

Determinants of IPv6 Adoption in Korea

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Introduction

- The Internet is a loosely organized system of self-governing yet interconnected networks
- It relies on the voluntary adoption of common protocols
- Prior research introduced two main adoption factors
 - Environmental conduciveness
 - Usefulness of the features

Introduction - Continued

- Korea is in the “adoption through co-existence” quadrant
- However it is not a “pure” case since it also has:
 - High drag
 - Government sponsorship
 - Network externalities
- What are the main adoption determinants of IPv6 in Korea?

Literature Review

- *Diffusion of innovation* literature's basic focus is on the attributes of the innovation and their value to the organization
- Rogers [13] identified five innovation characteristics: (1) *relative advantage*, (2) *compatibility*, (3) *complexity*, (5) *trialability*, and (5) *observability*

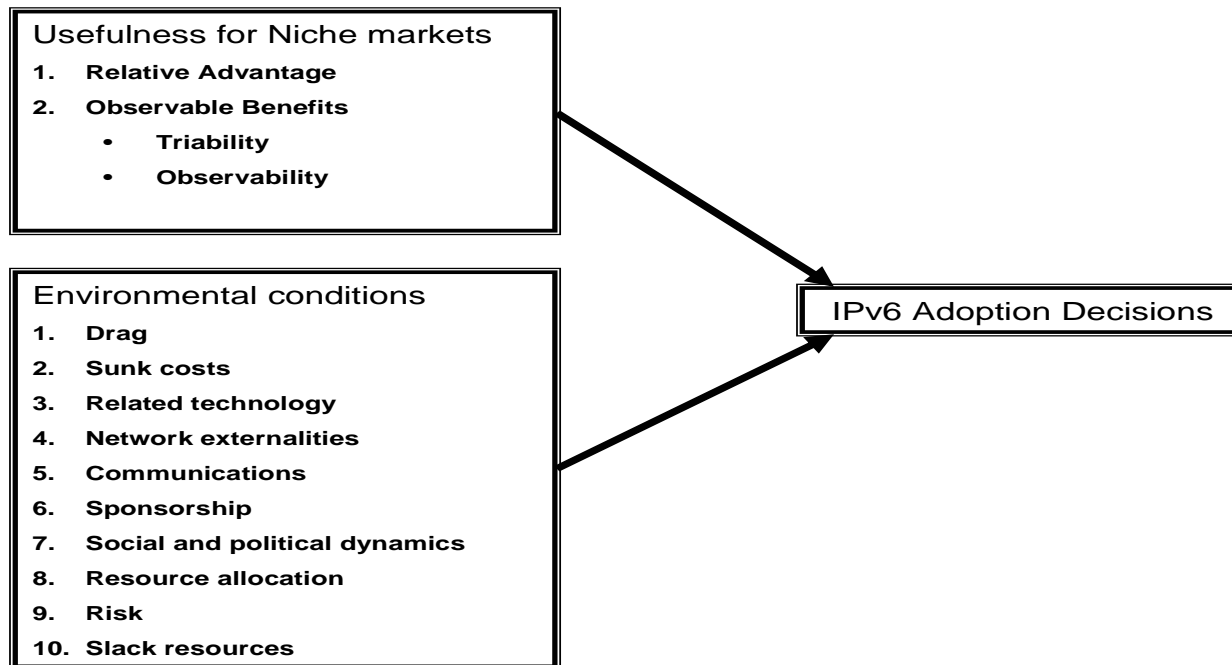
The Economic Perspective

- Focuses on environmental factors
- The installed base of the existing technology (drag)
- Irreversible investments (sunk costs)
- The existence of related technological infrastructure
- The size of both the existing and the potential network of adopters
- The extent of communication among adopters
- The existence of sponsorship
- Social and political dynamics
- The allocation of resources

In the Context of IPv6 ...

- Based on a number of case studies:
 - The existence of a killer application
 - The ability to test and quantify the benefits of the new standard
 - The risk associated with early adoption
 - The availability of slack resources

Research Model



IPV6 in South Korea

- The Korean government views the Internet as a strategic tool and an economic enabler
- The objective is to encourage the adoption of IPv6
- Korea has been allocated 4,145 IPv6 addresses in units of /32
- It has approximately 43 Million IPv4 addresses
- The implementation of an IPv6 infrastructure will increase the number of available addresses by 7.6×10^{24} .

IPV6 in South Korea

- The Korean government will lay foundations for early adoption and help firms to deploy IPv6 by providing test beds and R&D
- However, the Korean government does not plan to support the adoption of IPv6 financially or via tax incentives
- NCA has developed a strategic plan for the implementation of next generation technologies. Some rely on IPv6

Reliance of Applications on IPv6

Applications	Reliance	Firms planning to offer
Wibro	High	91%
DMB	Low	85%
Home networks	High	85%
Telematic	High	88%
RFID	High	85%
W-CMDA	High	85%
Terr DTV	Low	85%
VoIP	High	82%

Methodology

- We surveyed 34 companies in Korea
 - Some are ISPs
 - Some are members of the Korean IPv6 forum
- The surveys were completed by the CTO or CIO in each of the companies
- The companies surveyed are from various industries
 - 65% are SMEs (10-300 persons)
 - 19% are large companies and 9% are very large
 - Over 80% have been using the Internet for over 5 years

Analysis and Results

These companies are pushing the market

- 17% of the surveyed companies have implemented IPv6
- 11% have no plans to implement IPv6 in the near future
- The rest of the companies are either in:
 - Planning stages, or
 - Will start implementation within 24 months
- Half expect IPv6 to become prevalent in 3-5 years
- Currently – there is little users' demand
- Most anticipate increased demand in the future

Analysis - continued

- Based on the surveys, we classified each of the factors presented in the research model into:
 - High – users perceive the factor to have high impact on their adoption decision
 - Medium
 - low

Results – Usefulness of the Features

- Triability is low due to lack of information
- Observability is low
- Relative advantage is medium
 - Expectation of future needs
 - Low expected ROI
- Relative advantage (security)
 - Organizations perceive IPv6 to be more secure

Environmental Conditions

- Drag is high
 - 70% have high investments in IPv4 technology
- Network externalities are high
- Slack resources are high
 - At least 45% of the organizations stated that they have the funds to upgrade
- Sunk costs -- medium
 - 58% infrastructure is upgradeable
- Related technology -- high

Environmental Conditions – cont.

- Communications and industry knowledge – medium
 - There is little information regarding the technical and economic benefits
 - Most of the information is available from trade magazines
- Government sponsorship is medium
 - Training and R&D
 - No financial support
- Industry sponsorship is high
 - Networking, hardware and software industries

Environmental conditions – cont.

- Resource allocation crisis is low
 - The price of IP addresses is increasing, 58% will need addresses in the future
 - However, presently there is no crisis
- Vendor enforced crisis – low
- Social & political dynamics – medium
 - Government involvement has some effect on the adoption decision of companies
 - IPv6 is perceived as the norm
- Perceived risk of implementation is high

Discussion

- The Korean government's official IPv6 strategy is to create:
 - Extensive investments in IPv6 related R&D
 - Test environments
 - Prototyping
 - Network externalities
 - Related technologies
- Designed to demonstrate the technical capabilities of IPv6
- These are key drivers for the adoption of IPv6

Discussion – cont.

- As a result, organizations:
 - Believe that IPv6 will become the prevailing technology in the region
 - Are considering implementing because they think IPv6 will become the norm
- However, these organizations stated that the business value of IPv6 has not been clearly demonstrated

Discussion – Hinderling Factors

- Despite the Korean government's efforts to provide information about IPv6, there is a perception of lack of information
 - Most of the information provided is technical
 - Most of the information comes from trade magazines and industry
 - Lack of information regarding the risks involved
 - Lack of information regarding ROI
 - Lack of information regarding implementations in other countries

Discussion – Economic Factors

- Drag is high but sunk costs are low
 - Most of the infrastructure is upgradeable
- Cost to maintain IPv4 is high
- Companies have the slack resources needed to upgrade
- Thus, cost is not a hindrance

Summary

- Organizations in Korea believe that under current conditions:
 - Rapid adoption is too risky
 - There is a need for a killer application and a large customer base
- They expect the Korean government to create a market via:
 - Financial incentives
 - Regulations

Final Note..

- Although presently, firms can not quantify the benefits/risks related to IPv6 adoption, a majority of the surveyed organizations recognize the competitive advantage afforded by IPv6 and its future prevalence in the region
- This pervasiveness is mostly the result of the Korean government official strategy



Thank you very much for your time and
attention

Any Questions
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