Smart Applications and Consumers' Intention to Adopt 5G:
A Case Study in Thailand

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Outline

Background

It is anticipated that smart applications will expand users' demand for advanced mobile and fixed broadband to ensure reliable and stable connections.

Research question

How do people prefer mobile and fixed broadband access for the use of smart applications?

Increased expectations on smart applications

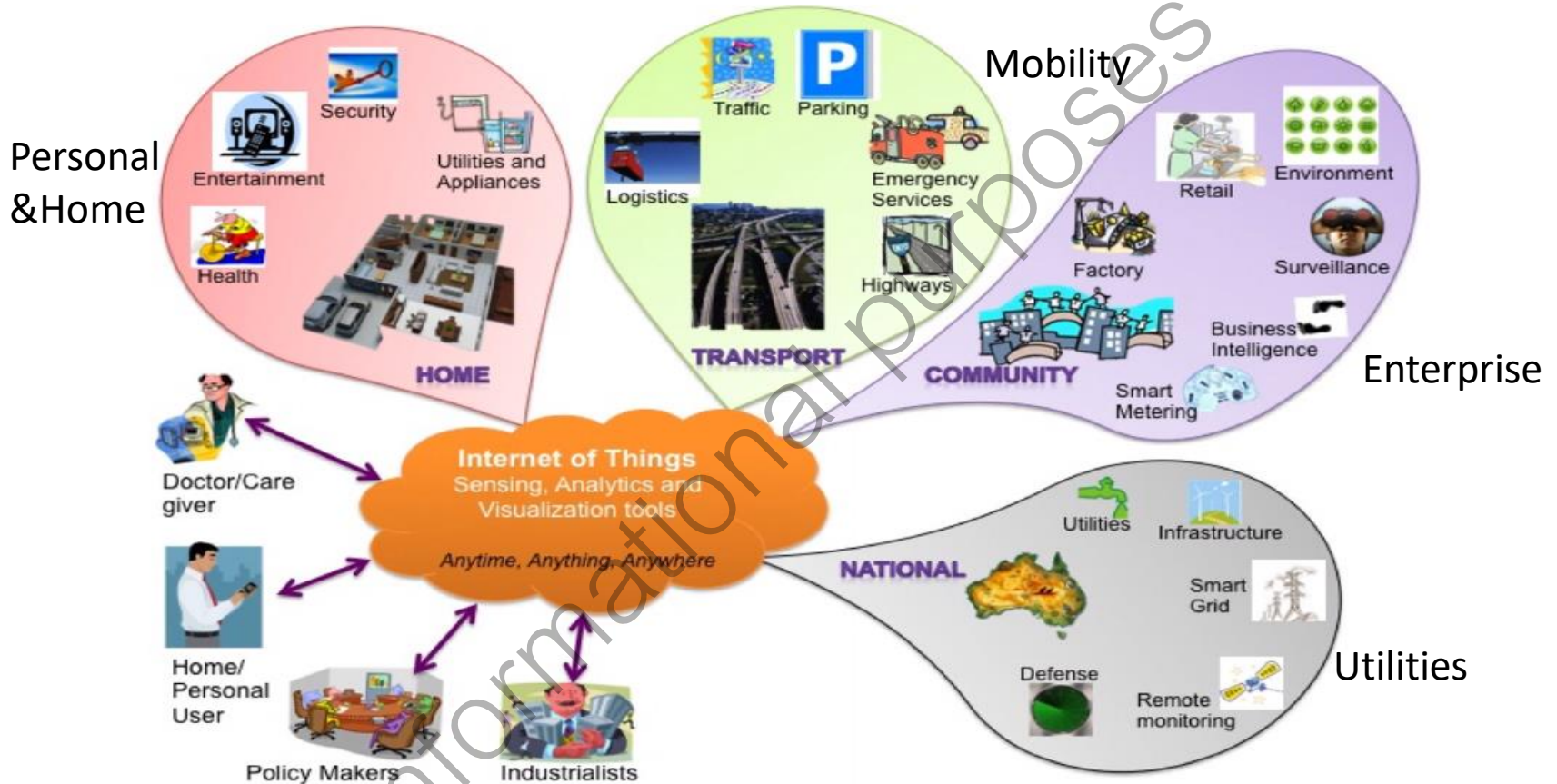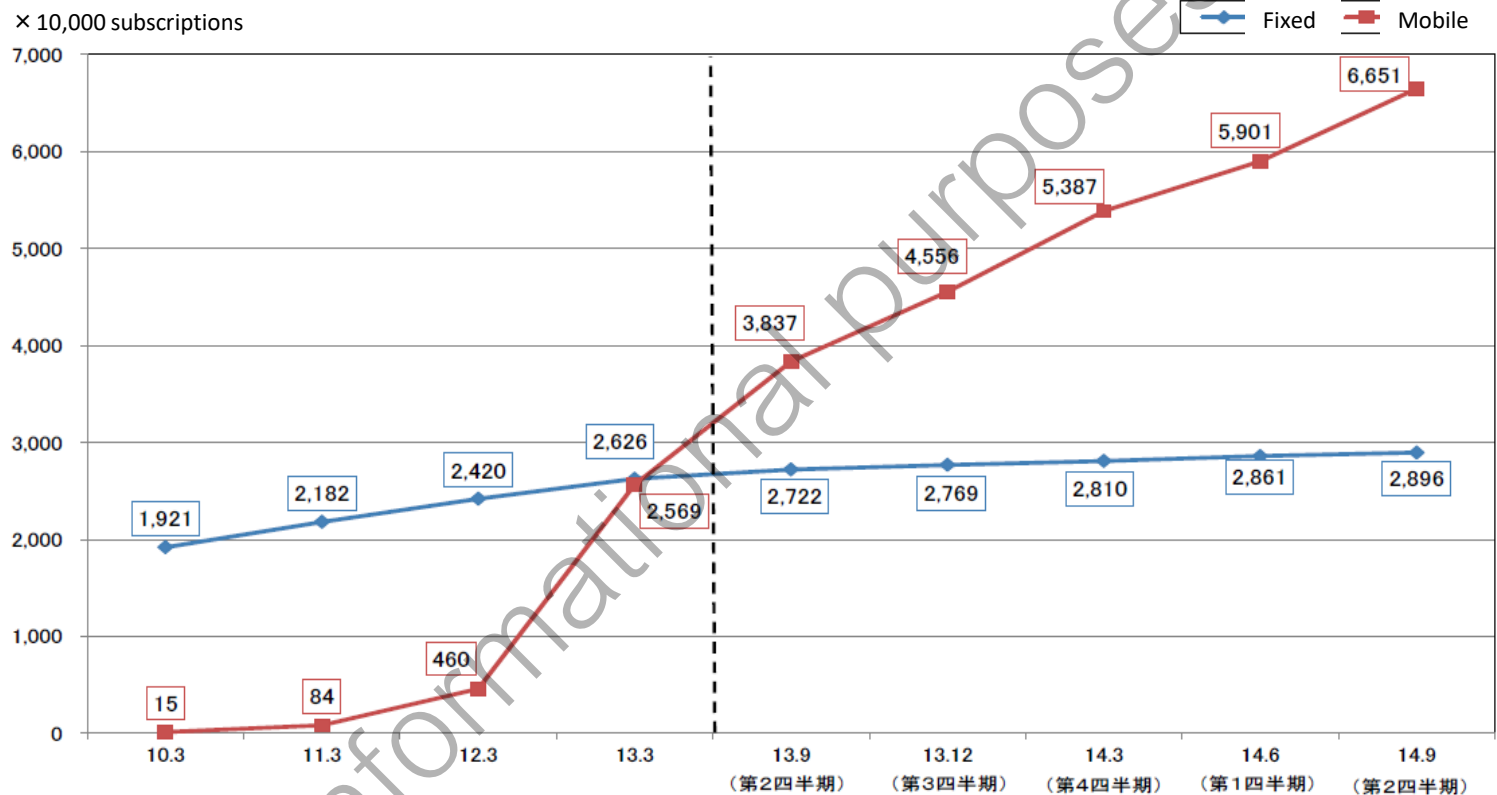J. Gubbi et al. / Future Generation Computer Systems 29 (2013) 1645–1660

Fig. 1. Internet of Things schematic showing the end users and application areas based on data.

For smart apps to be available, an well-developed network is inevitable.

Deployment of ultrahigh-speed broadband access in Japan


× 10,000 subscriptions

Legend: Fixed, Mobile

Both mobile and fixed have been increasing.

This suggests that mobile and fixed are not fully substitutable.

Directions of broadband deployment

- Necessity of further deployment of broadband

- There is discussion that a priority should be placed on either **mobile** or **fixed**

- **Intensive** development of mobile or **harmonious** development between mobile and fixed?
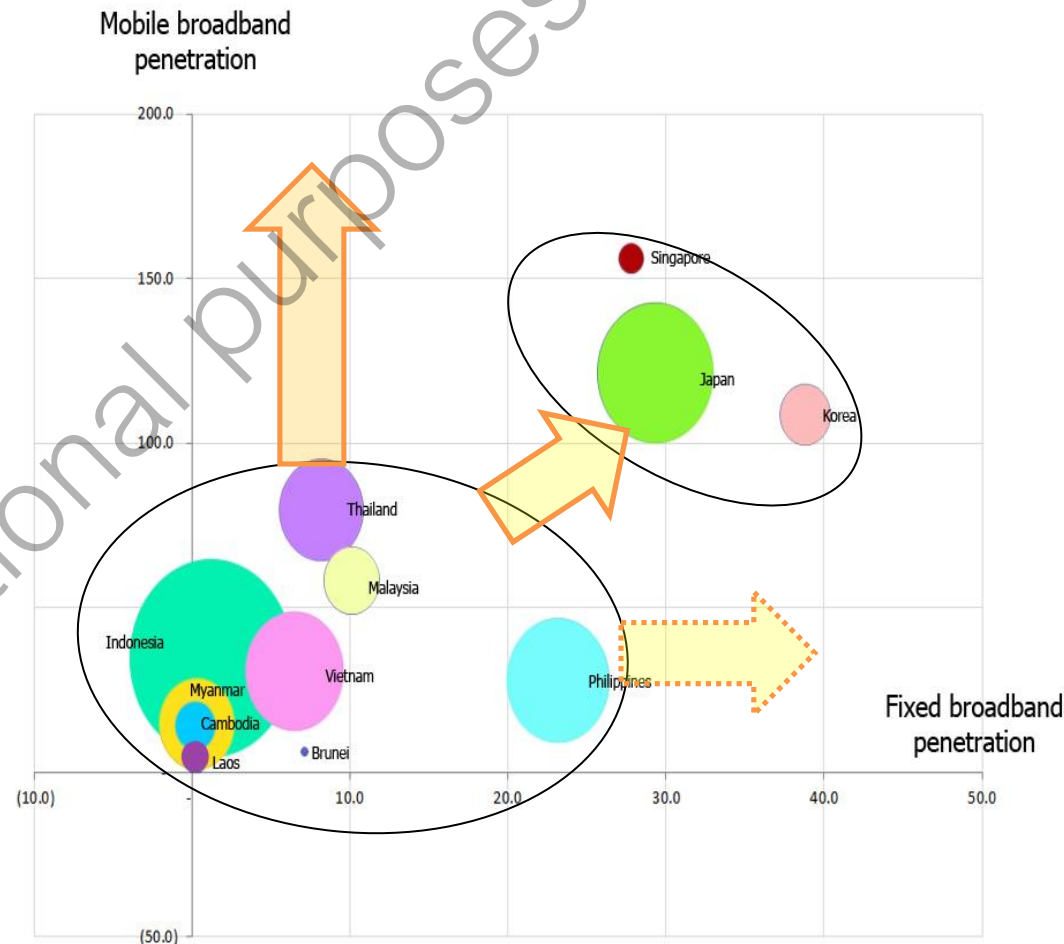
Note: Size of the circle represents population
Data: ITU, *The State of Broadband 2015*

Framework

- <u>Presumption</u>: Internet-of-Things will affect consumers' intention to adopt advanced mobile broadband, which would further accelerate migration to 5G connections.

- <u>Purpose</u>: to examine the effect of IoT on consumer's intention to adopt advanced mobile broadband in conjunction with a fixed broadband connection.

Explanatory variable

| Knowledge about Smart applications |

Consumer's **intention** to adopt advanced broadband

5G

Control variables

| - Age |
| - Gender |
| - Potential (degree of proximity to new connected technologies) |
| - Current use 3G mobile broadband |
| - Current use 4G mobile broadband |
| - Current use fixed broadband |

FTTH
(as a competitive or complementary alternative)

The survey

- Online survey (841 respondents, Sept. 5-25, 2015)
  - Individual users (Internet users)
  - Bangkok and surrounding areas, Thailand

- **Part 1**:Asking the profile and the current use of high-end devices
  - Gender, age, occupation, education, monthly income
  - Currently using high-end devices such as smartphone, tablet, laptop, smart watch, and smart TV.

- **Part 2**: Asking the current intention to use ultrahigh-speed Internet access (including explanation of capacity of 5G and FTTH)
  - 5G   :   1   1   0   0
  - FTTH   :   1   0   1   0

  The prices for 5G and FTTH are assumed to be the same as current 4G and fixed broadband plan.

The survey (cont'd)

- **Part 3**: <u>Explaining the functions of smart apps</u>:
  - Home appliance: smart lock, smart light, smart thermostat
  - Lifestyle: smart TV
  - Mobility: connected car
  - Health: wearable health monitoring
  - Security: smart security camera

- **Part 4**: <u>Asking again Consumers' intention to choose ultrahigh-speed Internet</u> access for using the smart apps.

The model

- The choices of mobile and fixed Internet accesses are not exclusive each other.
- The bivariate model was applied
  - Bivariate probit and logit models use binary dependent variables, commonly coded as a 0 or 1 variable.
  - Two equations are estimated, representing decisions that are dependent(Katchova, 2013).

- **The Bivariate Probit model**

$$5G = f(after_{iot}, gender, age, 3G, 4G, FBB, potential)$$
$$FTTH = f(after_{iot}, gender, age, 3G, 4G, FBB, potential)$$

$$5G = \begin{cases} 1 & if\ 5G^* > 0 \\ 0 & if\ 5G^* \leq 0 \end{cases} \qquad FTTH = \begin{cases} 1 & if\ FTTH^* > 0 \\ 0 & if\ FTTH^* \leq 0 \end{cases}$$

where

$5G$: consumer's choice of 5G, $FTTH$: consumer's choice of FTTH,
$after_{iot}$: Consumers' knowledge about smart applications
$gender$: male or female,
 $4G$: current use of 4G mobile broadband,
FBB: current use of fixed broadband at home, and
$potential$: the degree of potential of consuming new connected technologies, represented by the number of high-end devices that he or she currently uses （smartphone, tablet, laptop, smart watch, and smart TV).

The estimation result (marginal effects)

Marginal effect:

- An increase in x increases (decreases) the probability that y=1 by the marginal effect expressed as a percent.
- For dummy independent variables, the marginal effect is expressed in comparison to the base category (x=0). (Katchova, 2013).

	Both 5G and FTTH	5G only	FTTH only	Neither 5G nor FTTH
Knowledge of SA	0.0773***	-0.02567	-0.00463	-0.0469***
Age	-0.0250**	0.0294***	-0.02039*	0.0160***
Gender	0.001086	0.00532	-0.00596	-0.0004
Potential	0.0279***	-0.00279	-0.00843	-0.0167***
Current use 3G	0.0986**	-0.02487	-0.0109	-0.0628**
Current use 4G	0.1403***	0.01108	-0.0752**	-0.0761***
Current use FBB	0.0796***	-0.1498***	0.1188***	-0.0486***

***:1%, **: 5%, and *:10% of significant level

The result

- The knowledge of smart applications increases the intention to adopt both 5G and FTTH.

	Both 5G and FTTH	Only 5G	Only FTTH	Neither 5G nor FTTH
Knowledge of SA	0.0773***	-0.02567	-0.00463	-0.0469***
Age	-0.0250**	0.0294***	-0.02039*	0.0160***
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Current use FBB	0.0796***	-0.1498***	0.1188***	-0.0486***

Influence of current mobile broadband

- Current use of 3G and 4G increases the intention to adopt both 5G and FTTH.

	Both 5G and FTTH	Only 5G	Only FTTH	Neither 5G nor FTTH
Knowledge of SA	0.0773***	-0.02567	-0.00463	-0.0469***
Age	-0.0250**	0.0294***	-0.02039*	0.0160***
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Current use FBB	0.0796***	-0.1498***	0.1188***	-0.0486***

Influence of current fixed broadband use

- Current use of fixed broadband increases the intention to adopt both 5G and FTTH, and FTTH only but decreases the intention to adopt 5G only.

	Both 5G and FTTH	Only 5G	Only FTTH	Neither 5G nor FTTH
Knowledge of SA	0.0773***	-0.02567	-0.00463	-0.0469***
Age	-0.0250**	0.0294***	-0.02039*	0.0160***
Gender	0.001086	0.00532	-0.00596	-0.0004
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Proximity to high-end technologies

- High-end users tend to adopt both 5G and FTTH.

	Both 5G and FTTH	Only 5G	Only FTTH	Neither 5G nor FTTH
Knowledge of SA	0.0773***	-0.02567	-0.00463	-0.0469***
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Result and conclusion

1. The result has indicated that

   • with the emergence of smart applications, people in and around Bangkok are more willing to use ultrahigh-speed Internet access.

   • their proximity to current broadband technologies such as 3G, 4G and fixed broadband positively affects consumers' intention to use both advanced mobile and fixed access.

2. Not only advanced mobile such as 5G but also fixed broadband should be developed for the use of smart applications.

3. In conclusion, development of 5G is inevitable. In addition, from users' point of view, its harmonious development with fixed broadband is preferred.

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Thank you!

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