Digital Convergence Ideation Process
with TRIZ and customer Value

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Contents

1. Studying the evolution of digital convergence based on TRIZ

2. The factors of digital convergence in Value : what should we consider to get useful functions of digital convergence

3. Digital convergence ideation process

1.1. The method of predicting digital convergence technology system with TRIZ evolution laws

▸ Digital convergence refers the convergence of various functions by digital technology into one conglomerate. This creates new, innovative solutions to consumers and business users.

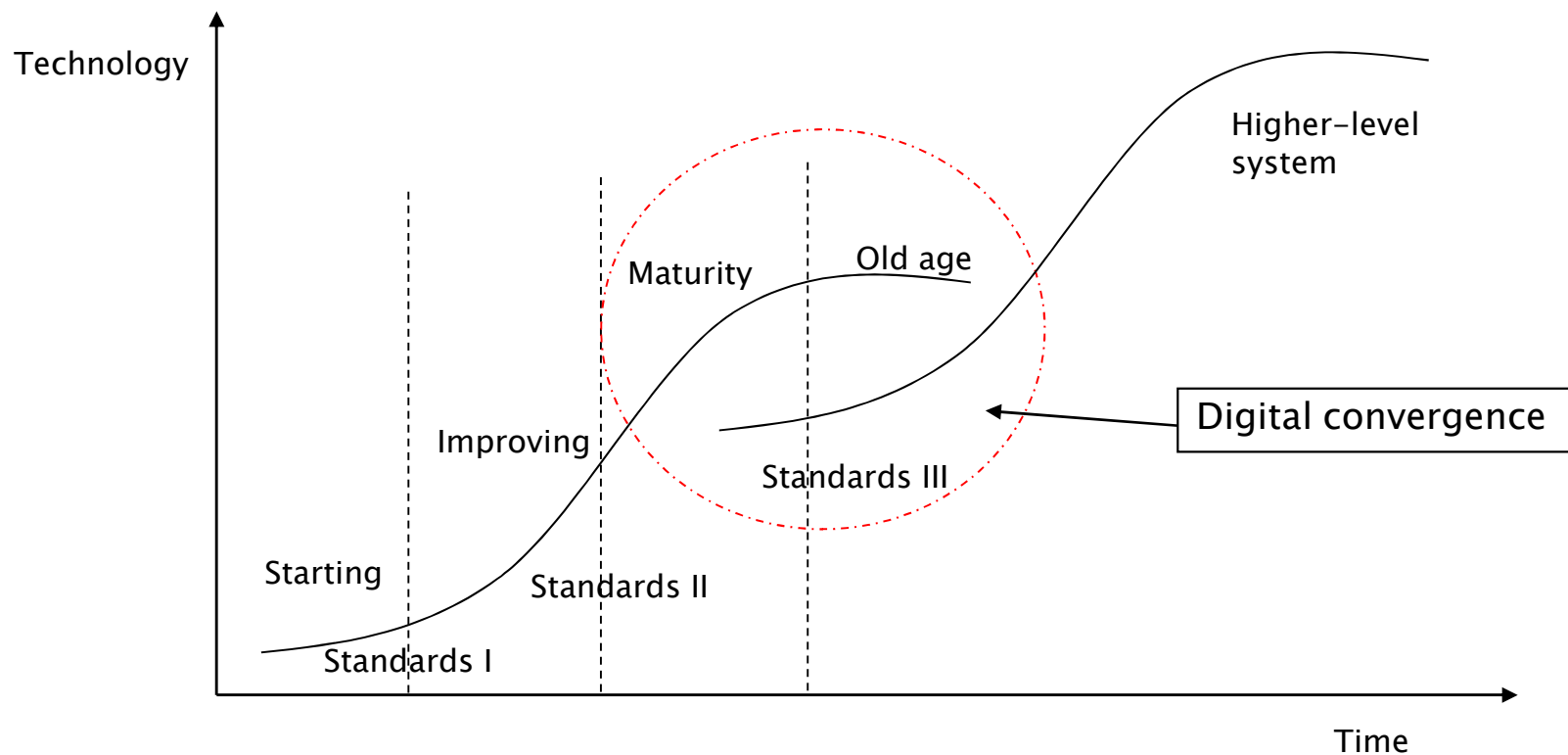▸ By the definition of digital convergence, it refers the class 3.1 in 76 standards.

1.2. Standards 3.1(mono-by-poly)

▸ ## Group 3.1: transition to bi- and poly-system

Standards 3.1.1	The effectiveness of a system at any stage of its evolution can be enhanced by combining the system with another system(s) into bi- or poly-system
Standards 3.1.2	The enhancement of effectiveness of synthesized bi-systems and poly-systems is achieved, first of all, by evolution of connections between components of these systems.
Standards 3.1.3	The effectiveness of bi- and poly-systems is enhanced when diversity of their components is increasing along the line: identical components -> components with shifted characteristics -> different components -> inverse combinations 'component and anti-component.
Standards 3.1.4	The effectiveness of bi-systems and poly-systems is enhanced in the process of their convolution. Completely convoluted bi- and poly-systems again become mono-systems and the evolutionary cycle may repeat itself on the new level.

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1.3. S-curve and 76 standards

▸ Digital convergence is between maturity and old age in technology . And it will be transited to a higher-level system. (Standards 3.1.4)

1.4. Predicting digital convergence technology system with TRIZ evolution laws

▸ The method of predicting

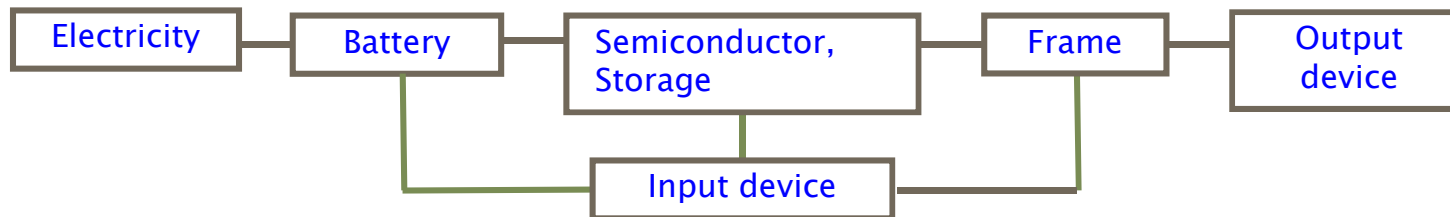(1) Definition the function in system and then the parts of system are defined according it.

| Energy Source | — | Engine | — | Transmission | — | Tool | — | Product |

Control Unit
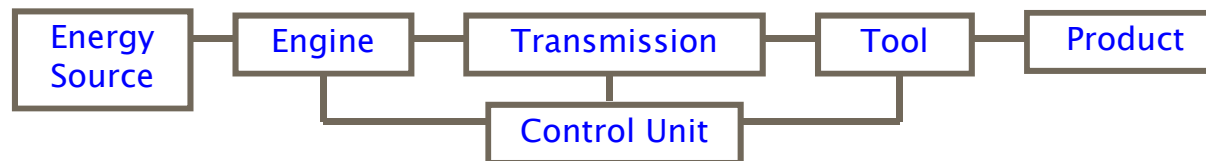
(2) Analyzing the trend of system and predicting all parts of system based on TRIZ evolution laws.

1.5. Case study
: analyzing the trend from hand phone to smart phone and predicting the future of smart phone.

(1) Definition the function in system and then the parts of system are defined according it.
- – Defining the function : 'communicate'
- – Defining the all parts of system according the function, 'communicate'

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┌─────────────┐   ┌──────────┐   ┌──────────────────┐   ┌─────────┐   ┌────────────┐
│ Electricity │───│ Battery  │───│ Semiconductor,   │───│  Frame  │───│  Output    │
└─────────────┘   └──────────┘   │ Storage          │   └─────────┘   │  device    │
                        │        └──────────────────┘        │        └────────────┘
                        │              ┌──────────────┐      │
                        └──────────────│ Input device │──────┘
                                       └──────────────┘
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(2) Analyzing the trend of smart phone evolution and predicting the future based on TRIZ evolution laws.

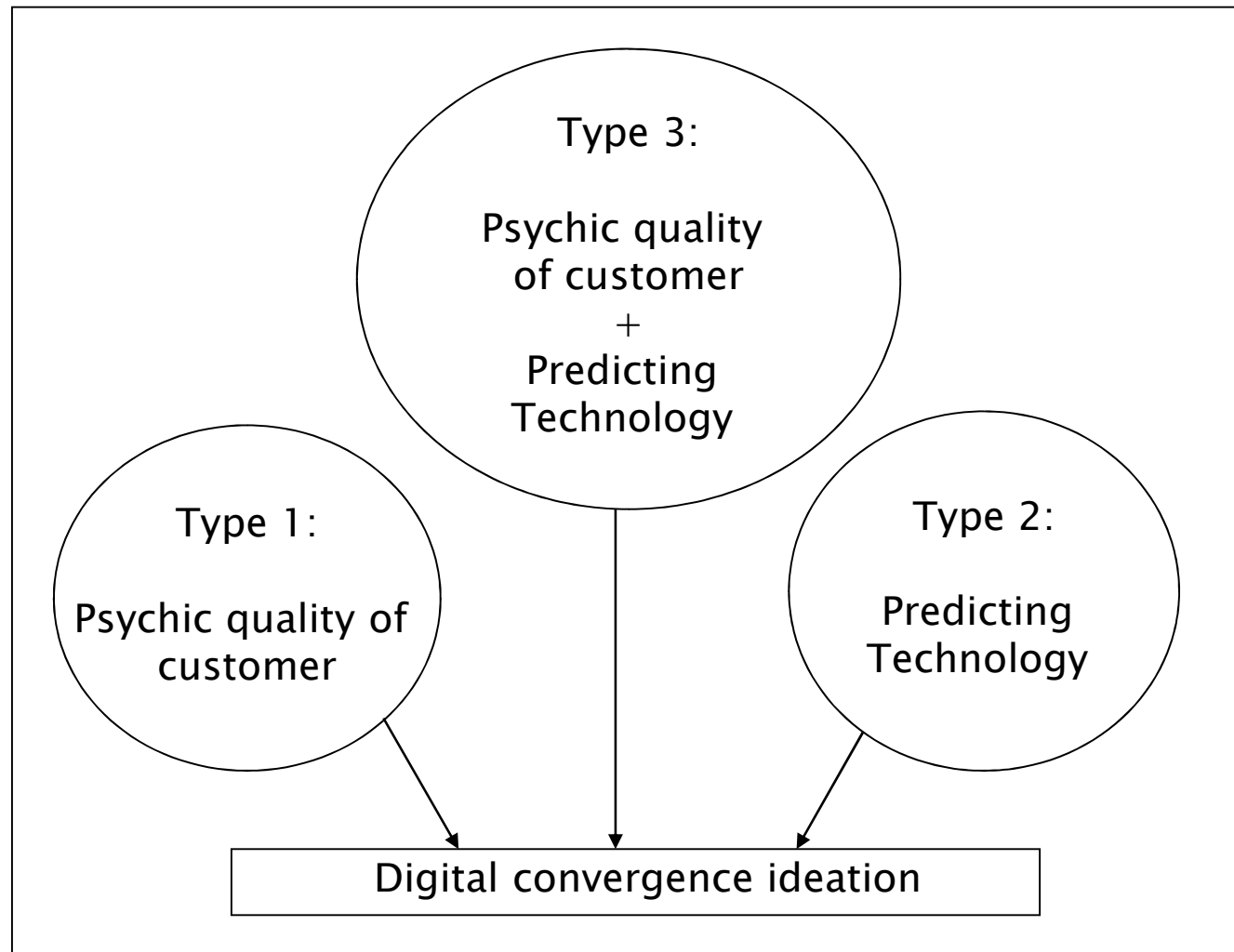| (3)Analyzing smart phone trends and future			Past (Standards 1,2)	Past (Standards 3)	Present -> Future (standards 3 -> transition to new level system again)
Super system 1				The functions of communication have been stronger and various	Smartphone with operation system : Hand phone transition to new level system
System	Function	Communicate person to person		Person to person communication had been stronger	Combining other functions with communication function -> Smartphone application
				Person to internet communication -> m-commerce, e-mail	Machine to machine communication with artificial intelligence
				Person to broadcasting communication -> DMB	Small computer -> Artificial intelligence ro
				Person to machine communication -> m-banking	Person to artificial intelligence robot
		Communicate One to one		Many person to many person communication -> SNS Twitter, Facebook	
				Inverse function of communication -> Security of communication	Stronger inverse function of communication
Sub system 1	Input, Output data		Text, Sound	Data, Image, Movie	Various types of data : Light, Color, Shape, Brain waves, Scent, Feeling, Hologram, Eye, DNA
	Display		One display	Many display with using TV, PC, others	Display on other things (table, mirror, wall, glasses), Hologram
	Input device, (Energy source)		Keypad (Mechanical fields)	Touch screen (Thermal fields)	Electrical, magnetic, chemical fields
	Storage device		Small storage device	Storage at any place, any time	Artificial intelligence storage device
Sub system 2	Frame, Battery		Heavy, big	Smaller	Smaller, soft and disappeared
	Semiconductor			Smaller	Smaller artificial intelligence chip, disappeared

<Table 1-1>

2. The facotrs of the digital convergence in Value : what shoud we consider to get useful functions of digital convergence?

$$\text{Value} = \frac{\text{Product/Service quality} + \text{Psychic quality}}{\text{Price} + \text{Time}}$$

$$\text{Ideal Final Result} = \frac{\text{Useful Functions}}{\text{Cost} + \text{Problems}}$$

2.1. Three types of factors in digital convergence :
We should consider predicting technology and psychic quality for finding the useful functions.

Type 3:

Psychic quality
of customer
+
Predicting
Technology

Type 1:

Psychic quality of customer

Type 2:

Predicting
Technology

Digital convergence ideation

2.2 Considering technology and psychic quality for finding the useful functions of digital convergence with multi-screen thinking

Super system 1	Society, Culture, Economy, Politics, National policy, etc.	Psychic quality
Super system 2	– The specific character of customer in the times of convergence : Humanity, Entertainment, Precious value, Sensitivity, Personal, Autonomously participation, Producer consumer, Simple and easy user interface, – Through all of them, pursuit of happiness	
Super System 3	– Environmental factor around the systems – Market research data – Consumer's needs in systems	
System (Function)	*New useful functions*	
Sub system	Pursuit of IFR (ideal final system)	Predicting technology

\<Table2-1\>

2.3. Case study : Analyzing Apple convergence development

	Past	2001 Launching 'iPod' with 'iTunes'	2007 Launching 'iPhone' and 'Apple TV'	Future
super system 1	Weak policy for copyright	Culture = {Young age design concept} National policy = {Strong policy for copyright}		Digital Convergence will have more various functions and transit to new level system : ubiquitous.
super system 2		The specific character of customer in the times of convergence : – Sensitive Users = {Contents by iTunes} – Autonomously participation, Producer consumer = {Applications} – Simple and easy user interface		
system (functions)		(iPod) + (iTunes)	(iPhone : evolution of iPod) + (iTunes =more various contents) + (Apple TV)	Hub of Ubiquitous : It is one of the best evolution of this company
sub system		IFR (ideal final system) : predicting the future of system		

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3.Digital convergence ideation process

3.1. The line of evolution in standards 3.1.3

(1) Combined with similar functions
   ex) Black pen->Black and red pen-> Four color pen

(2) Combined with Different or Inverse functions
   ex) Running shoes ("protecting foot")+ iPod sensor("sending information of running")
   ex) Pencil ("write") + Eraser ("erase")

3.2. New(combined) functions of have some things in common

(1)   Systems to need convergence : They locate between maturity and old age on S-curve. The growth
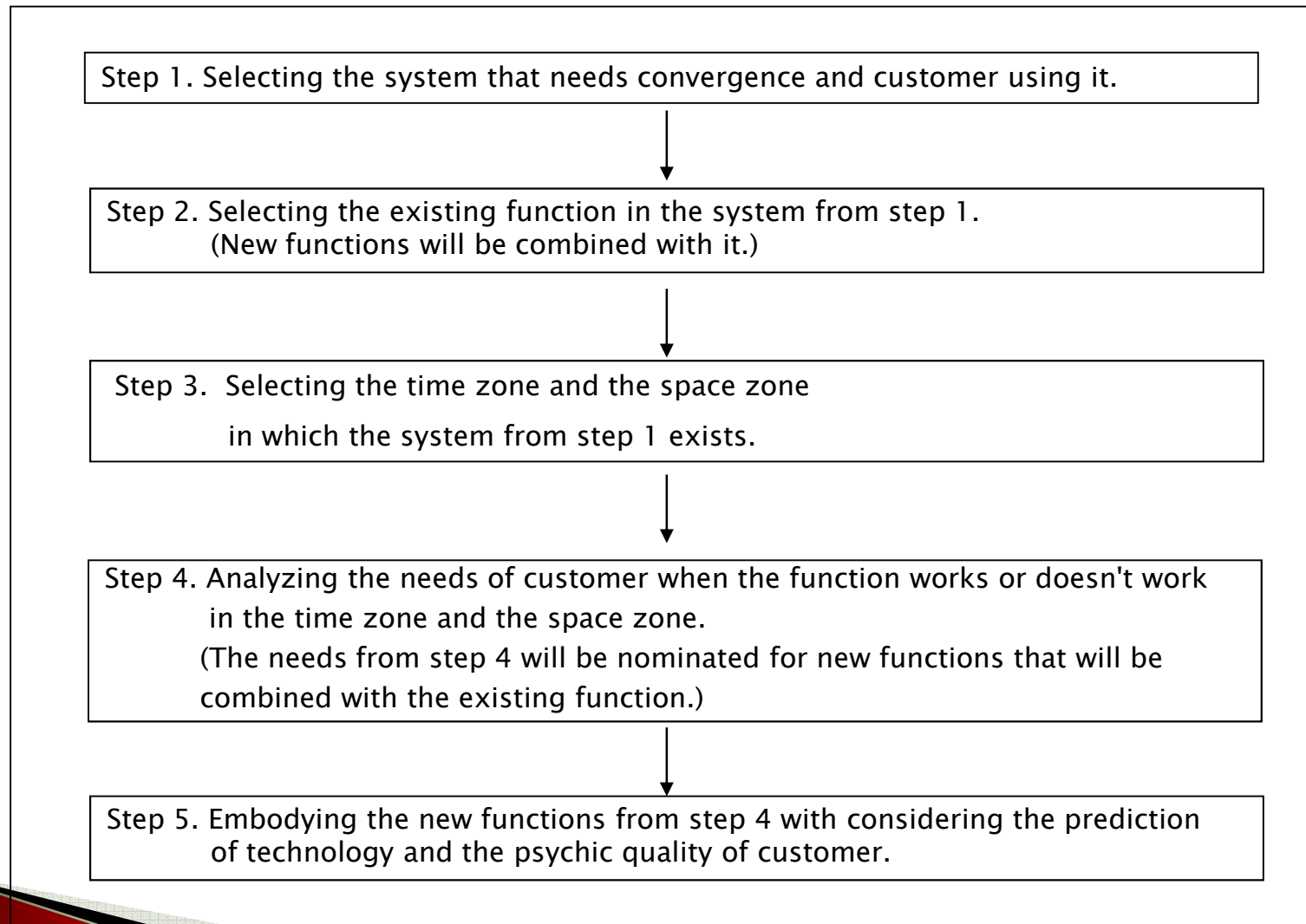   of them is almost stopped or decreases.

(2) Some new functions work with exiting functions at the same time, but other new functions
    at a different time. : Convergence refers to consolidation(no.5), universality(no.6) in 40 principles.
    The first cases come from No.5 and the second from No.6.

(3) Super system is different depending on time zone and space zone of the existing system.
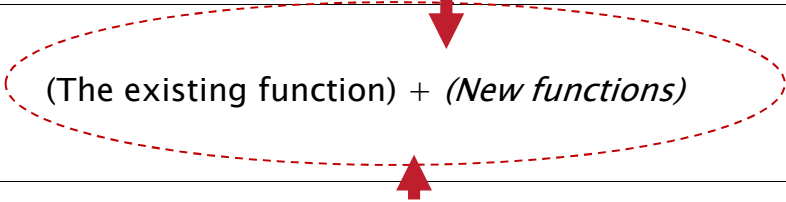
3.3 Candidates for new functions

   We can analyze the needs of customer when the function works in time zone and space
zone and the function doesn't. The needs will be nominated for new functions that will be combined
with the existing function. They would be fresh ideas for companies.

3.4. Process from Step 1 to step 5

Step 1. Selecting the system that needs convergence and customer using it.

Step 2. Selecting the existing function in the system from step 1.
(New functions will be combined with it.)

Step 3. Selecting the time zone and the space zone

in which the system from step 1 exists.

Step 4. Analyzing the needs of customer when the function works or doesn't work
in the time zone and the space zone.
(The needs from step 4 will be nominated for new functions that will be
combined with the existing function.)

Step 5. Embodying the new functions from step 4 with considering the prediction
of technology and the psychic quality of customer.

3.5 Digital convergence ideation process with multi-screen thinking

Super system	System, Customer, Function	
	The time zone and the space zone in which the system exits.	
	The needs of customer when the function works in the time zone and the space zone.	The needs of customer when the function doesn't work in the time zone and the space zone.
	The psychic quality of customer (refers to table 2-1)	
System	(The existing function) + *(New functions)*	
Subsystem	Predicting technology system (refers to table 1-1)	

3.6. New Idea 1: Words scanning by smart phone

Super system	System, Customer, Function = {Smartphone, Student , Communicate}
	The time zone and the space zone in which the system exits. = {Library, the whole day }
	1. The needs of customer when the function works in the time zone and the space zone. | 2. The needs of customer when the function doesn't work in the time zone and the space zone. (1) Reading the English book, it is uncomfortable to find by keypad in smart phone. (2) Words to find like that are forgotten easily, it is uncomfortable to find again.
	The psychic quality of customer (refers to table 2-1)
System	(The existing function = "communicate") + *(New functions)*
Subsystem	Predicting technology system (refers to table 1-1)

From the process, created ideas are scanning English words by camera of smart phone, saving words at the same time and contents for studying words from input with fun images of the word.
The first and second ideas are found from predicting input system in table 1-1, the third idea is found from the psychic quality of customer, entertainment in table 2-1.

3.6. New Idea 2: Security for women tourist walking on the Olle Roads in Jeju

The Olle roads are the Santiago road of Asia. Known or hidden and big or small beautiful roads in Jeju were connected. We call it "Olle-gil" or "Olle roads." (Gil means a road in Korean.) Tourists can watch the beautiful view and rest with walking on the roads. So the Olle-roads have become very popular and one of the main reason that increases the number of tourists to Jeju . In this may, it was over 1 million for Only a month in Jeju which has a population of 550 thousands.

But some woman who want to walk alone or with a few people can feel afraid. Because most of Oll-gil are between small mountains and sea. There would be a very weak security when they meet a robber or danger. So it is needed to search for women's security on Olle-roads.

올레길

[ˈoˈleˈgil] 🔊

Eco-friendly road in Jeju, "The Santiago road of Asia."
Refresh your body and soul
on Jeju Island's "Olle-gil."

From PSY's Wiki Korea (ENG)
On www.youtube.com

Super system	System, Customer, Function = {Smartphone, Tourist, Communicate}
	The time zone and the space zone in which the system exits. = {Olle Roads in Jeju, The whole day }
	1. The needs of customer when the function works in the time zone and the space zone. / 2. The needs of customer when the function doesn't work in the time zone and the space zone. -> Security for women who want to walk alone or a few people : Many women often want to walk alone or with a few people on Olle-roads. But it may be dangerous, so women tourist are afraid to walk like that.
	The psychic quality of customer (refers to table 2-1)
System	(The existing function = "communicate") + *(New functions)*
Subsystem	Predicting technology system (refers to table 1-1)

   From the process, created ideas are an application for security by smart phone. When woman meets a robber, smart phone can get input data by screen keypad, button, moving smart phone, body action, eye scrolling, very loud voice and some saying like "help me" designated as a signal of dangerous. Then the smart phone sends the information of woman's location from GPS to the nearest police office and rings very loudly at the same time.
   This ideas are found from predicting input system in table 1-1. In the future, input data type can evolve with more various like brain wave of fear feeling etc.