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Course 15: Customer Experience-Driven Design

Module 2: Customer Experience Value Creation

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

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

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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.

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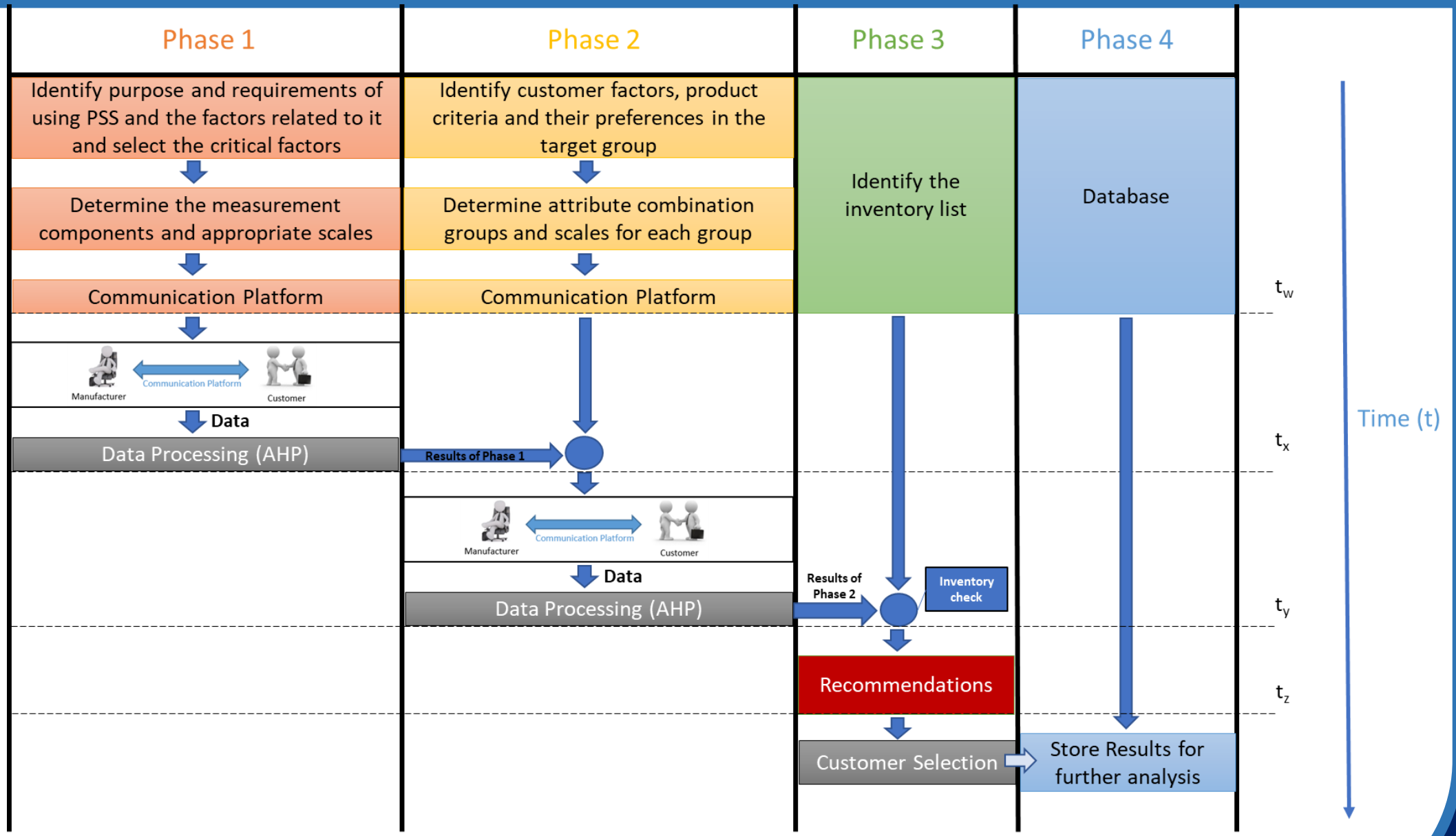

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Case Study

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

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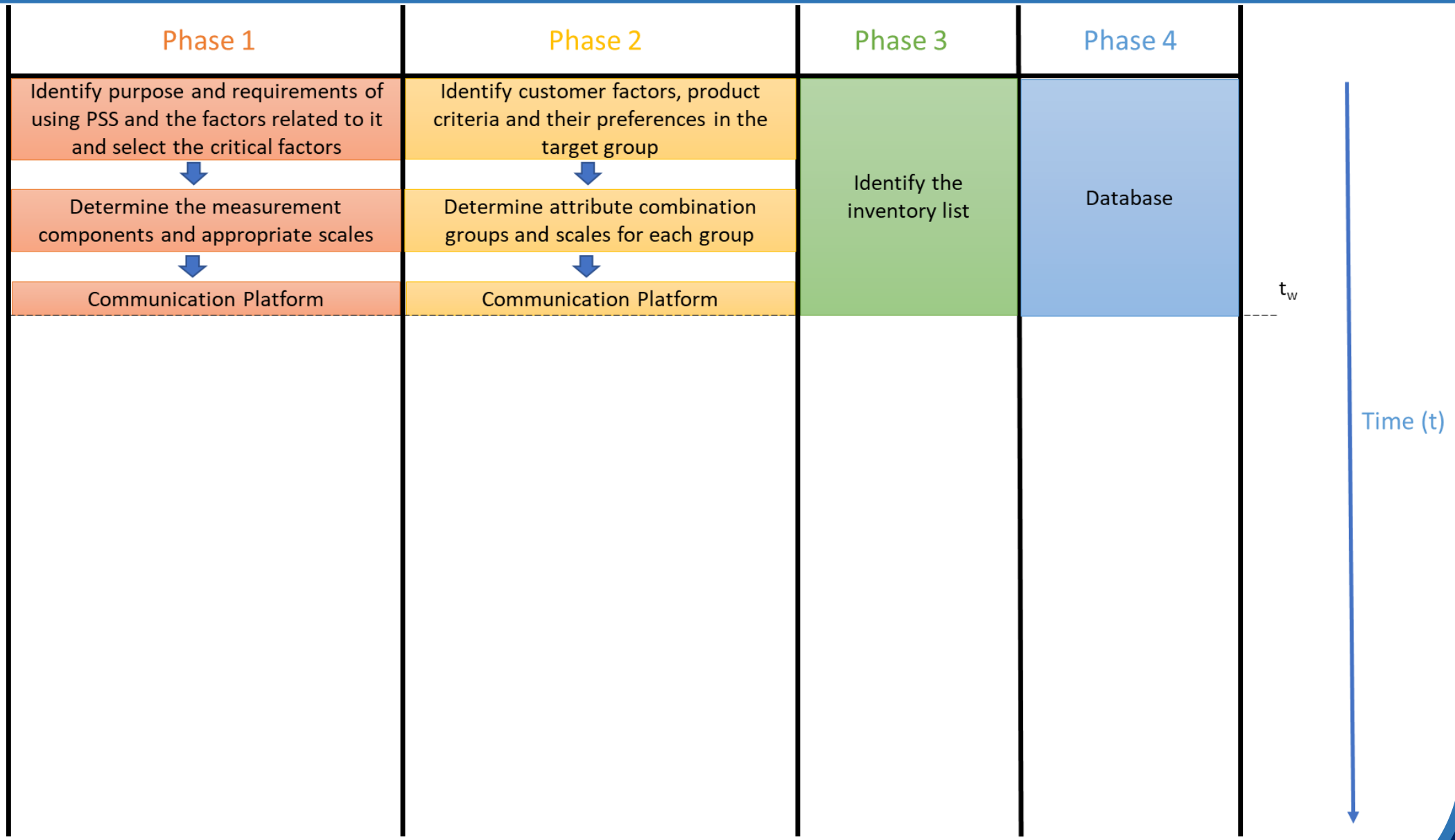

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Types of PSS

Phase 1

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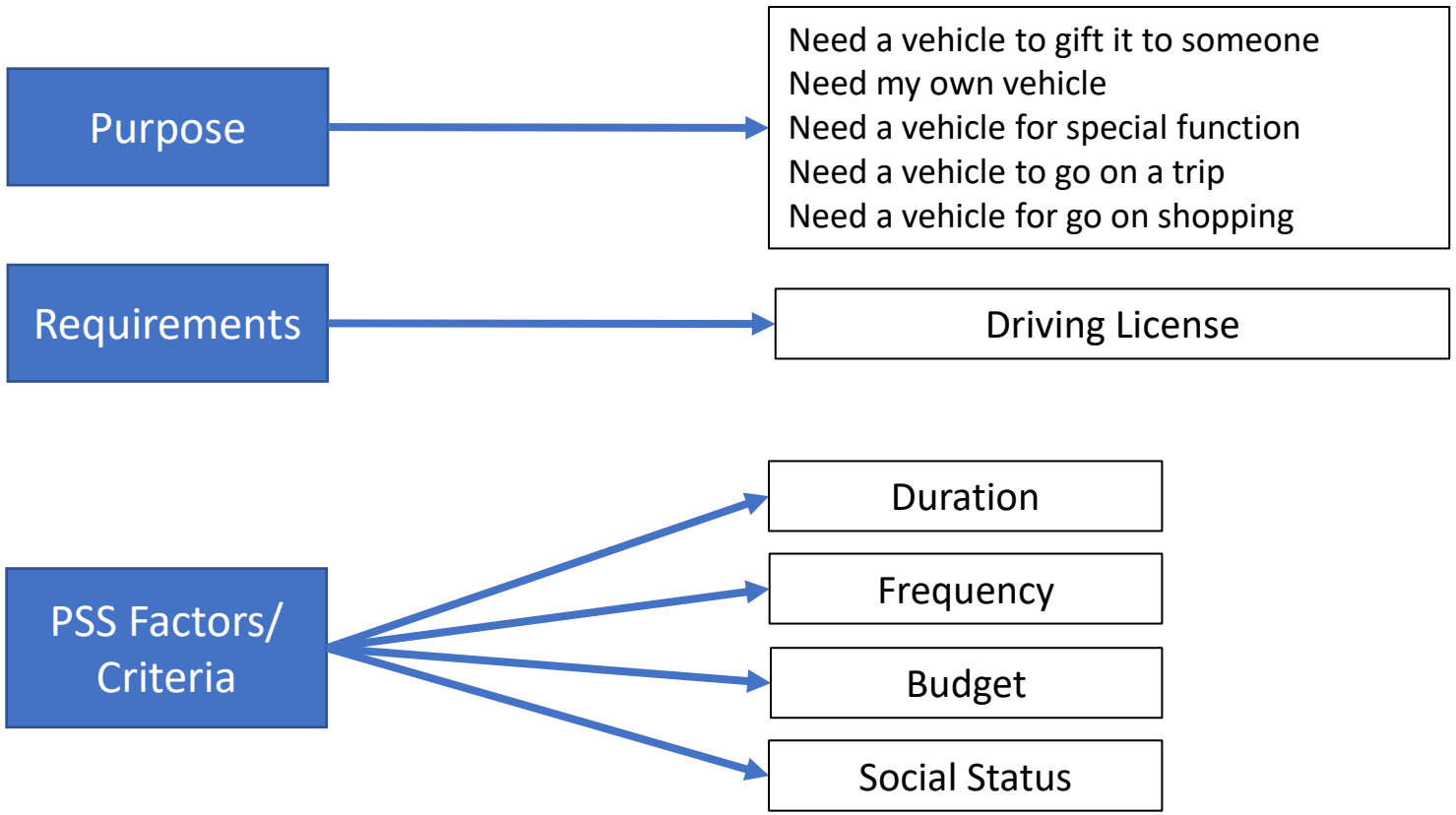

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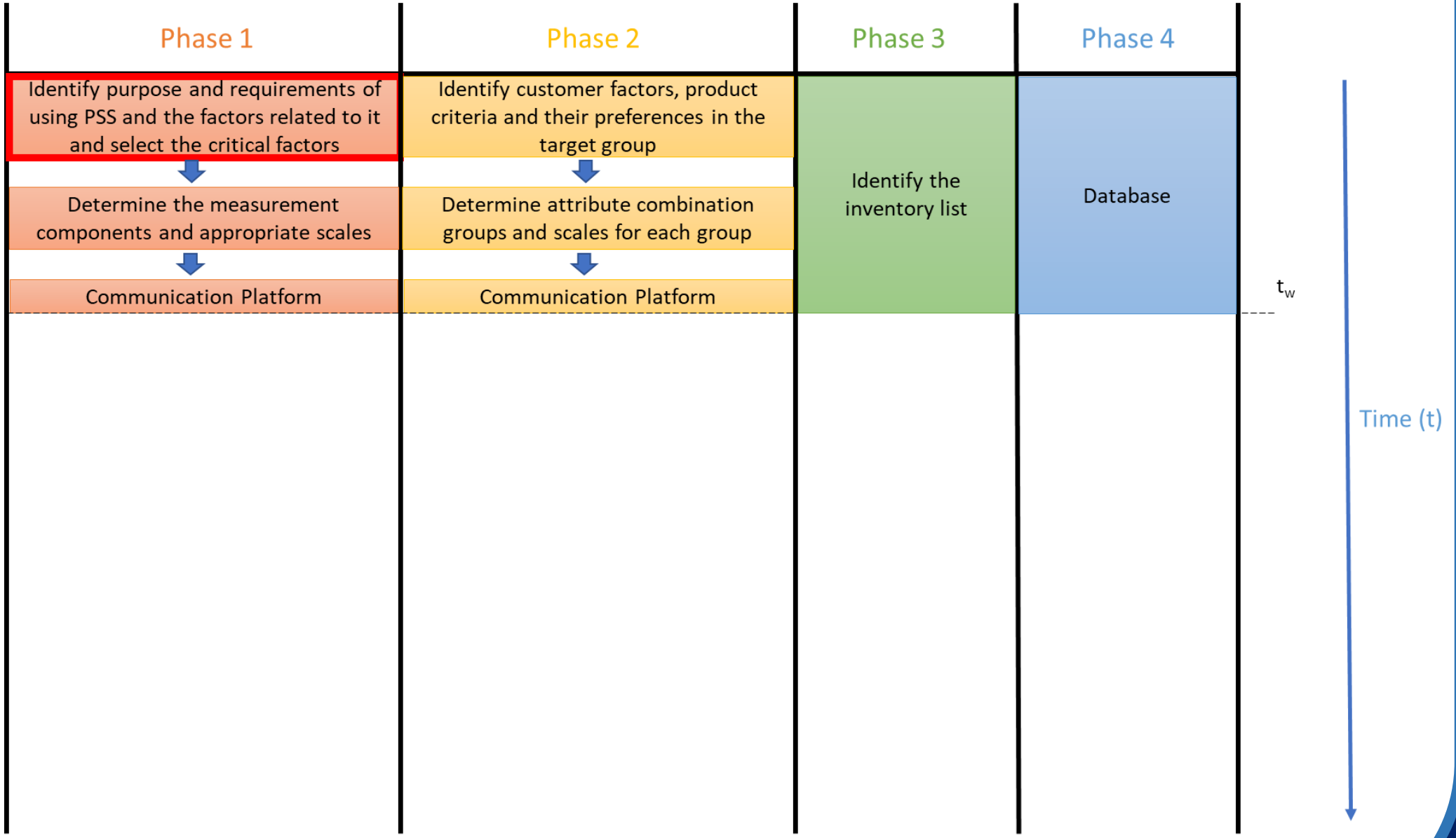

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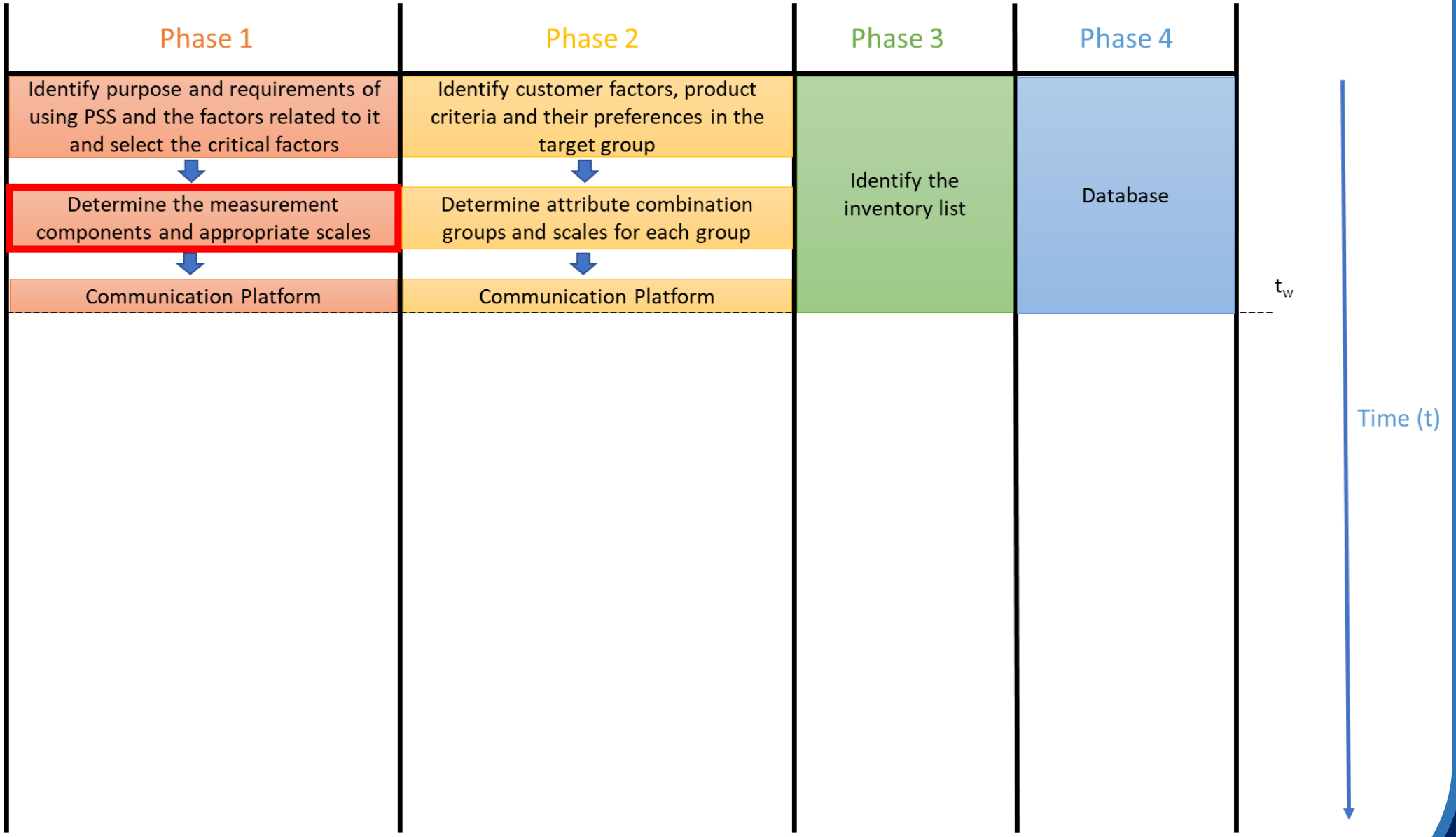

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Phase 1 : Identify the optimum PSS

Criteria	Measurement component
Duration	1 day
	1 – 7 days
	1 – 4 weeks
	1 – 3 months
	3 – 12 months
	1 – 5 years
	More than 5 years
Frequency	Daily
	6 days
	5 days
	4 days
	3 days
	2 days
	1 day

Measurement Components

Criteria	Measurement Component
Budget (Monthly expense)	Less than 10,000
	10,000 – 20,000
	20,000 – 30,000
	30,000 – 40,000
	More than 40,000
Social status (Brand consciousness)	Extremely important
	Very Important
	Moderately Important
	Slightly Important
	Not at all important

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Phase 1 : Identify the optimum PSS

Scales

Duration and Frequency (Up to 7 days)	PO	UO	RO
1 day	1	4	4
2 days	1	4	4
3 days	1	4	4
4 days	1	4	4
5 days	1	4	4
6 days	1	4	4
Daily	1	4	4

5 – Extremely Like it
4 – Like it
3 – Neutral
2- Dislike it
1- Extremely Dislike it

Similarity Agent
by Tsai and Chiu, 2017

Scale of Manufacturer

Scales of the target group

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Phase 1 : Identify the optimum PSS

Correlation = +0.604

Up to 7 days	PO	UO	RO
1 day	1	4	4
2 days	1	4	4
3 days	1	4	4
4 days	1	4	4
5 days	1	4	4
6 days	1	4	4
Daily	1	4	4
1 – 5 Years	**PO**	**UO**	**RO**
1 day	3	1	3
2 days	4	1	3
3 days	4	1	2
4 days	4	1	1
5 days	5	2	1
6 days	5	2	1
Daily	5	2	1

Manufacturer

Up to 7 days			RO
1 day			5
2 days	1	4	5
3 days	1	4	5
4 days	2	4	5
5 days	2	4	4
6 days	2	4	4
Daily	2	4	4
1 – 5 Years	**PO**	**UO**	**RO**
1 day	4	2	2
2 days	4	2	2
3 days	4	2	2
4 days	5	2	2
5 days	5	2	2
6 days	5	2	2
Daily	5	2	2

Target group

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Phase 1 : Identify the optimum PSS

Correlation = +0.722

Manufacturer

Up to 7 days	PO	UO	RO
1 day	1	4	5
2 days	1	4	5
3 days	1	4	5
4 days	1	4	5
5 days	1	4	4
6 days	1	4	4
Daily	1	4	4
1 – 5 Years	**PO**	**UO**	**RO**
1 day	4	1	2
2 days	4	1	2
3 days	4	1	2
4 days	5	1	1
5 days	5	2	1
6 days	5	2	1
Daily	5	2	1

Up to 7 days			RO
1 day	1	4	5
2 days	1	4	5
3 days	1	4	5
4 days	2	4	5
5 days	2	4	4
6 days	2	4	4
Daily	2	4	4
1 – 5 Years	**PO**	**UO**	**RO**
1 day	4	2	2
2 days	4	2	2
3 days	4	2	2
4 days	5	2	2
5 days	5	2	2
6 days	5	2	2
Daily	5	2	2

Target group

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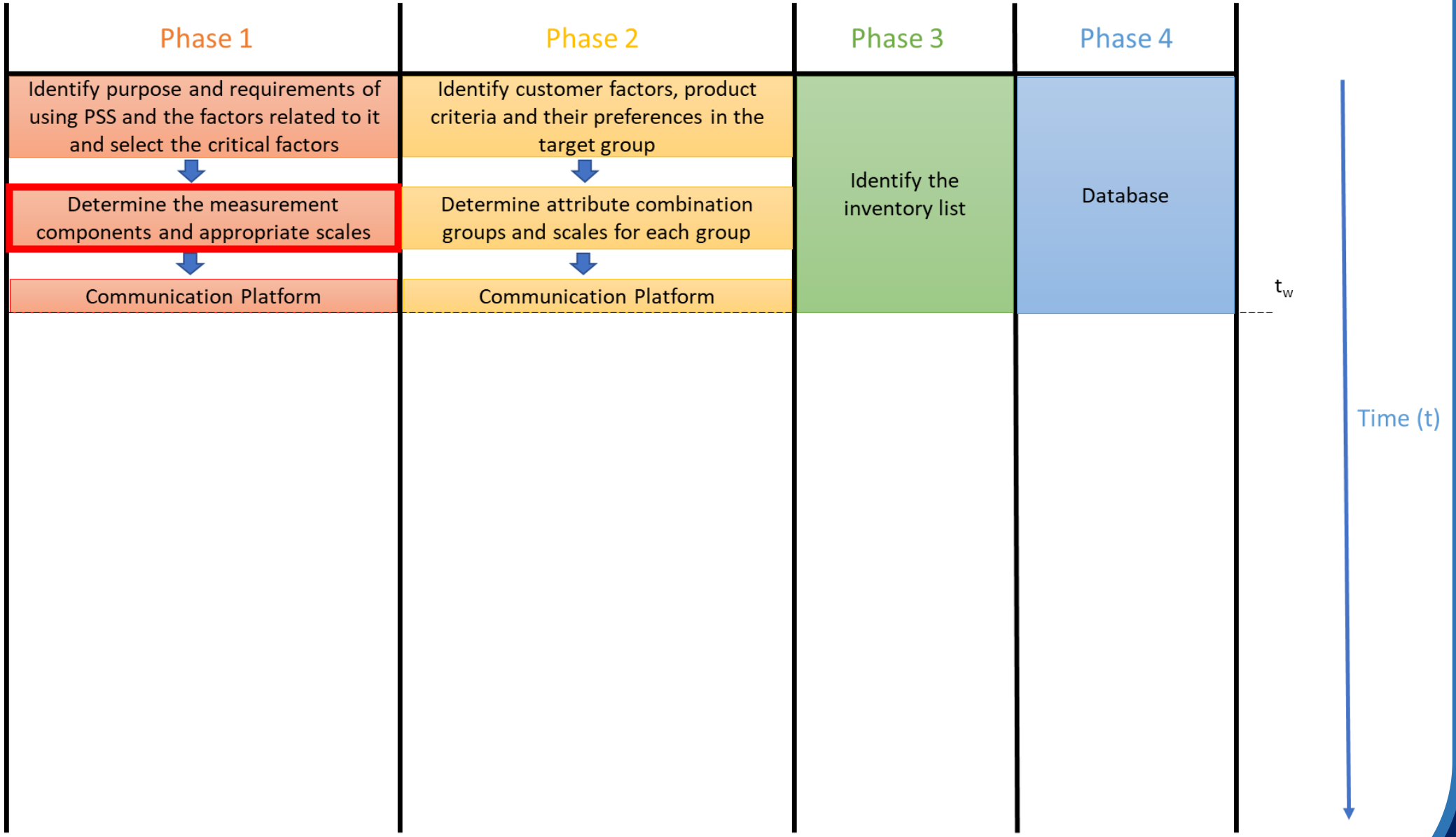

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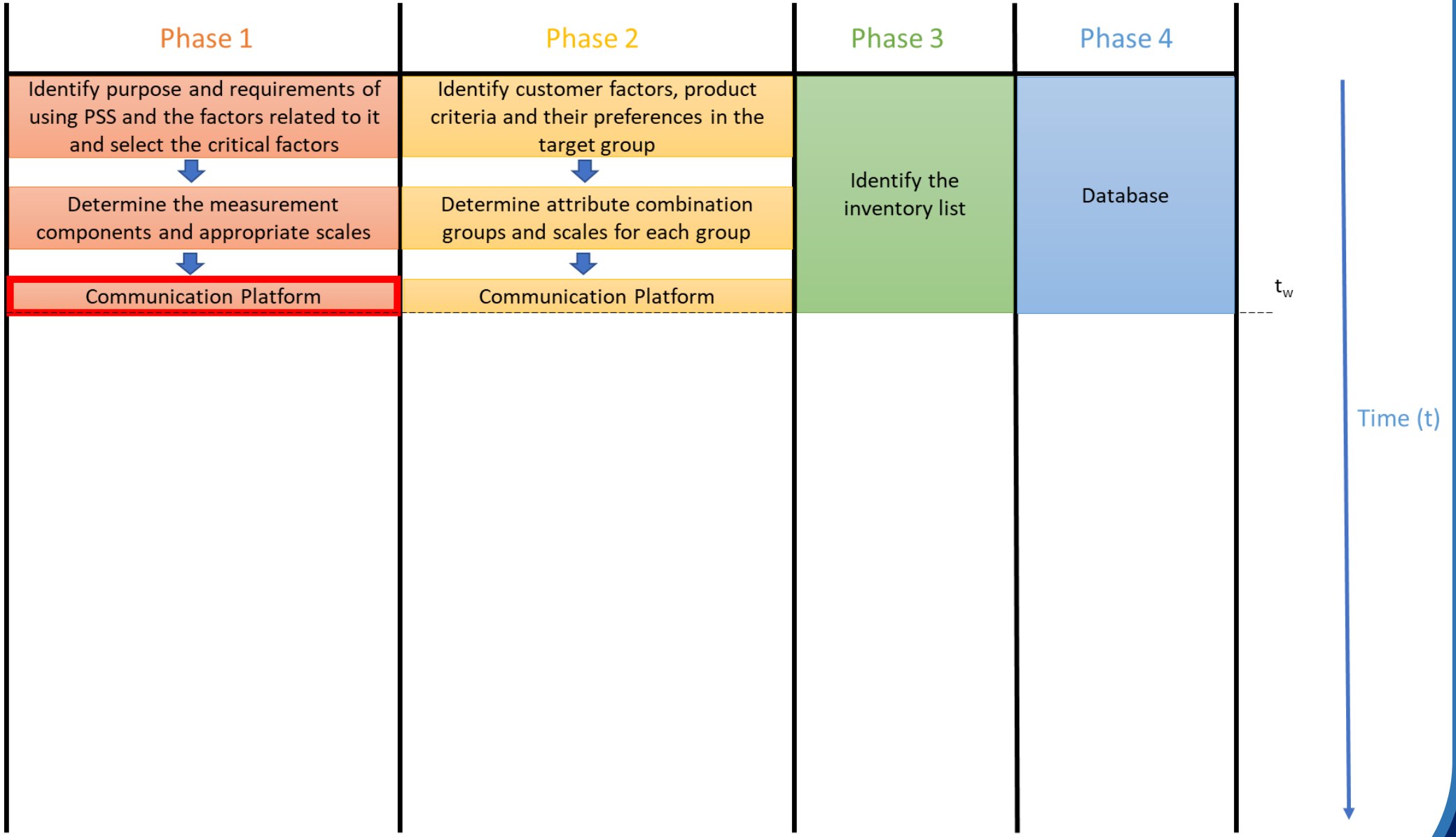

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Phase 1 : Identify the optimum PSS

Imagine you have a need of transportation, and you decide to go to a company, which has the ability to provide you the luxury of "Buying your own vehicle" or "Rent a vehicle" or "Provide a taxi service" according to your need. Please answer the questions below.

- Do you have driving license?
  - Yes
  - No
- What is your purpose of reaching out to our company?
  - Need a vehicle to gift it to someone
  - Need my own vehicle
  - Need a vehicle for special function
  - Need a vehicle to go on a trip
  - Need a vehicle for go on shopping
  - Other
- Your monthly expense level (baht)
  - Less than 10,000 ……..
  - 10,000 – 20,000 …….
  - 20,000 – 30,000 …….
  - 30,000 – 40,000 …….
  - More than 40,000 ……

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Phase 1 : Identify the optimum PSS

- The time period that you are planning to use the product/service for?
  - 1 day …….
  - 1 – 7 days …….
  - 1 – 4 weeks …….
  - 1 – 3 months ……
  - 3 – 12 months …….
  - 1 – 5 years ……
  - More than 5 years …….
- Roughly how many times per week will you need the product/service after purchasing?
  - Daily …….
  - 6 days ……
  - 5 days ……
  - 4 days ……
  - 3 days ……
  - 2 days ……
  - 1 day …….
- How important is the brand of any type of product (e.g. :- T-shirt, Shoes, mobile phone, etc) that you buy?
  - Extremely important ……
  - Very Important …….
  - Moderately Important …….
  - Slightly Important …….
  - Not at all important …….

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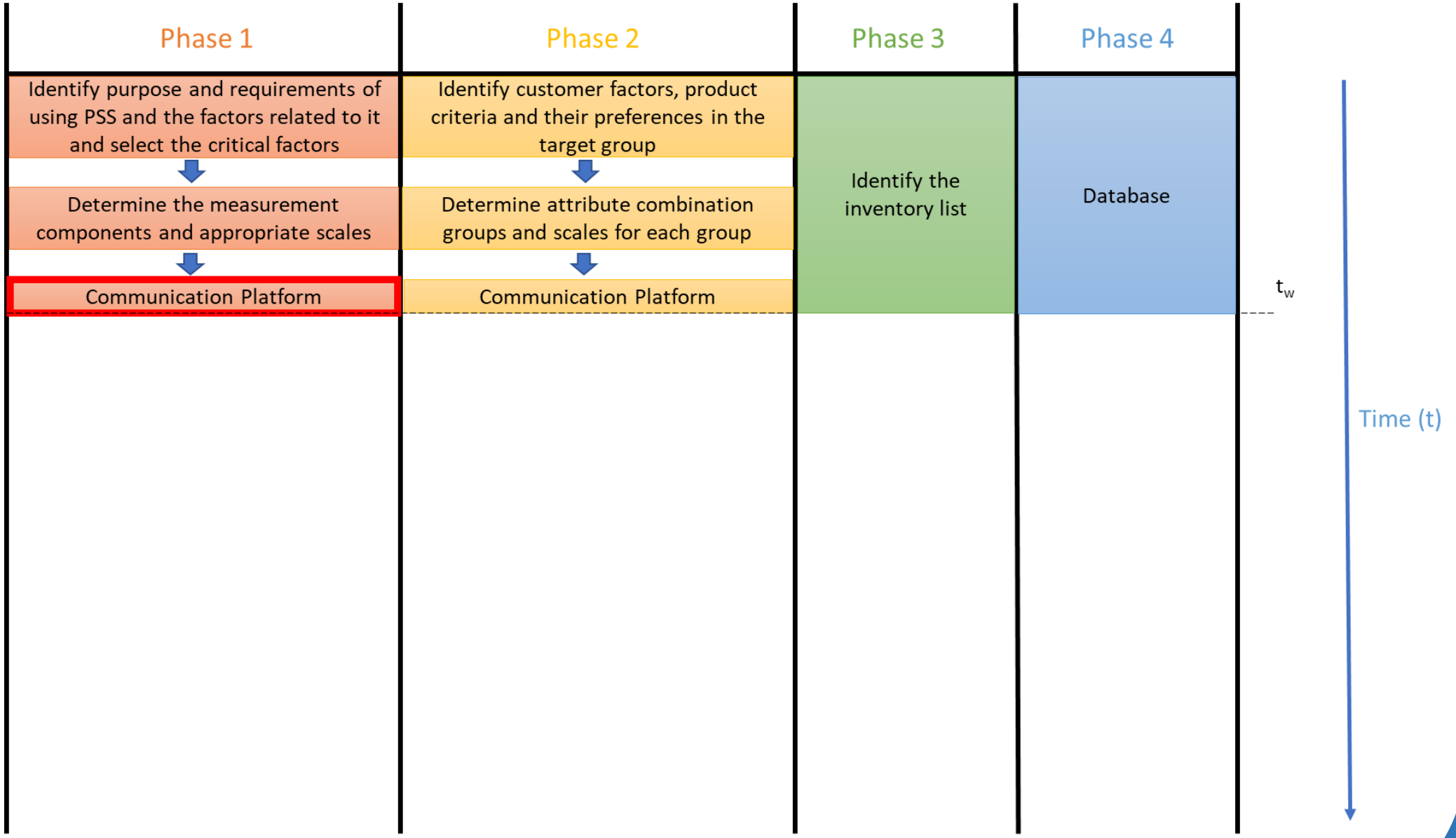

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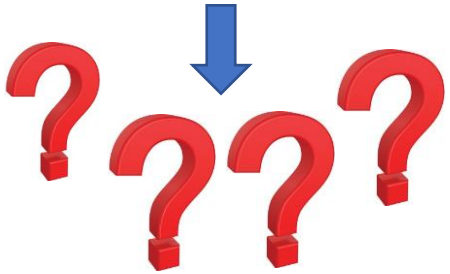
Type

Brand

Colour

Phase 2



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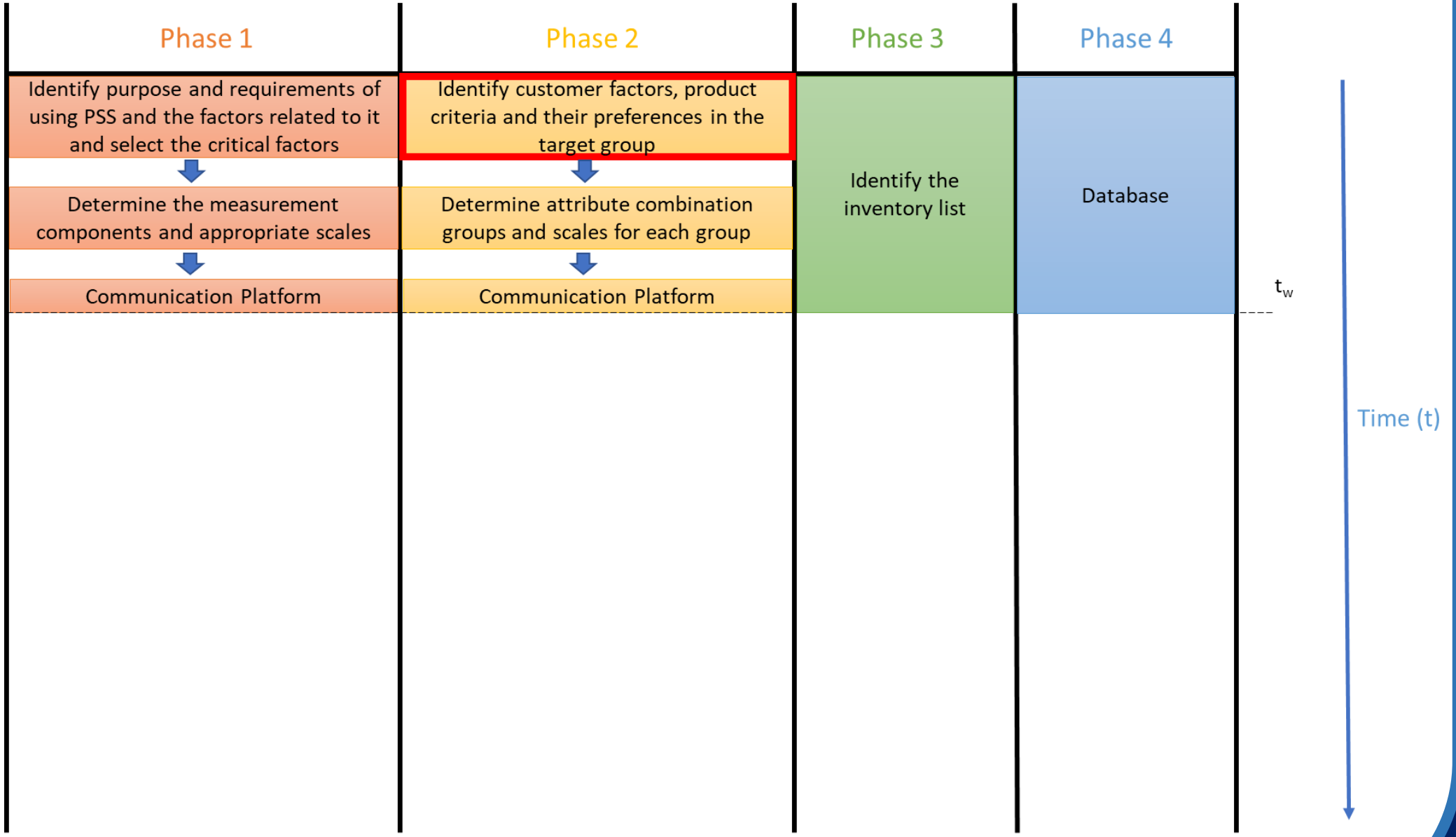

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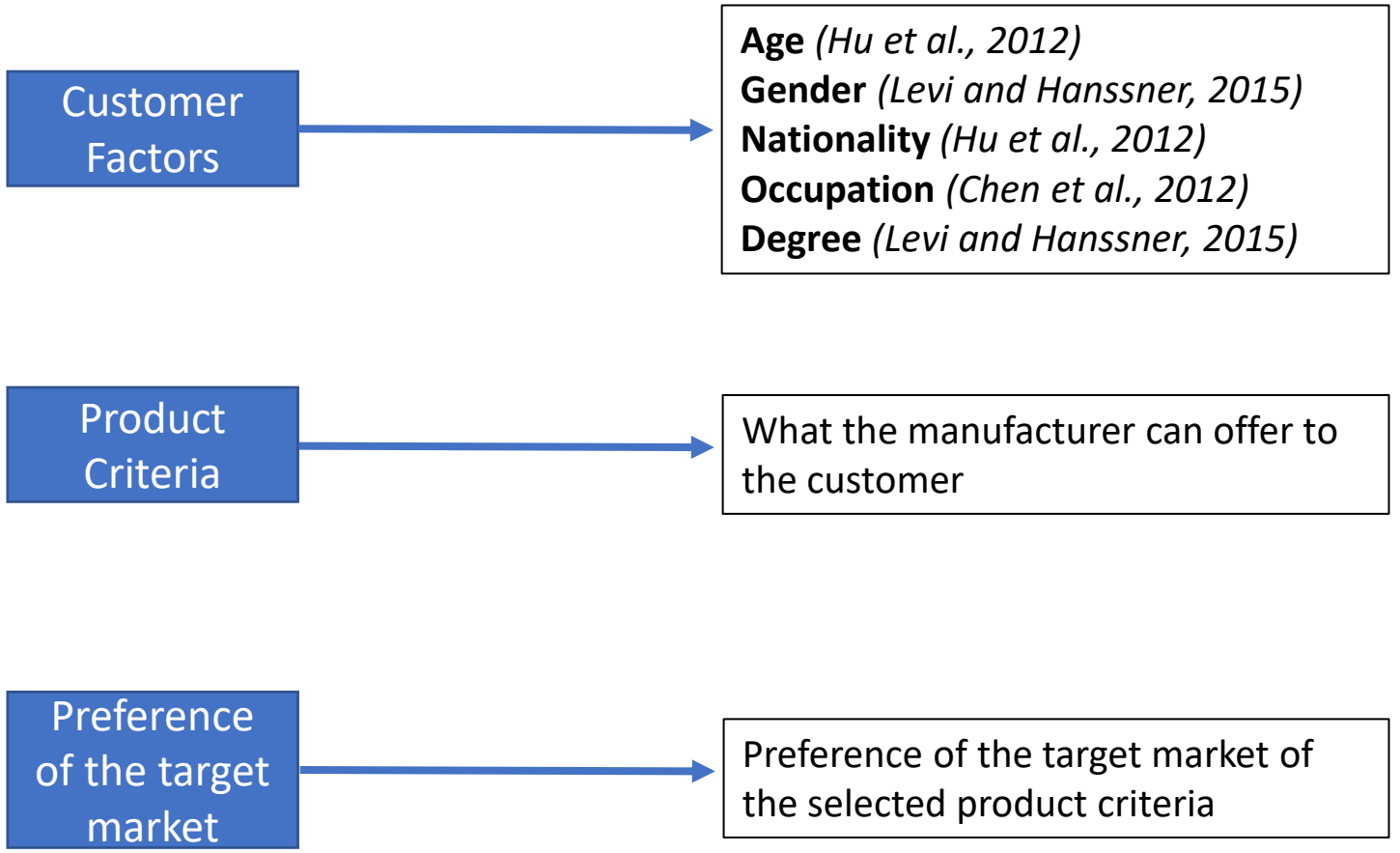

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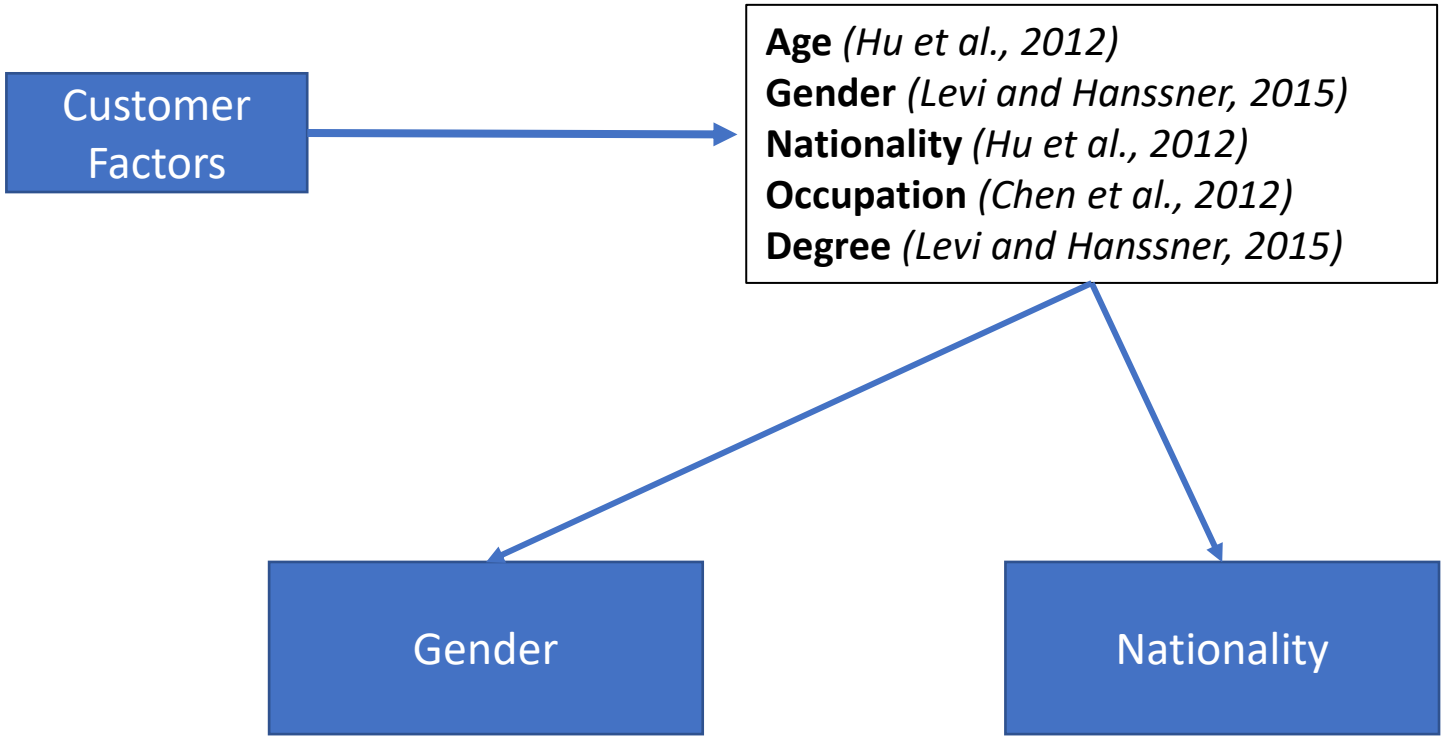

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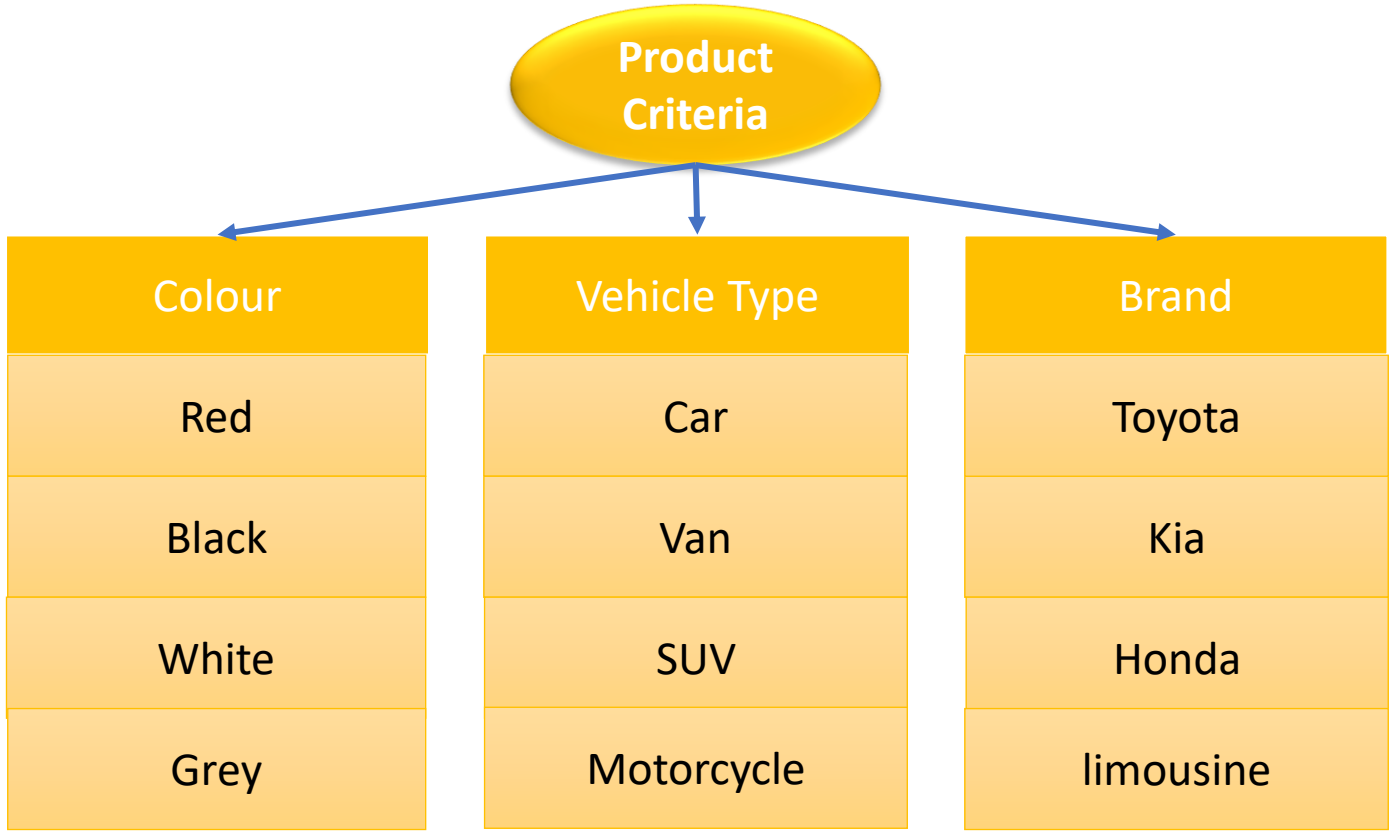
Product Criteria → What the manufacturer can offer to the customer



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Preference of the target market → Preference of the target market of the selected product criteria

- Provide ratings for each of the following **colours** according your preference
  - Red
  - Black
  - White
  - Grey
- Provide ratings for each of the following **vehicles** according your preference
  - Car
  - Van
  - SUV
  - Motorcycle
- Provide ratings for each of the following **brands** according your preference
  - Toyota
  - Kia
  - Honda
  - Limousine

(5 – Extremely Like it , 4 – Like it, 3 – Neutral, 2- Dislike it, 1- Extremely Dislike it)

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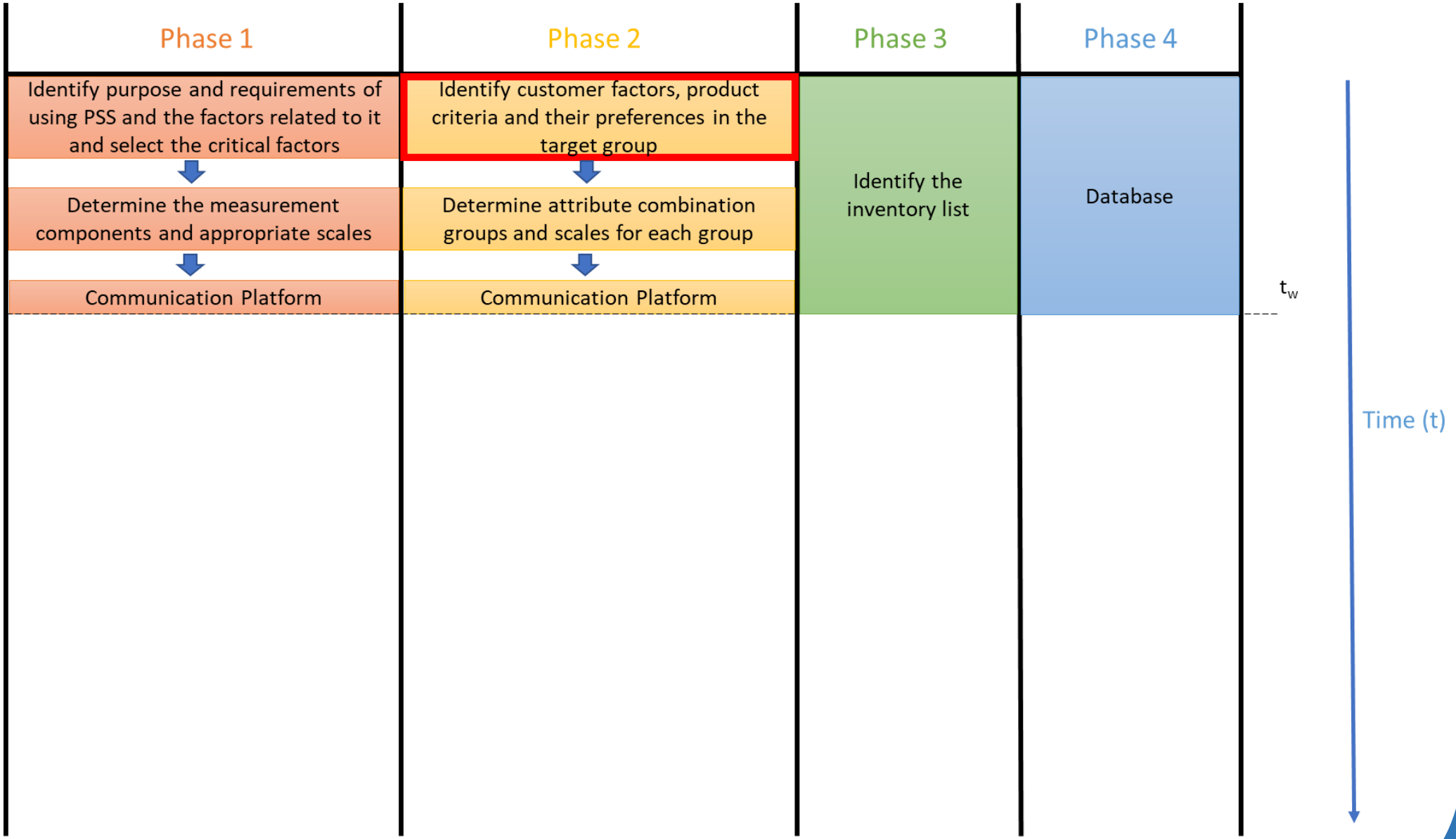

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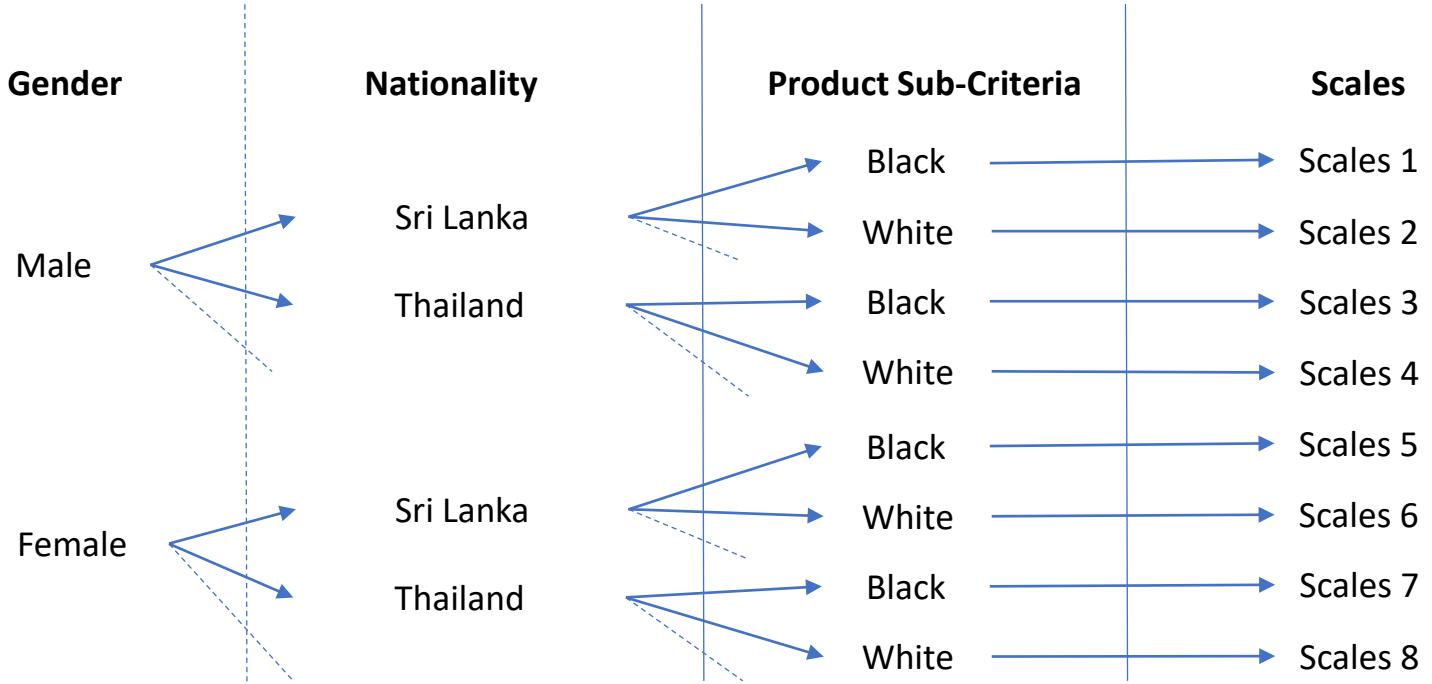
Customer Attributes

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)*



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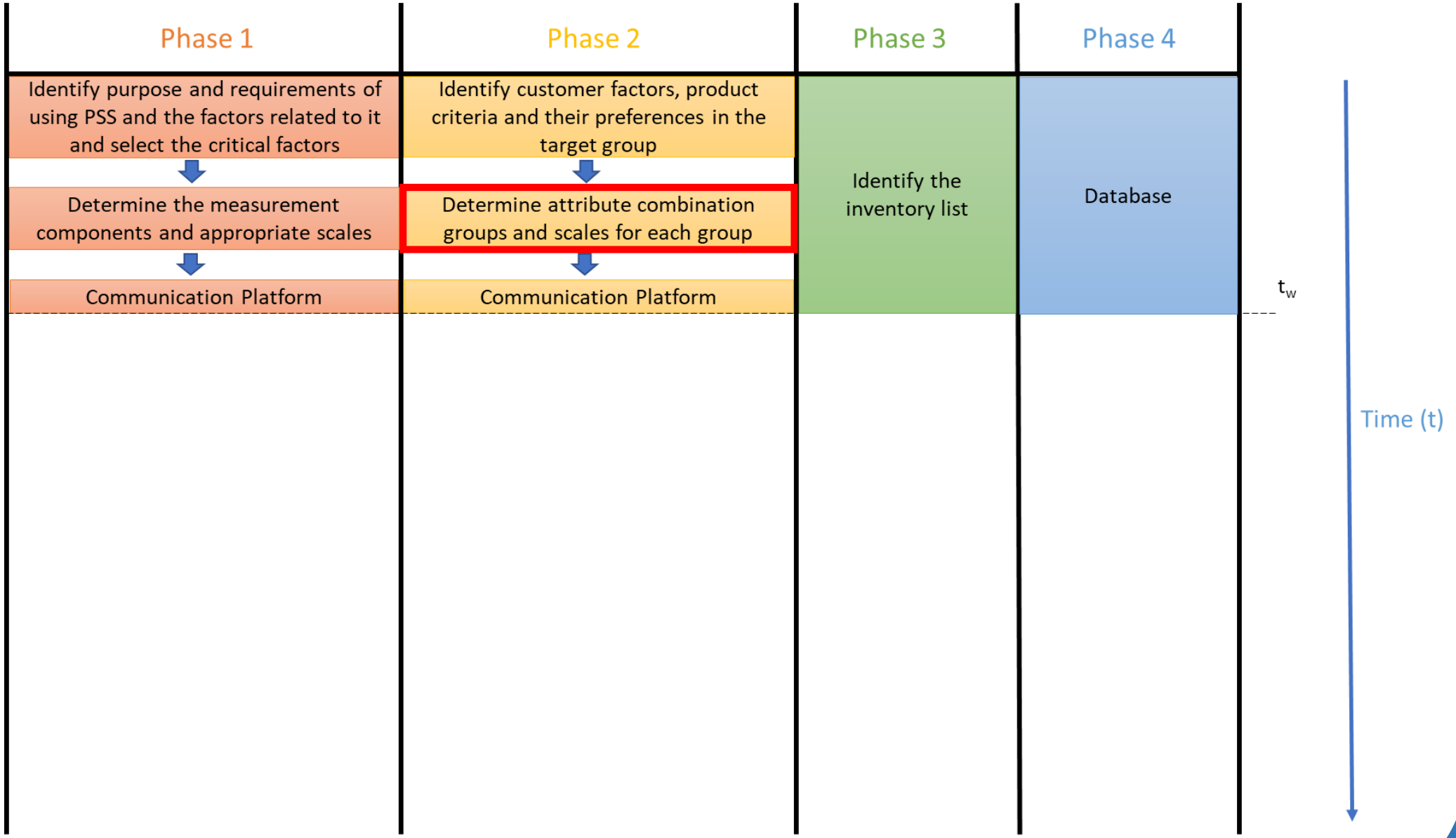
Sri Lanka

Male

Colour	Black	White	Grey
Red	5	3	3
	5	4	2
			3
			3
			3
			4

Type	Limo	SUV	Bike
Car	3	5	2
	3	3	4
	1	5	3
	3	5	4
	3	5	4
	1	5	3
	3	5	5
	2	3	3
	1	5	5
	3	5	1
	2	5	1
	2	2	4
	1	5	1
	1	4	1
	1	4	1
	3	4	3
	3	5	1
Average	2	4	3

Brand	Kia	Honda	Chrysler
Toyota	4	3	3
	5	5	4



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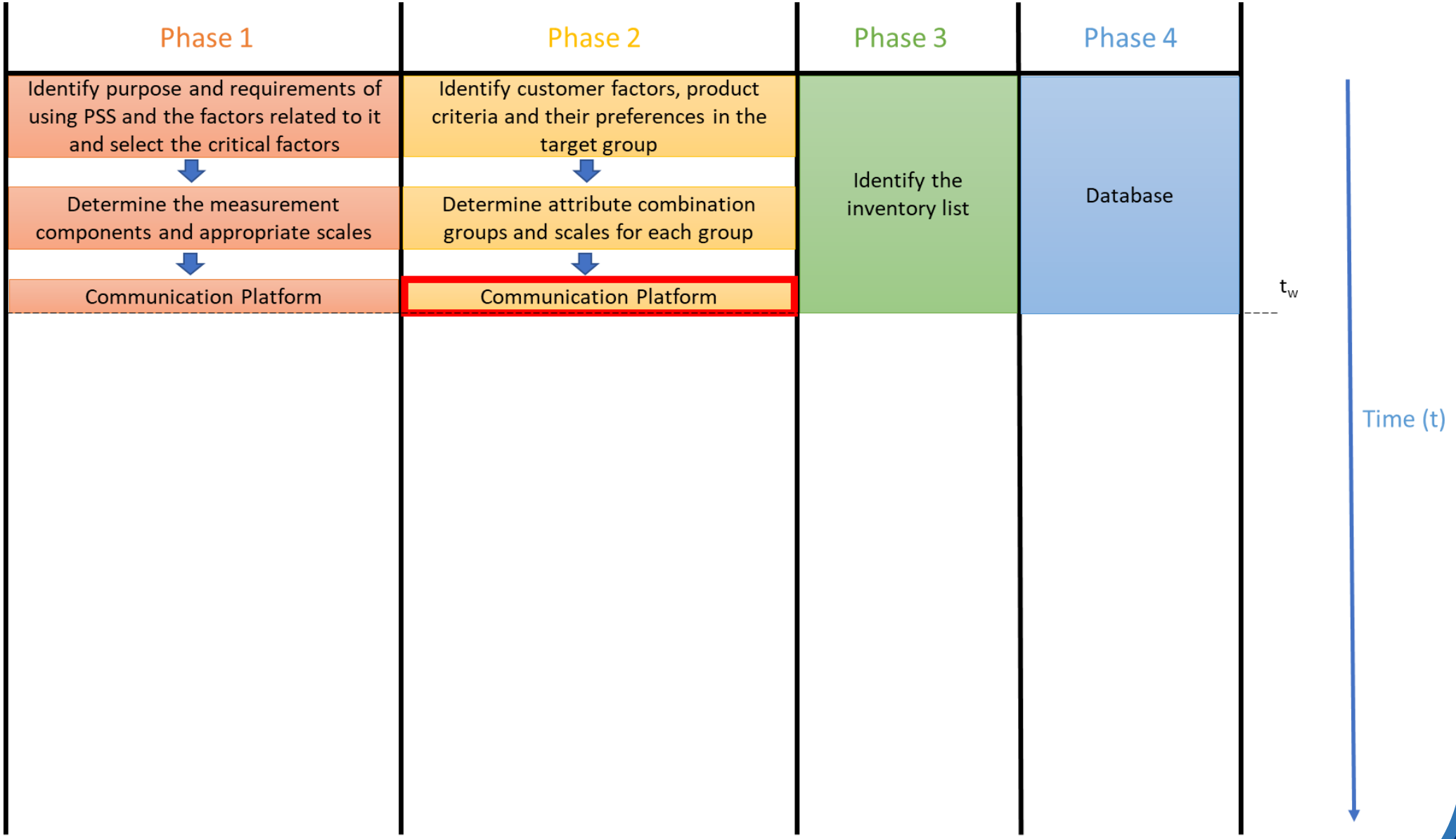

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Phase 2 : Provide personalized PSS

Based on your REQUIREMENT and AFFORDABILITY, select one feature from each criteria according to the vehicle description that you would like to have from the below choices.

- What is the type of vehicle that you would like to have?

  Car ○ SUV ○ Limousine ○ Motorbike ○

- What is the brand of the vehicle that you would like to have? (based on need and affordability)

  Toyota ○ Kia ○ Honda ○ Chrysler ○

- What is the colour of the vehicle that you would like to have?

  Red ○ Black ○ White ○ Grey ○

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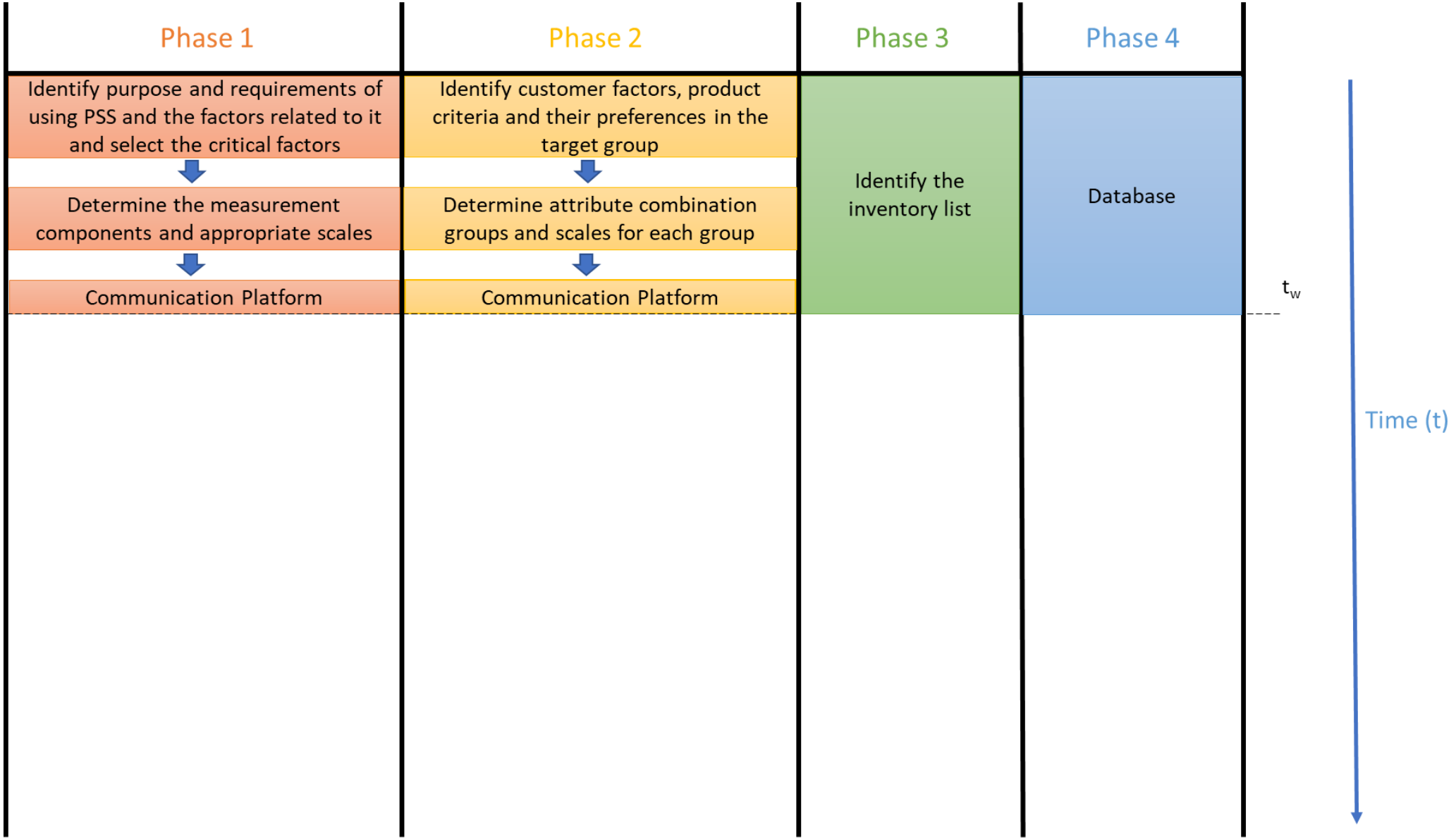

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  - Yes
  - No
- What is your purpose of reaching out to our company?
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  - Need my own vehicle
  - Need a vehicle for special function
  - Need a vehicle to go on a trip
  - Need a vehicle for go on shopping
  - Other
- Your monthly expense level (baht)
  - Less than 10,000 ……..
  - 10,000 – 20,000 ……..
  - 20,000 – 30,000 ……..
  - 30,000 – 40,000 ……..
  - More than 40,000 ……

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  - 1 day …….
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  - 1 – 3 months ……
  - 3 – 12 months …….
  - 1 – 5 years ……
  - More than 5 years …….
- Roughly how many times per week will you need the product/service after purchasing?
  - Daily …….
  - 6 days ……
  - 5 days ……
  - 4 days ……
  - 3 days ……
  - 2 days ……
  - 1 day …….
- How important is the brand of any type of product (e.g. :- T-shirt, Shoes, mobile phone, etc) that you buy?
  - Extremely important ……
  - Very Important …….
  - Moderately Important …….
  - Slightly Important …….
  - Not at all important …….
- What is the expected product you prefer to buy according to your need?
  - Buy a vehicle
  - Rent a vehicle
  - Acquire a taxi service

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- What is the colour of the vehicle that you would like to have?

  Red ○ Black ○ White ○ Grey ○

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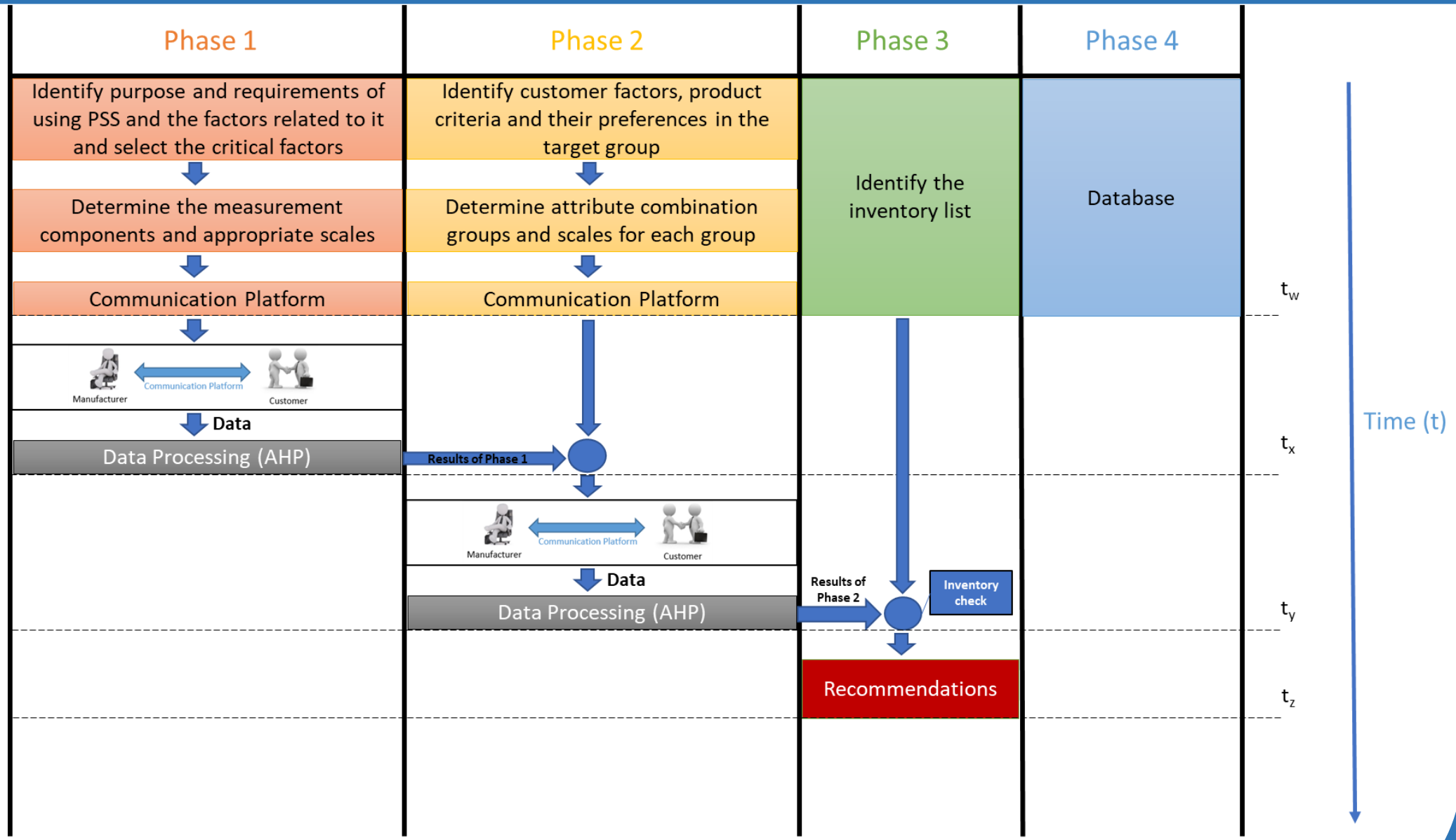

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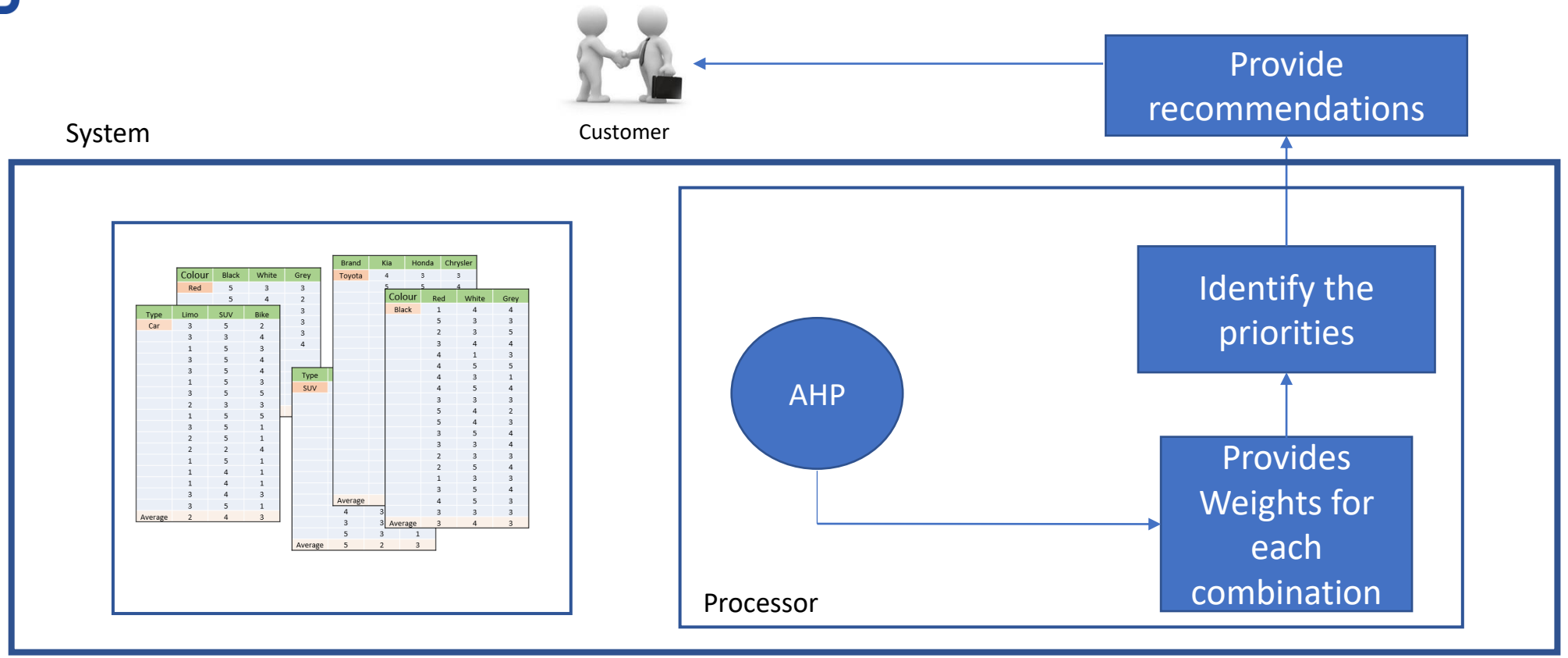

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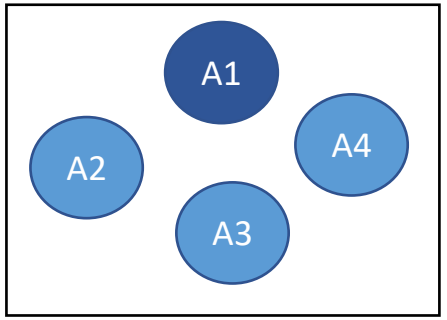
Customer

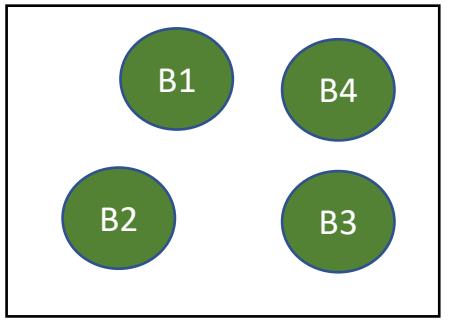
Customer Choice

A1 B1 C1

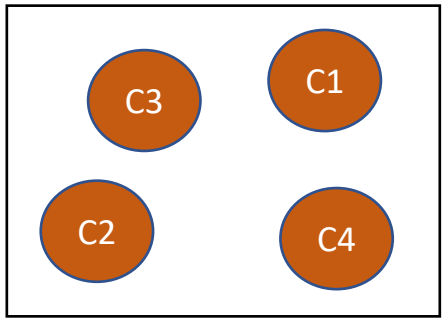
Colour



Type



Brand



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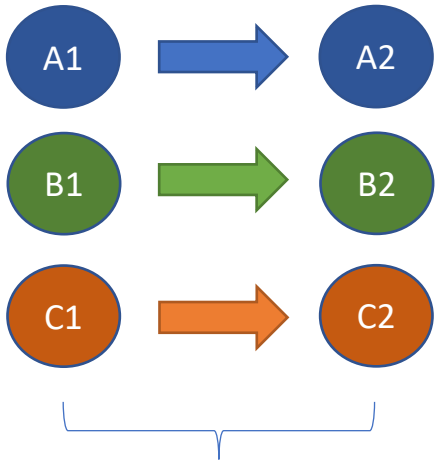
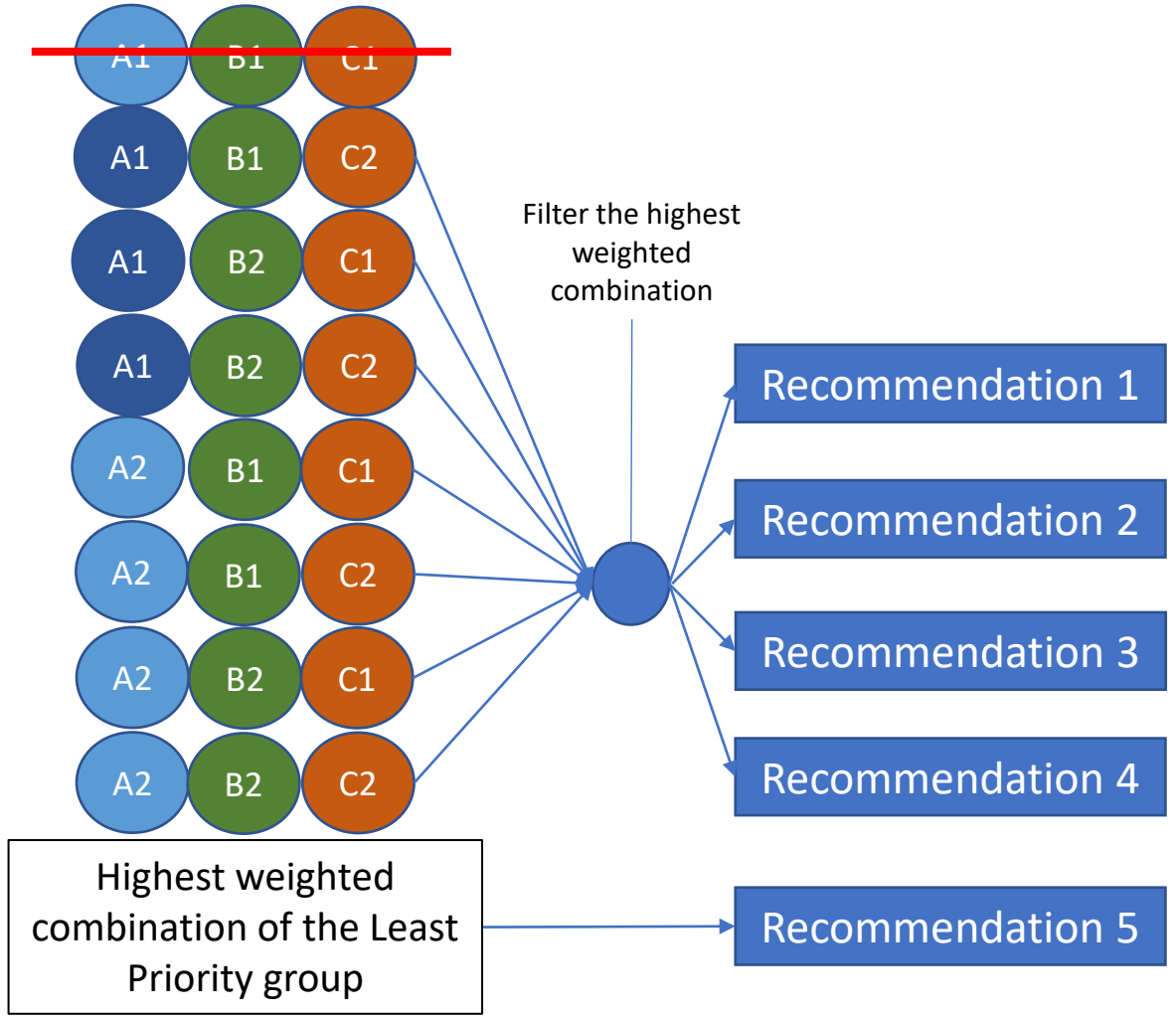
Customer

Knowledge gathered from target market



Highest Priorities



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Recommendations

Toyota Camry
- Power Front Seat
- Foldable Front Seat Headrest
- Wireless Hand-Free (Bluetooth) and telephone switch at Steering Wheel
- Memory Seat (Driver Seat and Side Mirror)

Toyota Rav4
- Cruise Control, Adaptive
- Moon-roof, Power Glass
- Pre-Collision Warning System, Audible Warning
- Audio Streaming: Bluetooth
- Lane Deviation Sensors
- Air Conditioning - Front - Dual Zones

Kia 2017 Sportage
- Performance with the turbocharged engine
- Accurate steering with good feedback
- Available enormous moon-roof
- Audio Streaming: Bluetooth
- Two four-cylinder engine options
- Air Conditioning - Front - Dual Zones

Kia 2016 Optima
- 6-speed shiftable automatic transmission
- Front wheel drive
- Front and rear head airbag
- Stability control
- Audio Streaming: Bluetooth

Toyota Rav4
- Cruise Control, Adaptive
- Moon-roof, Power Glass
- Pre-Collision Warning System, Audible Warning
- Audio Streaming: Bluetooth
- Lane Deviation Sensors
- Air Conditioning - Front - Dual Zones

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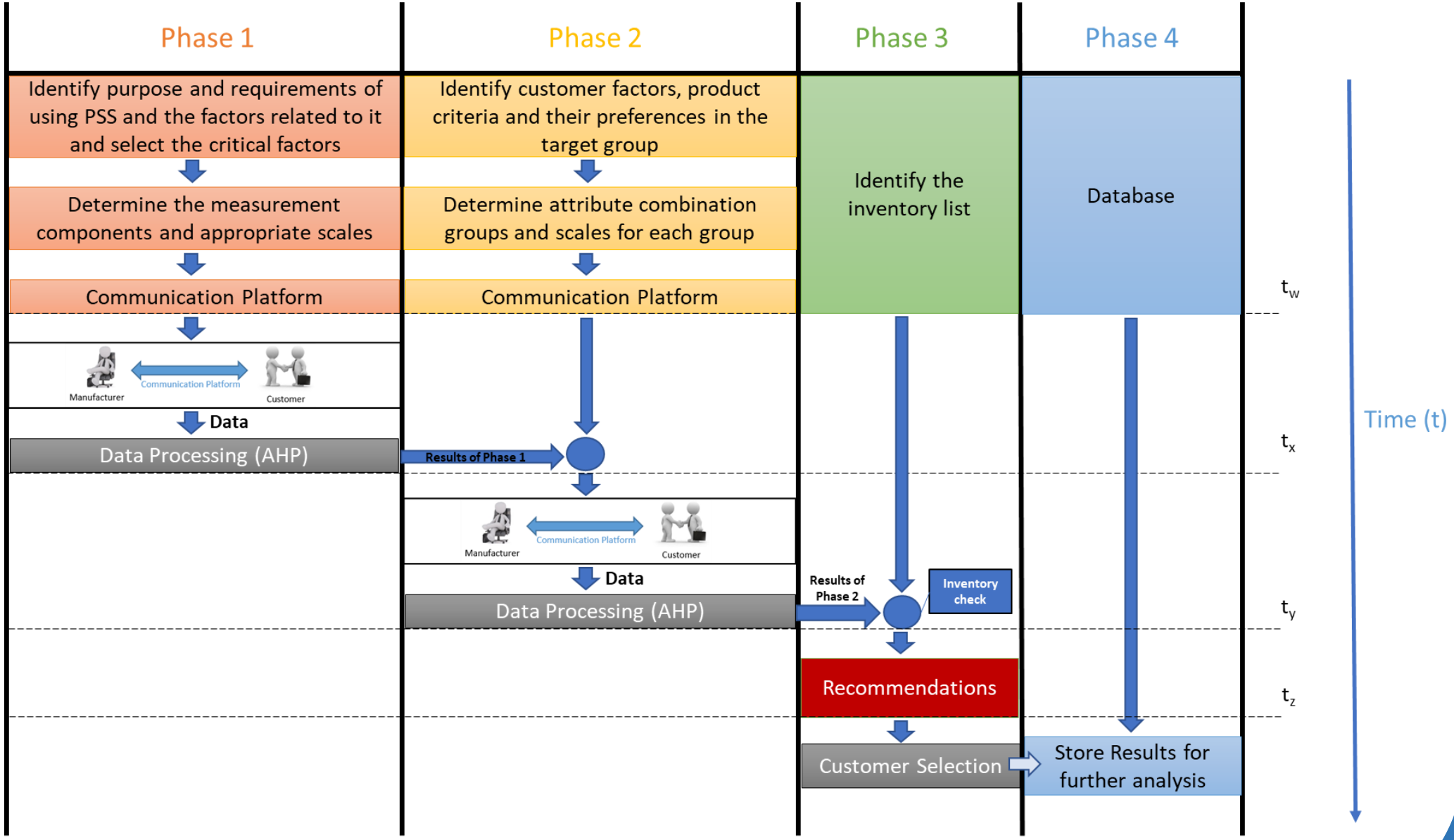

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System Evaluation

- What is the expected product you prefer to buy according to your need?
  - ○ Buy a vehicle
  - ○ Rent a vehicle
  - ○ Acquire a taxi service

- Assume that the vehicle that you ordered is not available. Based on your "Original Requirement" please select a different combination. (eg: Your product Red, Limousine, Chrysler is not available, but Red, Limousine, Toyota or any other combination is available).

Type :	Car ○	SUV ○	Limousine ○	Motorbike ○
Brand :	Toyota ○	Kia ○	Honda ○	Chrysler ○
Colour :	Red ○	Black ○	White ○	Grey ○

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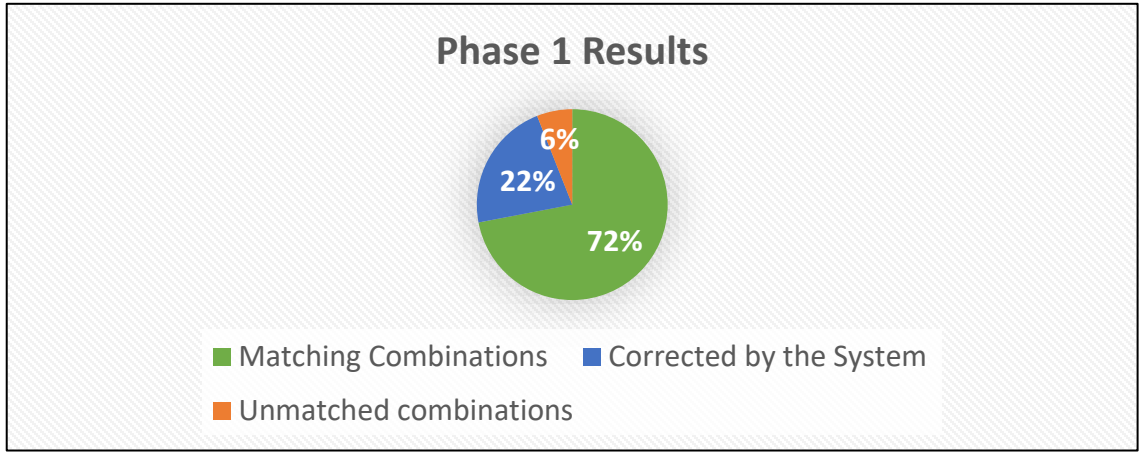
Phase 1 : Results of Phase 1

No. of Respondents = 50



	Customer Expectation	System Recommendation	
Participant no.23	Taxi service	Buy a vehicle	**Have driving license** Duration → 1-5 years Frequency of Use → At least 3 days per week Social Status → Very Important
Participant no.30	Renting a vehicle	Buy a vehicle	**Have driving license** Duration → 3-12 months Frequency of Use → At least 4 days per week Social Status → Extremely Important
Participant no.43	Taxi service	Rent a vehicle	**Have driving license** Duration → 3 days Social Status → Moderately Important Purpose → To go on a trip

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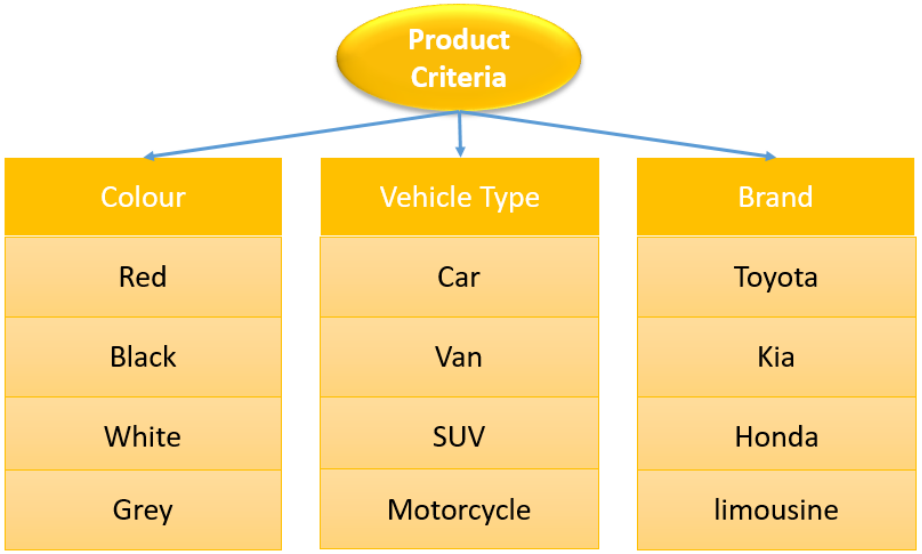
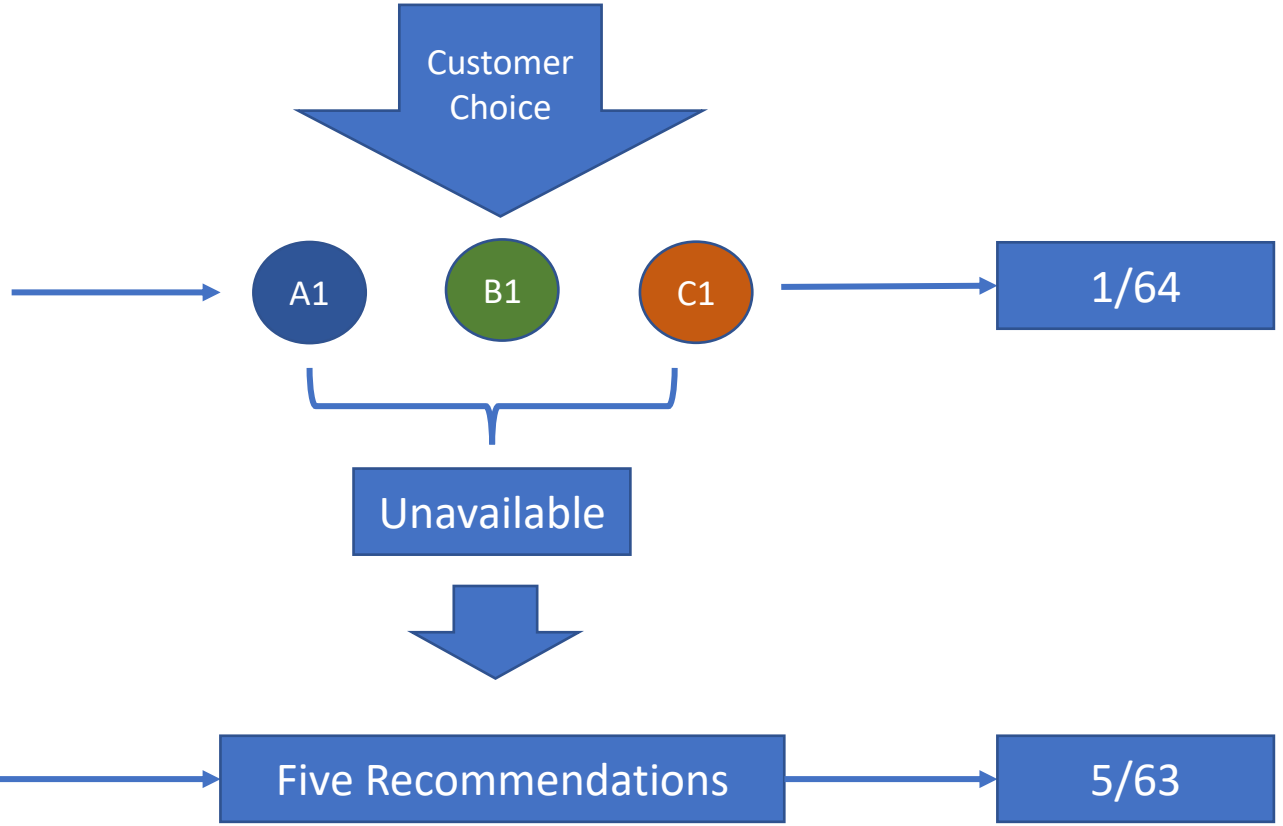
Phase 2 : Results of Phase 2

Customer





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System Analysis

	No. of Participants	Number of Matched/ Corrected Results "With system"	Number of Matched/ Corrected Results % "With system"
Phase 1	50	47	94.0%
Phase 2	50	39	78.0%

	No. of Participants	Number of Matched/ Corrected Results "With system"	Number of Matched/ Corrected Results % "With system"
Whole system (Phase 1 and 2 both Match)	50	37	74.0%

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Personalized PSS Process

- The system were **able to find the best fitting PSS** for each customer and provide opportunity for PSS customization using AHP as a tool.
- Using this model **companies can enhance their competence** by PSS personalization and hence increase customer satisfaction.
- The model also helps to **increase customer value** by allowing the customer to involve in value creation.
- The model can also be used by companies **as a tool** to analyse the potential of existing PSS.

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