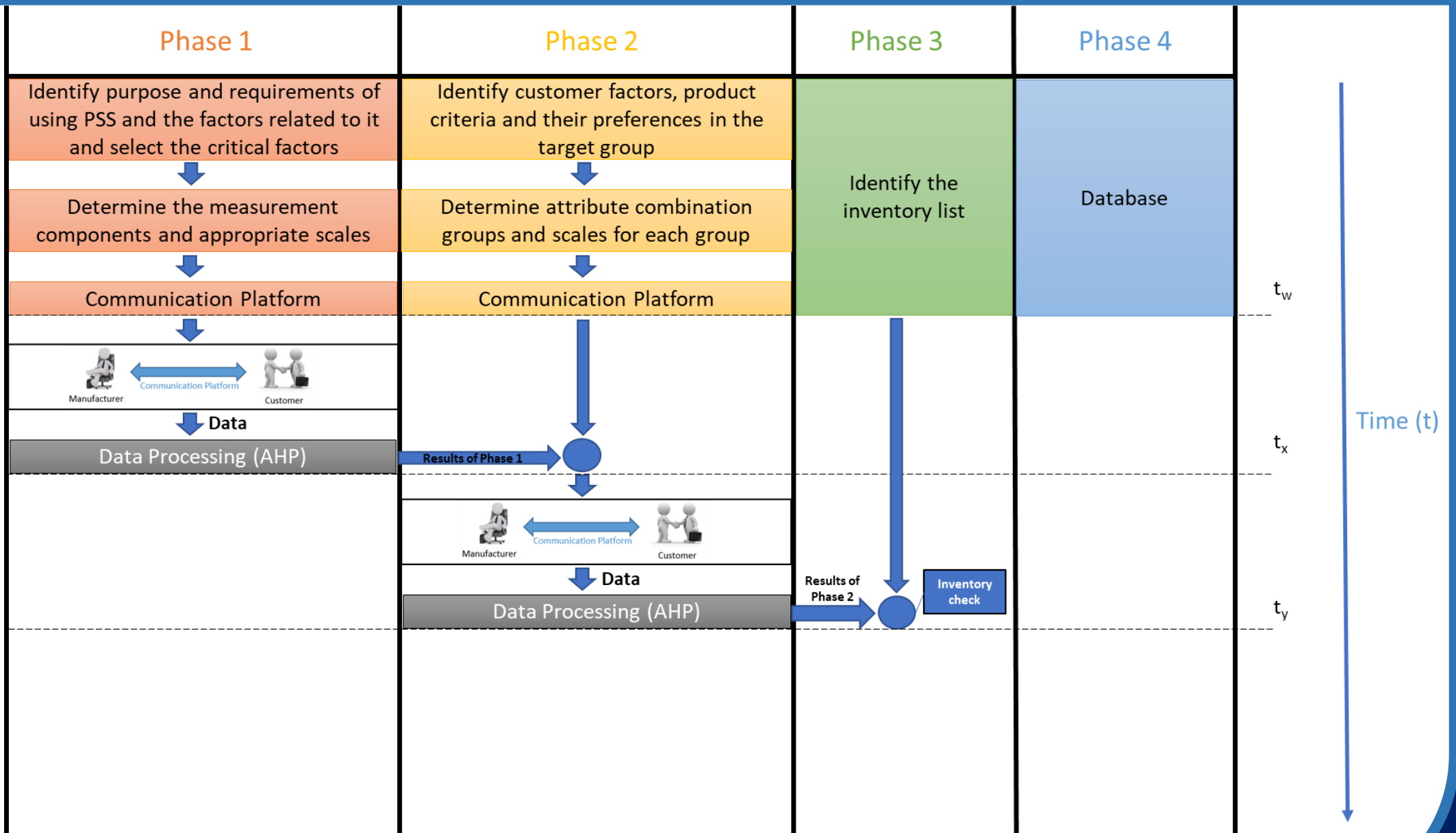


Customer

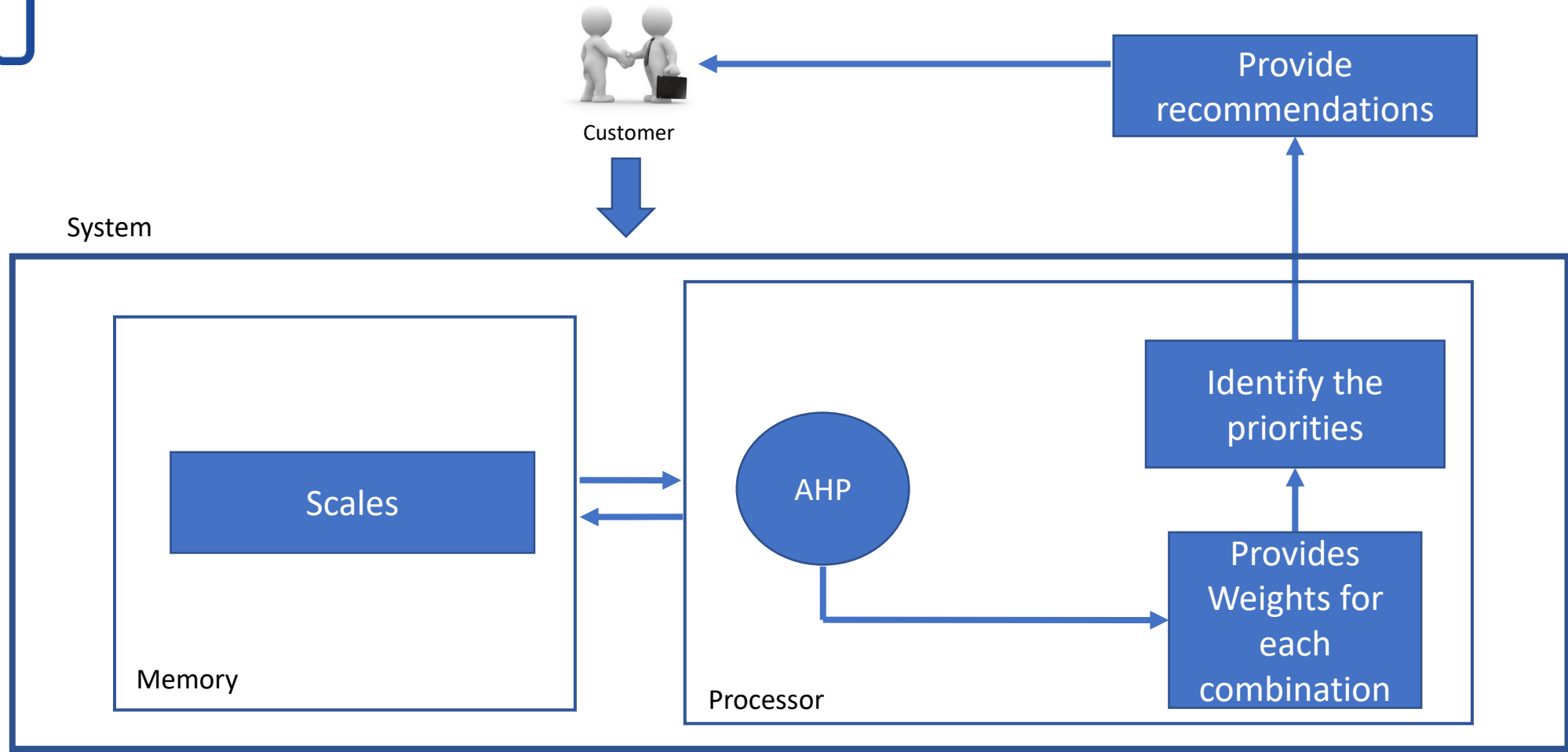


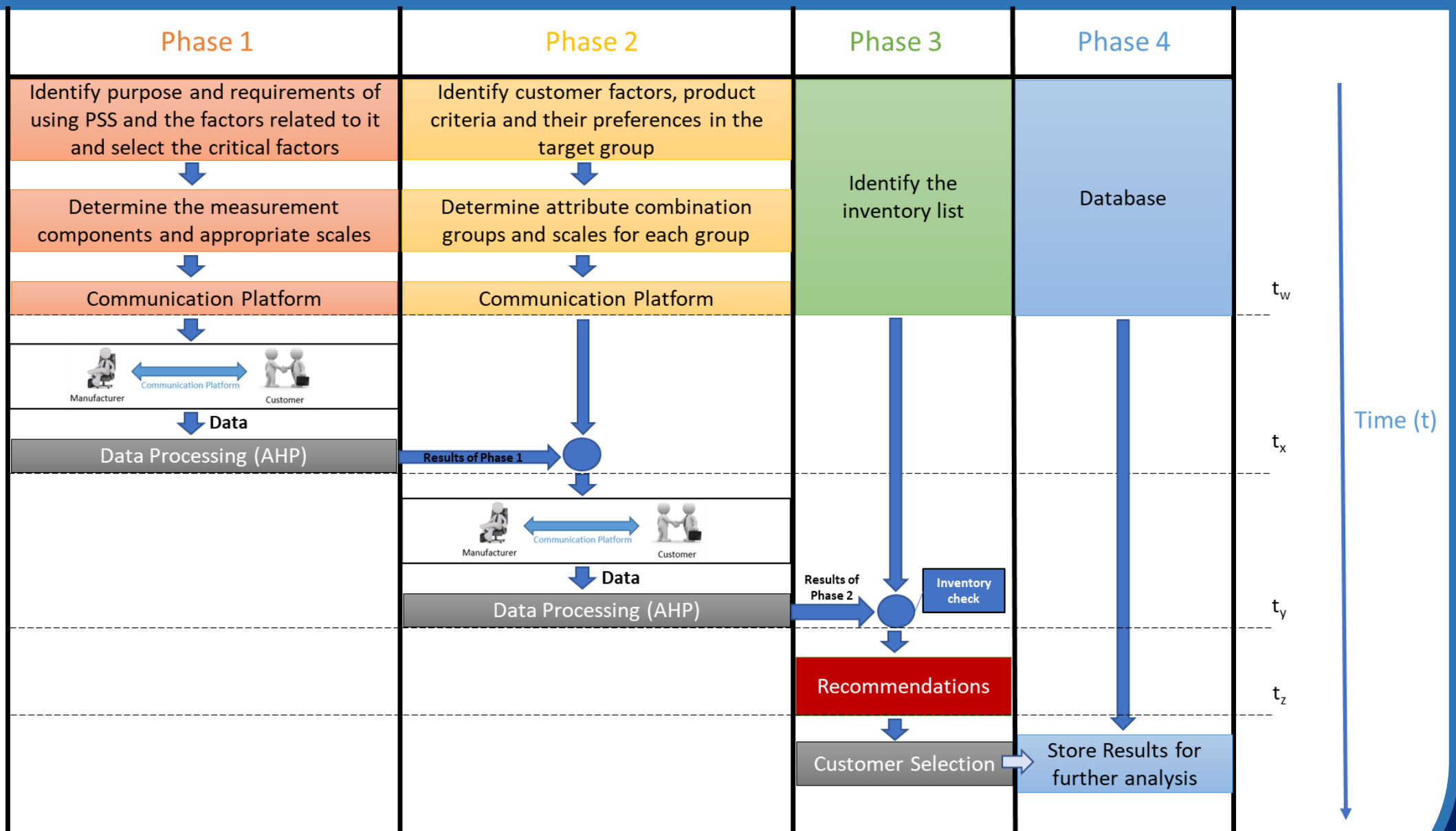
System













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# Thank You

Together We Will Make Our Education Stronger



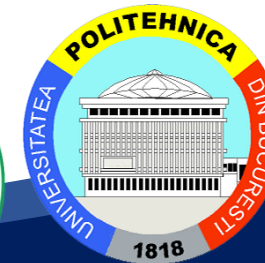
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