



Lecture 3: The KJ Method / Affinity Diagramming



Kawakita Jiro

- <http://www.rmaf.org.ph/Awardees/Biography/BiographyKawakitaJir.htm>



Japanese Anthropologist



The affinity diagram process was developed in Japan by a Japanese anthropologist, Jiro Kawakita. Looking for understanding of the societies that he was studying, he took the ideas he had written on pieces of paper, spread them on the table and looked for natural groupings. He discovered this process allowed him to sort through all kinds of seemingly unrelated data and identify fundamental themes for each grouping. These themes did not always follow traditional lines of thought and so, he concluded that they enhanced breakthrough thinking. Kawakita refined the method, named it KJ, and registered the KJ Method as a trademark.

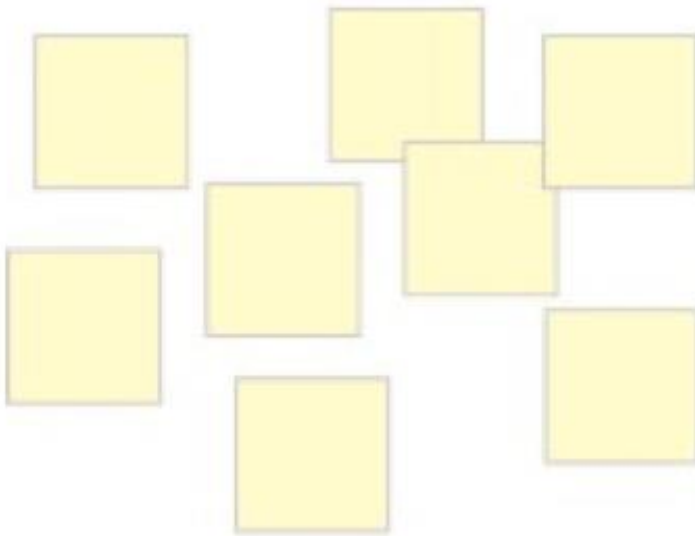
Affinity diagram?

- A tool that gathers large amounts of language data (facts, ideas, opinions, issues) and organizes them into groupings based on their natural relationships.
- An idea processing method:
 - Processing a large amount of data
 - Organizing data into common themes
 - Making sense out of the data/ideas



Affinity diagram?

Random Ideas

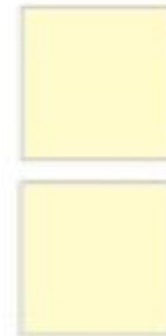


Affinity Diagram

Theme 1

Theme 2

Theme 3



Affinity diagram and problem understanding

- Can help define/understand problems:
 - Unearth facts relevant to a problem
 - Discover previously unseen connections between various ideas or information
 - Build a common understanding of a problem
 - Understand a causal structure of a problem:
 - Identify root causes and solutions to a problem
- Especially, useful for dealing with:
 - Complex, multi-faceted problems
 - Problems involving disparate interests and perspectives

Affinity diagram and brainstorming

- Idea processing after brainstorming
- After brainstorming session, there are usually pages of ideas. Many of them will be very similar, and many will also be closely related to others in a variety of ways. Affinity diagramming groups the ideas into themes.
- From the chaos of the randomly generated ideas comes an insight into the common threads that link groups of them together. From there the solution or best idea often emerges quite naturally. An affinity diagram can encourage new patterns of thinking.

Example 1

(Problem understanding/identifying root causes)

Wharton School style

Process

1. Form Team
2. Pose a question
3. Write statements of fact that relate to the question
4. Arrange similar facts into groups
5. Create headers for groups of facts
6. Arrange groups and identify links among groups
7. Write concluding statement and reflect
8. Perform ritual "YO WAN"



KARL ULRICH

CIBC Professor of Entrepreneurship and eCommerce, Vice Dean of Innovation

1. Form Team

- Team size is ideally 3-6 members.
- Team should include key stakeholders.
 - Sometimes face a trade-off between including key stakeholders and including those who have basic knowledge of problem.
- Allocate about two hours.
- Can be completed by one person for problems addressed by a single individual.
- Materials required:
 - Square self-stick notes (e.g., "Post Its")
 - Markers (e.g., "Sharpie") for post its
 - Flip chart or whiteboard
 - Markers for chart/board

Example:

A bicycle advocacy group wished to increase the number of people who commute to work by bicycle in the United States. The group assembled a team to discover some of the underlying factors that limit the use of bicycles in commuting. The team comprised two people from the advocacy group, two bike commuters and two people who do not commute by bicycle.

2. Pose Question

- "Why/what" questions usually work better than "how" questions.
 - "Why don't..." vs. "How can we...?"
- Question should be "scrubbed" to ensure that it reflects group's problem solving focus.
- Write question at top of whiteboard or flipchart.

Why don't more Americans commute to work by bicycle?

3. Write Statements of Fact

- Each team member writes 5-10 statements of fact on individual self-stick notes.
- Rules
 - Statements are facts not judgments.
 - Facts are in some way relevant to the question.
 - Facts need not directly "answer" question.
- Each fact is scrubbed by the author and then scrubbed by the group to eliminate judgments, inferences, and predictions.

People are idiots when it comes to picking bike routes.

scrub

The best bike routes are not usually the best car routes.

Americans are couch potatoes.

scrub

Many people have a hard time committing to exercise.

Why don't more Americans commute to work by bicycle?

The best bike routes are not usually the best car routes.

Biking time is more than driving time for trips > 10 miles.

Many people live > 10 miles from work.

A decent commuter bike costs at least \$500.

Recreational bikes are not always good commuter bikes.

Helmets give cyclists "helmet hair"

Fixing flats requires some technical skill

Most workplaces do not provide secure bike storage.

Cyclists are often perceived as eccentric.

Few workplaces provide locker room facilities.

On warm days, cyclists sweat.

Cars are an expression of self for many Americans.

Cycling requires at least modest fitness.

Carrying cargo requires extra equipment.

It's hard to stay comfortable on a bike in the rain.

Bikes locked outside are prone to theft.

Many people don't know what kind of gear they need for commuting.

Most locations have variable climate over the year.

In the winter, it's dark on the commute home.

Cyclists are exposed to danger from cars when they share the road.

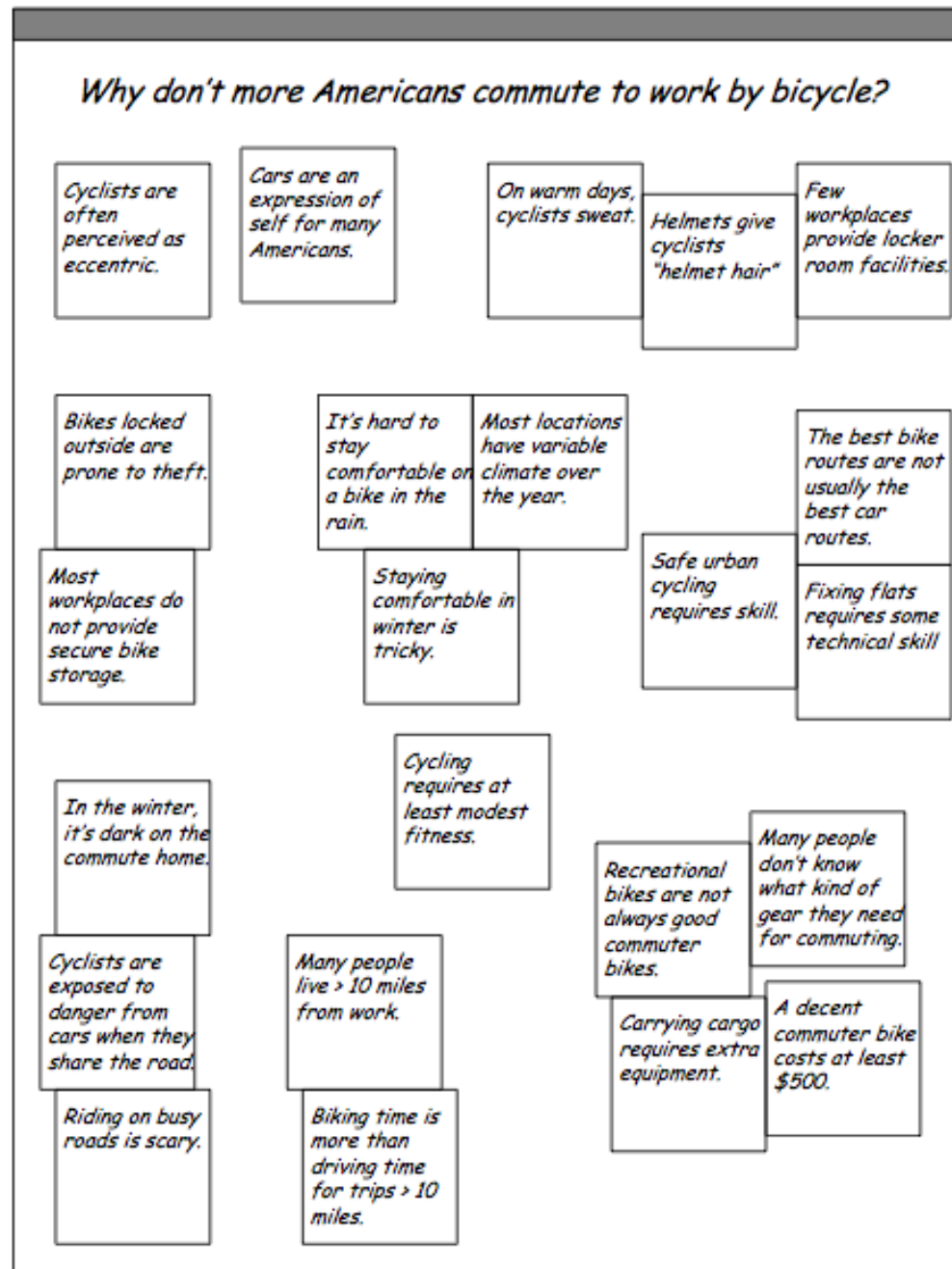
Safe urban cycling requires skill.

Riding on busy roads is scary.

Staying comfortable in winter is tricky.

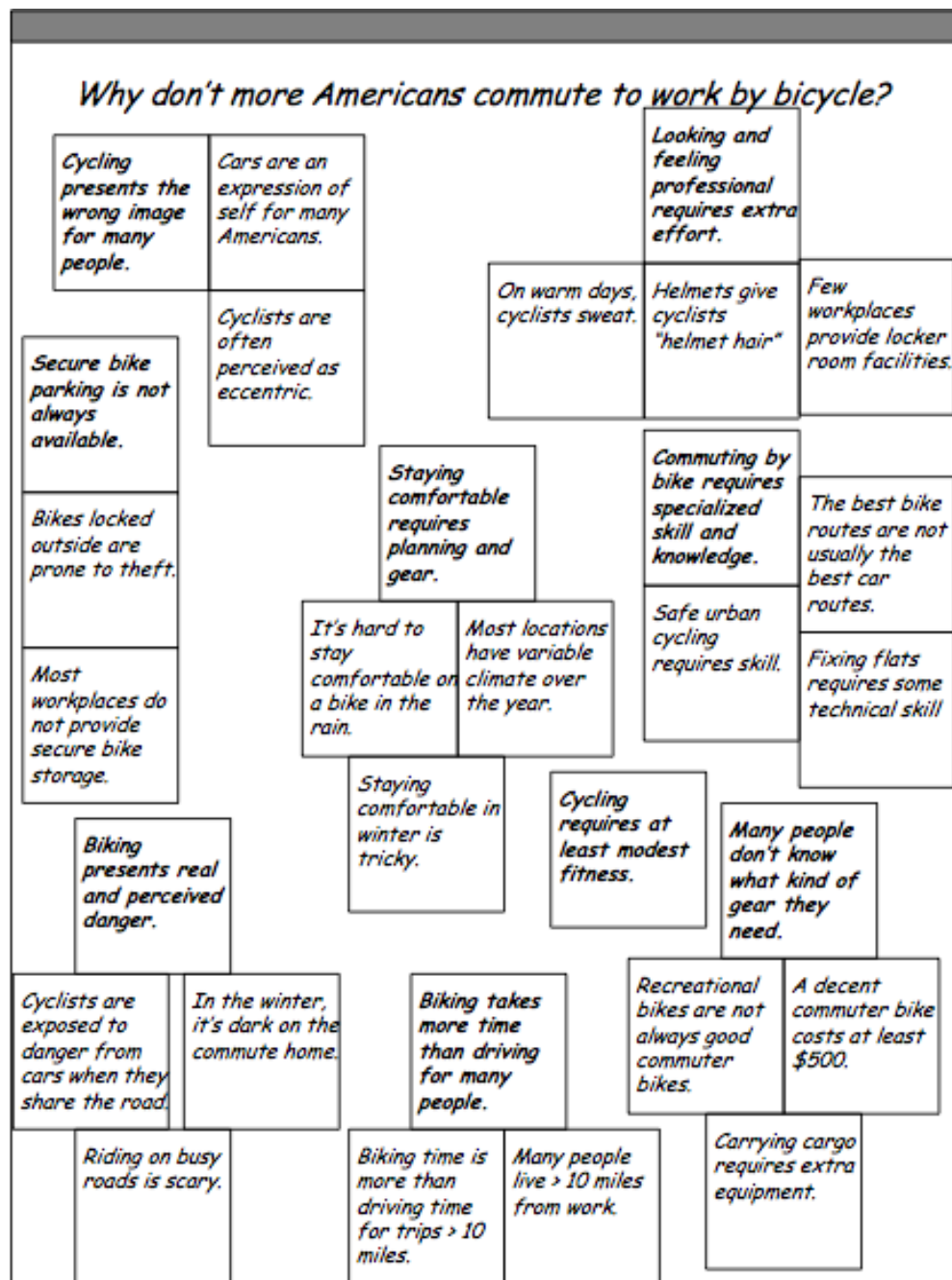
4. Arrange Facts in Groups

- The KJ dogma requires that this grouping be done in silence. There is some merit to this idea as it is fast and efficient and ensures that the less-verbal team members participate.
- Groupings are such that facts reflect similar ideas or feelings.
- Try to avoid generic, often technical, groupings under categories such as cost, performance, convenience, safety. Instead allow groupings to form based on intuition about similarity of underlying facts.
- An occasional "lone wolf" is o.k.
- Strictly redundant facts may be stacked on top of each other.
- If you don't like a grouping, just change it...don't argue about it.
- Work quickly to get some basic structure in place.



5. Create Headers for Groups

- A header summarizes the facts in a group.
- In some cases, an existing fact can serve as a header.
- In other cases, a new statement is drafted to summarize the facts.
- Generalize just enough to capture the collection of facts, but not more.
- Write headers in distinctive style (e.g., different color or script). (Here, the headers are shown in boldface.)



6. Arrange Groups and Show Relationships

- Stack the facts underneath the headers.
- Arrange the headers/stacks into groups in order to reflect similarities among the headers.
- Circle these groups and create a label for these groups of headers. These labels can be written right on the board or on another self-stick note.
- Some headers will remain "lone wolves"
- Identify the most significant headers with "stars" or "dots" through multi-voting.
 - In multi-voting each member of the team may allocate three dots/stars as he/she sees fit.
- Draw lines to indicate relationships among groups.

Why don't more Americans commute to work by bicycle?

Commuting by bike may require extra time and effort.

Looking and feeling professional requires extra effort. ★★

Cycling requires at least modest fitness. ★★

Biking takes more time than driving for many people. ★★★

Commuting by bike requires specialized skill and knowledge.

Commuting by bike requires specialized skill and knowledge. ★★

Staying comfortable requires planning and gear. ★★

Many people don't know what kind of gear they need. ★

Biking presents real and perceived danger. ★

Secure bike parking is not always available.

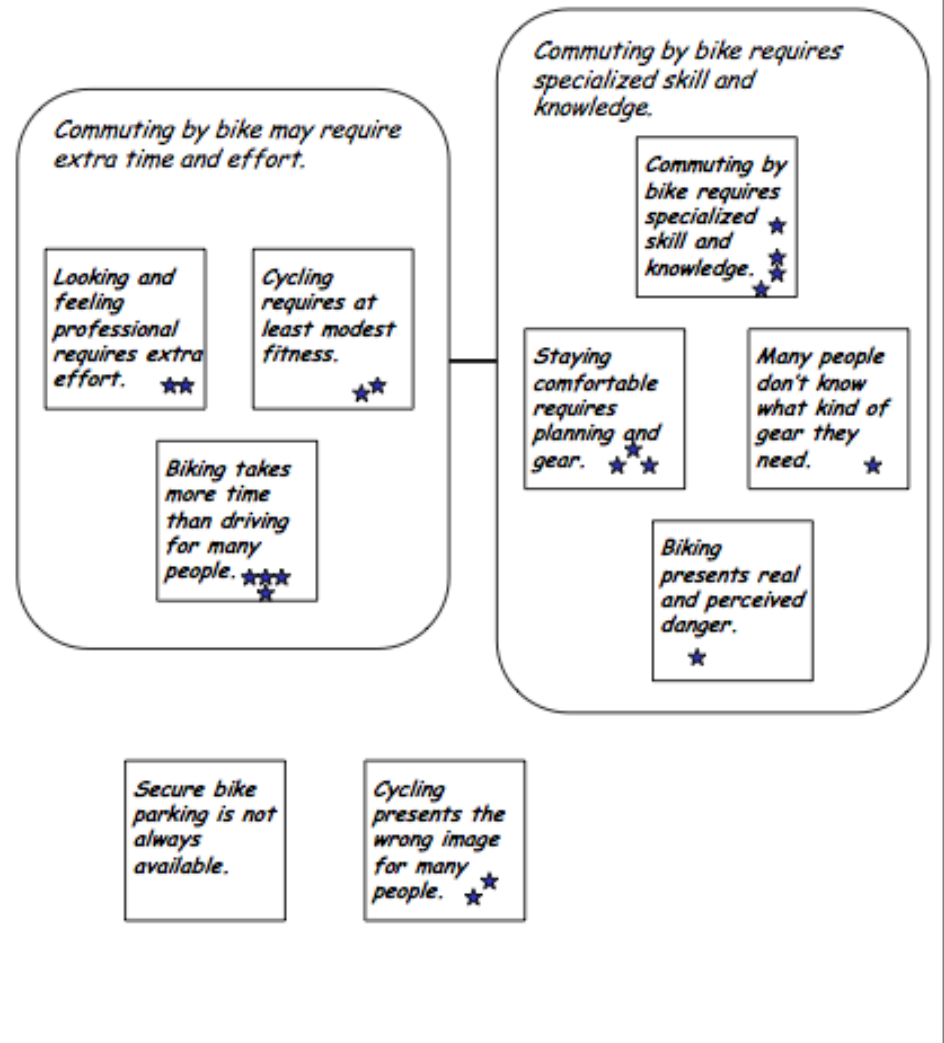
Cycling presents the wrong image for many people. ★★

7. Write Concluding Statement and Reflect

- Draft a statement that captures the essential message of the facts, headers, and groups.
- By necessity, this statement will not capture every factor.
- In most cases, the factors identified by the KJ diagram will provide several very clear direction for further problem solving efforts. For the bike commuting example:
 - How can skills and knowledge be easily and effectively delivered to potential bike commuters?
 - Which segments of the population are least likely to require extra time/effort for bike commuting due to distance/dress, etc.?
 - How could safe, efficient routes be identified and marked?
 - How could the image of bike commuting be enhanced?
 - What information systems might be used to guide cyclists in choices of cold-weather gear?

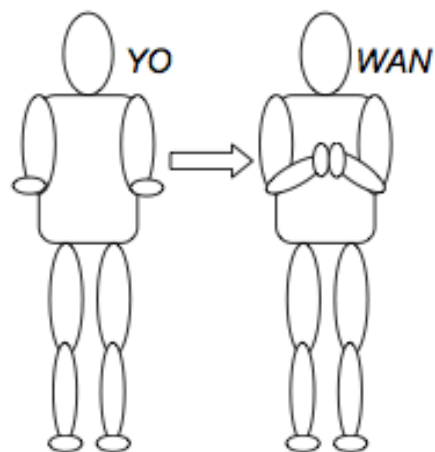
Why don't more Americans commute to work by bicycle?

Commuting by bike requires an investment in skills and knowledge, and in some cases a willingness to spend extra time and effort.



Step 8: Perform the ritual “YO WAN”

- As with many methodologies within the Total Quality Management (TQM) movement, the construction of the KJ diagram carries with it some ritual.
- In the best case, ritual may create a cultural bond that contributes to organizational efficiency and problem solving efficacy.
- In any case, the ritual adds a bit of levity to the process.
- The YO WAN ritual is performed as follows:
 - After team members come to consensus that the KJ diagram is a good reflection of the causal structure of the problem, the team stands ready for the YO WAN.
 - All team members hold their hands in front of them at waist level with palms up.
 - The team chants YO...WAN while simultaneously bringing the hands together in a clapping motion at chest height. The WAN syllable coincides with the clap.
 - If the chant is not sufficiently enthusiastic it is repeated (or the team returns to the KJ diagram until it is a good reflection of the group's problem solving effort).
- I'm sure YO WAN is derivative of some expression in Japanese, but has probably lost quite a bit in various reinterpretations over the years. (In an interesting twist on this ritual, one group I worked with on a product development project insisted on chanting “YO MAMMA.”)



Example 2

(Problem understanding/identifying root causes)

Supermarket checkout redesign

- The personnel department of a food supermarket chain store identified a high resignation rate of good checkout staff. **There was information available from exit interviews about their reasons for leaving**, but this was disorganized and there was no clear area that they felt they could address. They decided to use the KJ method and an Affinity Diagram to try to better understand why these people were leaving (see as illustrated).
- As a result, the checkout process was investigated further and eventually completely redesigned. This included a redesigned booth and hourly breaks for operators. Consequently, there were significantly fewer leavers (and as a bonus, customer satisfaction increased).

Checkout operators
leaving job

Inefficient
checkout
process

Unhappy
customers

Customers
became
impatient

There were
always long
queues

It's a fuss
just to sell a
few things

Till difficult
to use

The till could
be easier
to use

I kept
breaking
my nails

There's a lot
of button-
pressing

Seats not
comfortable

I just couldn't
keep still

I kept getting
stiff

It's a pokey
little hole to
sit in

I've always
had problems
with my back

Not happy
in job

Jealous of
others

I could have
done Jan's
job better

The manager
just swanned
around

Some other
jobs looked
better

Boring job

I got sleepy
sometimes

By the end
of the day I'd
be scowling

I just didn't
care any
more

The pay
wasn't worth
the effort

The job just
wasn't me

Example 3

(Problem understanding/identifying root causes)

Bakery business problem

- In the example, a bakery has recently expanded its business and opened a chain of retail outlets. A number of problems have arisen and the management team, involved with the retail outlets, has met to discuss the problems. The issues are complex so they have decided to complete an affinity diagram.

Header card

Issue: What are the problems associated with our expansion into retail outlets?

AVAILABILITY OF STOCK

Unreliable arrival time of stock from bakery.

Often have to sell day-old stock as new stock has not arrived.

New stock arrives too late to sell that day.

Loyal customers have to come later in day to get fresh stock.

Don't receive what is ordered.

Orders often short.

Can't reliably supply other businesses such as sandwich shops.

VARIETY OF PRODUCTS

Insufficient variety of products.

We do not cater to special diets.

Unresponsive to customers' special needs.

Limited resources means reduced variety of products.

Main products focus.

More money could be made on specialty items.

Big market for special products.

Specialty products will attract customers.

FORECASTING AND ORDERING

Huge delay between ordering and receiving goods.

Order form is difficult to use.

Order processing is too slow.

No forecasting from retail outlets.

Retail outlets order too late.

CONVENIENCE STORES GIVEN PRIORITY

Convenience stores given priority over retail outlets.

Good stock goes to convenience stores.

Hard-to-sell stock goes to retail outlets.

Convenience stores want bulk volume of few items.

LIMITED BAKING CAPACITY

Insufficient oven capacity.

Resources in bakery are stretched.

Don't utilize our existing resources well in bakery.

Running into overtime every day.

Not getting goods from bakery to distribution early enough.

FINANCIAL PERFORMANCE

Turnover too low.

Cash flow unpredictable.

Overtime costs in bakery excessive.

Labor budget blown due to overtime.

Profitable when adequate stock at start of day.

Stock waste high.

Day-old stock sells for less.

DISTRIBUTION

Product damaged during transit.

Convenience stores and our outlets want goods at the same time.

Unloading at retail outlets difficult due to later times of arrival.

Orders are received at last minute from administration.

Easier to put convenience store loads together.

Like pile of cards

Exercise: quality of education at SNU

- Initial problem statement:
 - “Develop products/methods for improving the quality of education at SNU”
- Rephrase the problem statement so as to conduct affinity diagramming for problem understanding
- Once the problem is understood, identify opportunity areas and develop solutions by post-hoc brainstorming.

Example 4: SNU Souvenirs Concepts (Post-brainstroming idea processing)

Create new SNU souvenirs!

“I went to SNU”
“To climb Mt.
Gwanak”
T-shirts

Trekking poles

Chopsticks

Spoon

Experience SNU Program

Wine

Cellphone earphone

SNU board games

Rings

T-shirts

Cellphone wiping cloth

Glasses

Alcoholic beverage

ㄱ ㄷ ㅈ Bookshelf

ㄱ ㄷ ㅈ Pasta

Earplugs

Calendars:
•Different colleges
•Alumni

Perfume

ㄱ ㄷ ㅈ Chocolate

Cosmetics

Pens

School supplies

ㄱ ㄷ ㅈ tote bag

Handkerchief:
•Colleges
•Departments

Photo with ㄱ ㄷ ㅈ in the back

Home appliance

Picture with handsome SNU students

iPhone

Jewelry

ㄱ ㄷ ㅈ Memo Holder

T-shirts

“I went to SNU”
“To climb Mt. Gwanak”
T-shirts

Trekking poles

T-shirts

Alcoholic beverage

Wine

Glasses

ㄸ ㄴ ㄷ Chocolate

Calendars:
•Different colleges
•Alumni

Handkerchief:
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•Departments

School supplies

Earplugs

Pens

ㄸ ㄴ ㄷ Memo Holder

Experience SNU Program

Picture with handsome SNU students

Picture with ㄸ ㄴ ㄷ in the back

Rings

Handkerchief:
•Colleges
•Departments

Jewelry

Cosmetics

Perfume

iPhone

Cellphone earphone

Cellphone wiping cloth

Chopsticks

Spoon

Glasses

ㄸ ㄴ ㄷ Pasta

Home appliance

ㄸ ㄴ ㄷ Bookshelf

Board games

ㄸ ㄴ ㄷ tote bag

ㄸ ㄴ ㄷ Pasta

ㄸ ㄴ ㄷ Chocolate

ㄸ ㄴ ㄷ Bookshelf

Picture with ㄸ ㄴ ㄷ in the back

ㄸ ㄴ ㄷ Memo Holder

Clothing/apparel

T-shirts

Mountain Climbing/Mt. Gwanak

“I went to SNU”
“To climb Mt. Gwanak”
T-shirts

Trekking poles

T-shirts

SNU drinking

Alcoholic beverage

Wine

Glasses

Colleges and departments

Calendars:
•Different colleges
•Alumni

Handkerchief:
•Colleges
•Departments

School/office supplies;
Study aids

School supplies

Earplugs

Pens

ㄸㄴㄷ Memo Holder

SNU Experience

Experience SNU Program

Picture with handsome SNU students

Picture with ㄸㄴㄷ in the back

Dinnerware/food

Chopsticks

Spoon

Glasses

ㄸㄴㄷ Pasta

ㄸㄴㄷ Chocolate

Home appliance/furniture

Home appliance

ㄸㄴㄷ Bookshelf

Games

Board games

Personal accessories/cosmetics/perfumer

Rings

Jewelry

Cosmetics

Handkerchief:

•Colleges

•Departments

Perfume

Sense of belonging

Handkerchief:
•Colleges
•Departments

Rings

Smartphone stuffs

iPhone

Cellphone earphone

Cellphone wiping cloth

ㄸㄴㄷ

ㄸㄴㄷ tote bag

ㄸㄴㄷ Pasta

ㄸㄴㄷ Chocolate

ㄸㄴㄷ Bookshelf

Picture with ㄸㄴㄷ in the back

ㄸㄴㄷ Memo Holder

Can this help us identify new business opportunities?

Clothing/apparel

T-shirts♪

New area!

Games

Board games♪

School/office supplies;
Study aids

School supplies♪

Earplugs♪

Pens♪

ㄸ ㄸ ㄸ Memo Holder♪

New area!

Dinnerware/food

Chopsticks♪

Spoon♪

Glasses♪

ㄸ ㄸ ㄸ Pasta♪

ㄸ ㄸ ㄸ Chocolate♪

New area!

Home appliance/furniture

Home appliance♪

ㄸ ㄸ ㄸ Bookshelf ♪

New area!

SNU culture

SNU Experience

Experience SNU Program♪

Picture with handsome SNU students♪

Picture with ㄸ ㄸ ㄸ in the back

SNU drinking

Alcoholic beverage♪

Wine♪

Glasses♪

Mountain Climbing/Mt. Gwanak

“I went to SNU”

“To climb Mt. Gwanak”

T-shirts

Trekking poles♪

T-shirts♪

Personal accessories/cosmetics/
perfumery

Rings♪

Jewelry♪

Cosmetics♪

Handkerchief:

• Colleges

• Departments♪

Perfume♪

Smartphone stuffs

iPhone♪

Cellphone earphone♪

Cellphone wiping cloth ♪

New area!

Affiliation

Sense of belonging

Handkerchief:

• Colleges

• Departments♪

Rings♪

Colleges and departments

Calendars:

• Different colleges

• Alumni♪

Handkerchief:

• Colleges

• Departments♪

New area!

ㄸ ㄸ ㄸ

ㄸ ㄸ ㄸ tote bag♪

ㄸ ㄸ ㄸ Pasta♪

ㄸ ㄸ ㄸ Chocolate♪

ㄸ ㄸ ㄸ Bookshelf ♪

Picture with ㄸ ㄸ ㄸ in the back

ㄸ ㄸ ㄸ Memo Holder♪



Can this trigger more new ideas?

Clothing/apparel

T-shirts♪

New area!

Games

Board games♪

School/office supplies;
Study aids

School supplies♪

Earplugs♪

Pens♪

ㄸ ㄴ ㄷ Memo Holder♪

New area!

Dinnerware/food

Chopsticks♪

Spoon♪

Glasses♪

ㄸ ㄴ ㄷ Pasta♪

ㄸ ㄴ ㄷ Chocolate♪

New area!

Home appliance/furniture

Home appliance♪

ㄸ ㄴ ㄷ Bookshelf ♪

New area!

SNU culture

SNU Experience

Experience SNU Program♪

Picture with handsome SNU students♪

Picture with ㄸ ㄴ ㄷ in the back

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Handkerchief:

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Jewelry♪

Cosmetics♪

Perfume♪

Smartphone stuffs

iPhone♪

Cellphone earphone♪

Cellphone wiping cloth ♪

New area!

Affiliation

Sense of belonging

Handkerchief:

• Colleges

• Departments♪

Rings♪

Colleges and departments

Calendars:

• Different colleges

• Alumni♪

Handkerchief:

• Colleges

• Departments♪

New area!

ㄸ ㄴ ㄷ

ㄸ ㄴ ㄷ tote bag♪

ㄸ ㄴ ㄷ Pasta♪

ㄸ ㄴ ㄷ Chocolate♪

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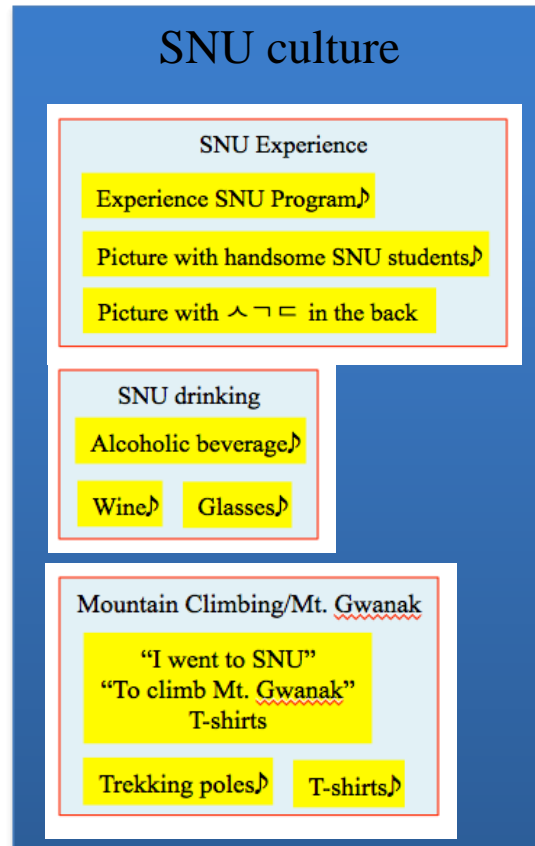
Picture with ㄸ ㄴ ㄷ in the back

ㄸ ㄴ ㄷ Memo Holder♪



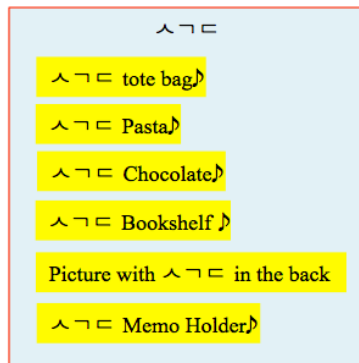
Getting more ideas (solution exploration)

- SNU culture?



Getting more ideas (solution exploration)

- Possible ☐☐☐ souvenir products?



Getting more ideas (solution exploration)

- New SNU tour?

Mountain Climbing/Mt. Gwanak

“I went to SNU”
“To climb Mt. Gwanak”
T-shirts

Trekking poles

T-shirts



SNU drinking

Alcoholic beverage

Wine

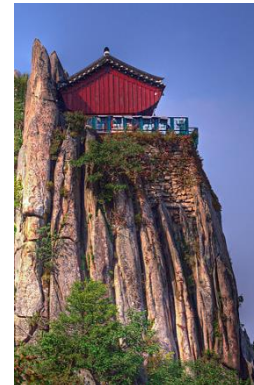
Glasses

SNU Experience

Experience SNU Program

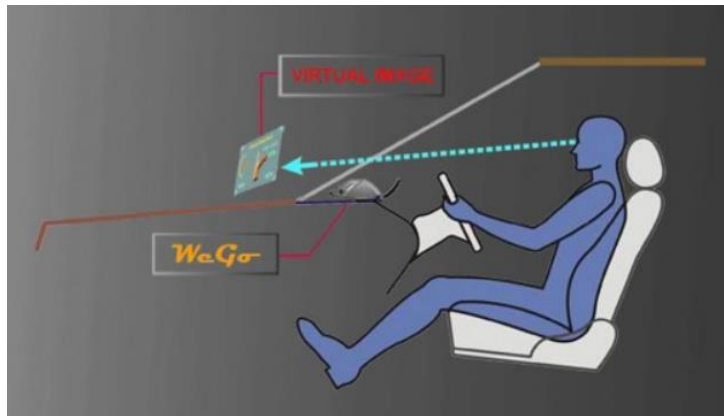
Picture with handsome SNU students

Picture with 스구드 in the back



자동차 증강현실 HUD 문제 1

- 광학기술의 발달로 가상 이미지들을 차창 밖의 외부 세계에 겹쳐서 표시하는 증강현실 Head-up Display 기술이 현재 연구 되고 있다. 자동차 운전과 관련하여 이 기술의 응용 방안들을 제시하라
 - 이 기술을 무엇에 쓸 것인가? (어떤 App들의 개발이 가능한가?)
- Brainstorming + KJ Method
- 최대한 많은 수의 아이디어 생성
- 잠재적 가능성이 높은 응용 방안 3~4개 선정하여 발표



자동차 증강현실 HUD 문제 2

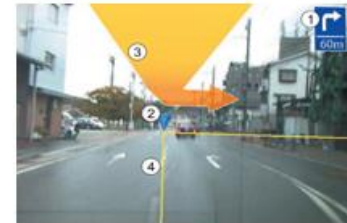
- 증강현실 HUD 시스템으로 내비게이션 시스템을 구현하려 한다. 주행경로 표시를 위한 방법들을 고안하고, 최적 대안을 선정하라:
 - (Visual) Brainstorming과 KJ Method를 사용
 - 최대한 많은 수의 아이디어 생성
 - 최적 대안 2개 선정, 발표



Wide, Transparent Road Level Surface



Virtual Cable



Wide, Transparent Hovering Surface



Unrolled Map



Virtual "Follow Me" Car



KJ Method 응용: Kansei Engineering Type I



Exercise Problem

- Design a “puppy-cute” laptop computer



Kansei Engineering (Affective Engineering)?

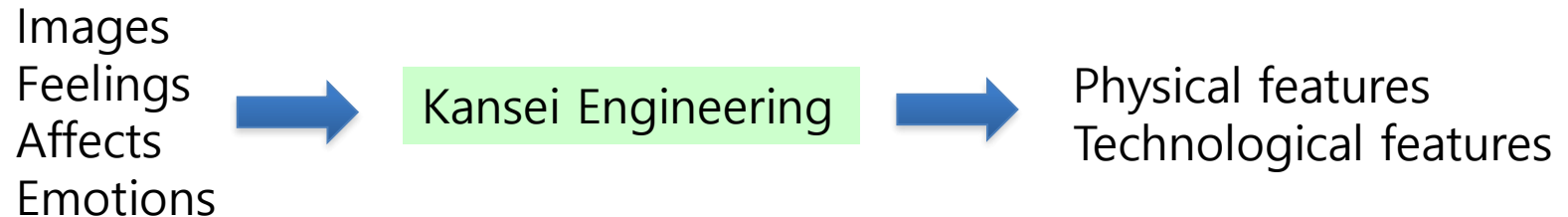
- Professor Mitsuho Nagamachi

Kansei engineering is a technology that unites Kansei (feelings and emotions) with the engineering discipline. It is a field in which the development of products that bring happiness and satisfaction to humans is performed technologically, by analyzing human emotions and incorporating them into product design.



Kansei Engineering (Affective Engineering)?

- Professor Mitsuo Nagamachi
- Kansei engineering is about “translation”
 - Translating Kansei (image, feelings, emotions) into physical and technological features



Product development strategies

- Product-out:
 - “Doing work according to the established process – an internal focus”
- Market-in:
 - “A focus on customer satisfaction”

House of Nanking (Product-Out)



Chronicle / Lucy Atkins



Market-in



Why Kansei Engineering?

- What is meant by good product/service?



Why Kansei Engineering?

- What is meant by good product/service?



Overview of Kansei Engineering Type I

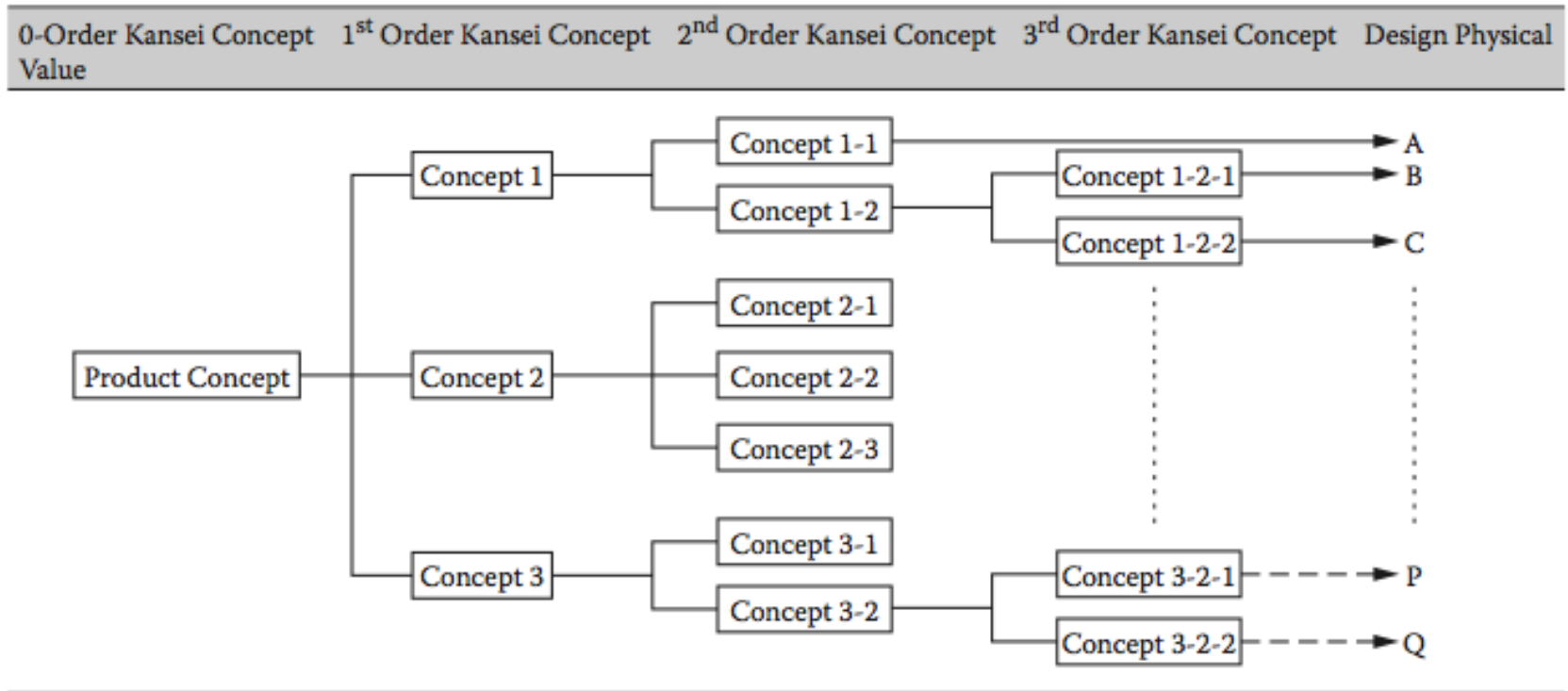


FIGURE 3.1

Conceptual map of Kansei engineering method Type I.

Breaking Down the Product Concept

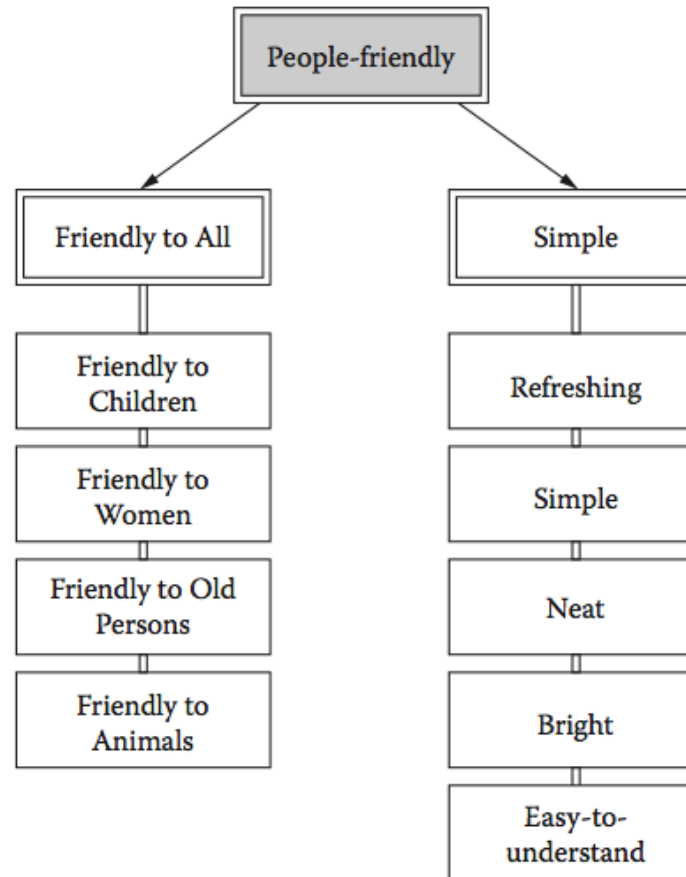


FIGURE 3.3

Kansei engineering Type I using the KJ Method for the concept *people friendly*.

Deployment to Physical Design Characteristics

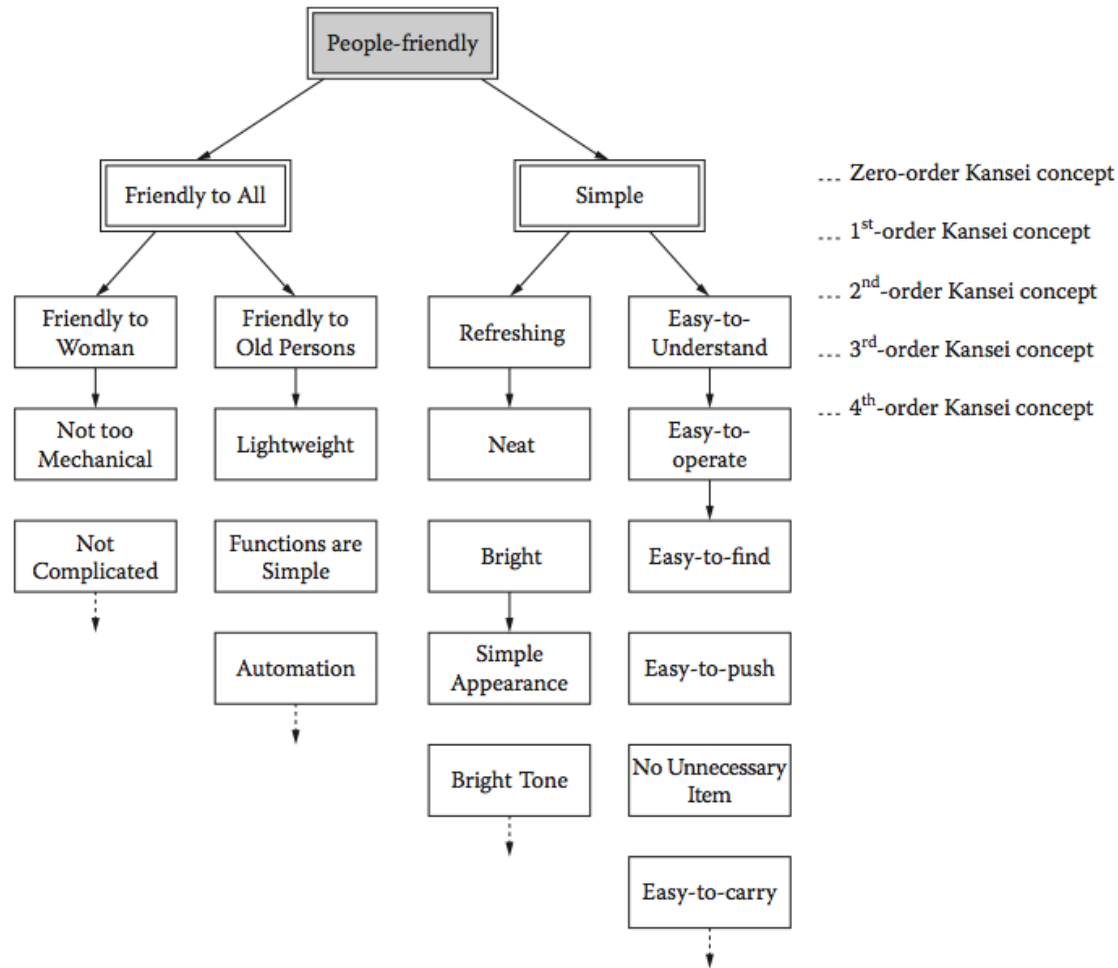


FIGURE 3.4
Expansion of Figure 3.3 to third- and fourth-order Kansei concept.

Application of Kansei Engineering Type I (Example)

Eunos Roadster (Mazda Miyata)



Mazda Eunos Roadster (MX5 Miata)

jinba ittai (人馬一体)

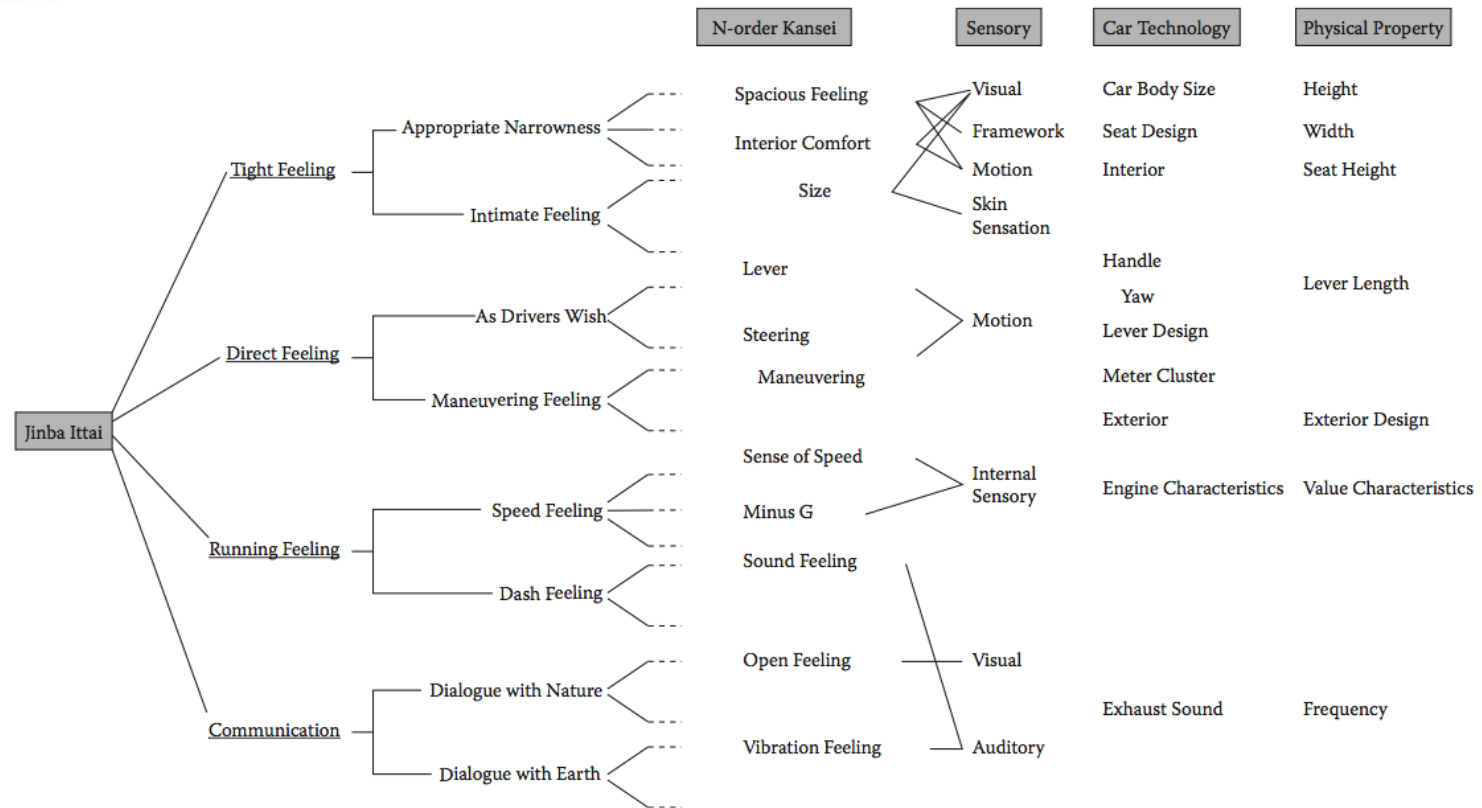


FIGURE 3.5
Translation map from Kansei for product's physical characteristics.

실습문제:

- 아래의 이미지와 같은 감성을 갖는 자동차를 설계하려 합니다. 감성을 자동차의 물리적 특성으로 번역해 보시오.



실습문제:

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