



# A socio-technical analysis of factors affecting the adoption of smart TV in Korea



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## ABSTRACT

Smart TV has been highlighted as a new platform of broadcasting, powered for the last five years by its own application store as well as by internet-based contents. However, recently, smart TV's performance in the pay-TV market has been below expectations. In the socio-technical view, this paper investigates three aspects surrounding smart TV: bundling as a market competition strategy; services using technological features represented by N-screen; and consumer attributes, including personal innovativeness and demographics. The results show that the bundles with IPTV have a lock-in effect, while other pay-TV services do not, indicating that bundling by communications service providers is a more effective strategy to keep market share away from new entrants. Policy makers only consider competition among incumbents, neglecting the entrance of new service providers, like over-the-top service providers. Therefore, bundling should be evaluated in terms of an entry barrier. Smart TV doesn't work as a platform because the adoption of smart TV has no influence on the watching of N-screen broadcasting services on TV. There are implications that the new technology alone cannot encourage lean-forward activity on TV. Managers should focus on what consumers expect from 'smartness', and develop contents for the smart TV as a home appliance.

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## 1. Introduction

### 1.1. Introduction

Smart devices and related services are changing overall media industries and consumer life all over Korea. Particularly in the pay-television (pay-TV) industry, portable devices and internet-based streaming services have threatened both incumbent service providers and TV manufacturers. Smart TV is a new competitor in pay-TV services, including cable TV (where it is available with the local infrastructure), satellite TV in rural areas, and internet-protocol TV (IPTV) delivered by internet networks all over the country. With internet-based multimedia content and interactive applications in addition to traditional broadcasting content, smart TV platforms were expected to be a new platform. However, according to the increasing market share of pay-TV and the slow adoption of smart

TV in the Korean market, its performance is not meeting expectations.

This study provides empirical evidence of the “lock-in effect of bundling” on the adoption of smart TV through a socio-technical analysis. When taking into consideration the interdependency of market, service, and consumers of smart TV, three factors were chosen: bundling as a major competition strategy among the incumbent pay-TV market players; N-screen service, or streaming multimedia content on multiple devices via the internet, as a rising service with smart TV; and key consumer attributes such as innovativeness, media use, and household demographics. The Korean media panel provided rich household and personal survey data for the panel regression. Compared to early smart TV studies that focused on consumers' intentions to adopt smart TV or preferences on technological features via the technology acceptance model, we examined the choices of consumers who have already adopted the smart TV.

The results show that a subscription to IPTV in bundle has a negative effect on the adoption of smart TV. However, it is hard to regard smart TV as a pay-TV platform because smart TV is not a substitute for pay-TV services, and the adoption of smart TV does

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not necessarily encourage watching N-screen broadcasting services on TV. Besides, as previous studies indicate, consumer innovativeness and household income have a significant influence on the adoption of smart TV.

Our findings suggest several managerial and policy implications. Smart TV manufacturers should think about how to allow consumers to “lean-forward,” or be more engaged and interactive with the services. Potential entrants on the pay-TV market should pay attention to the bundling strategies used by incumbents. In addition, the “lock-in effect of bundling” against new entrants should be discussed by policy makers, as this strategy was neglected in the market competition report.

The rest of this paper is organized as follows: Section 1 covers an overview of the Korean pay-TV market and the problem statement. Section 2 is a literature review of previous media and smart TV studies. Section 3 draws hypotheses from background research. Section 4 provides the research model and a description of the data analysis methods. Section 5 shows the results of the analysis, and Section 6 follows with a discussion of the results. Finally, Section 7 gives a summary and implications about the pay-TV market and smart TV.

## 1.2. Changes in the pay-TV market with smart TV

The pay-TV market is defined as the contract between a platform of broadcasters and a subscriber. The first cable TV service was launched in 1995 by regional-based system operators (SOs) and relay operators (ROs, which merged with or changed into SOs). Satellite TV followed in 2002 to support people in rural areas. In 2008, communications service providers (CSPs) entered the pay-TV market with IPTV. Since the launch of IPTV, the regulations on the discount rate of bundles had been eased step by step, and mixed bundles with discounts have been welcomed by customers. Data from the Korea Information Society Development Institute (KISDI, 2014) showed that 85.3% of households used bundled services in 2013. SOs have local infrastructure for pay-TV, fixed-line phones, and internet, and CSPs have infrastructure for internet and mobile devices all over the country. Each pay-TV service provider offers services in a bundle with its advantages. Therefore, bundling has become a main competition strategy. Since the beginning of the 2010s, the rise of digital broadcast services and the popularity of smartphones has changed the pay-TV market. Players focus on a variety of digital-based content, such as video-on-demand (VOD). However, they confront online video content providers, called over-the-top (OTT) service providers, as new competitors. OTT content is accessible on TVs with a set-top box that supports streaming online content directly to the TV or mirrors the display of other devices. Initially, third-party content providers were the majority of OTT service providers, but now CSPs and program providers have expanded their field through their network and content. In 2014, there were ninety-two SOs, one satellite TV provider, and three CSPs. Fig. 1 provides an overview of the Korean pay-TV market

(Korea Cable Television Association, 2014).

The pay-TV market consists of firms and infrastructure, and a new TV device, the smart TV, is entering into the market as a direct competitor. Google suggested the initial concept of the smart TV. Smart TV is a kind of internet TV, defined as an internet-like interface for accessing and watching TV and delivering internet-based contents. The definition of internet TV includes the information channel synchronized with real-time broadcasting on one side, and a fully asynchronous, individualized TV on the other side. Internet TV encourages audiences to participate in the interactive features in a so called “lean-forward” viewing behavior, different from the traditional ‘lean back’ behavior (Gerbarg & Noam, 2003; Slot, 2007). Many efforts have been made to become successful in this digital convergence medium, including video dial tone or interactive TV, but most of them have failed (Noll, 2003). The distinctive feature of Google TV, compared to its predecessors, is that it offers a TV set with a built-in android operating system and an application market, similar to the business model of the smartphone. Google TV enables real-time broadcasting, OTT contents, and other web-based contents (Google, 2010). The announcement of Google TV provoked TV manufacturing incumbents, such as Samsung and LG, who had fallen behind Google in the smartphone market. As leading manufacturers in the TV market, these companies tried to occupy the market by launching their own internet connected TV products from 2010 to 2011 (Kwon, 2011). Similar to the smartphone, the new type of TV is called a ‘smart TV’. A few other terms are used to indicate a similar type of TV, such as ‘connected TV’ or ‘hybrid TV’ but ‘smart TV’ is the only term that shows increasing search patterns according to Google trends.

The definition of smart TV is still ambiguous. Hwang (2010) defines smart TV as a multimedia device that provides features of both TV and internet, based on operating system. Song (2010) describes smart TV as a device that delivers videos and applications through the web or an application store. According to NPD DisplaySearch (2012), consumers can access branded portal and web-based service on a smart TV. Moon and Choi (2010) give a comprehensive definition of the smart TV as a system providing both a user interface/user experience and a contents format. Smart TV aims to establish a personalized environment with a variety of contents like video, using an internet-connected TV-shaped display. KISDI (2011a) also proposes that smart TV should be understood as a ‘smart TV service’, not only as a device, but also as a platform.

As seen in the above descriptions, there are various types of smart TV. As well as the built-in TV set type, a set-top box type and a dongle type are also available in the market. But the Korean media panel questionnaire only describes the internet-connected feature and has not updated its definition of smart TV since 2011. According to the Korean media panel data in 2014, 99% of the smart TV devices are produced by Korean domestic manufacturers. Therefore, it can be assumed that the interviewees have understood the term ‘smart

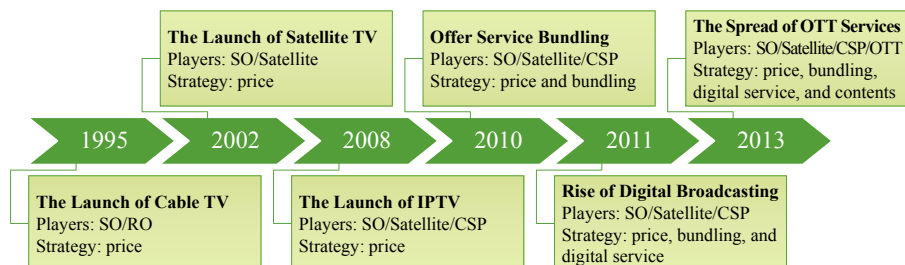


Fig. 1. An overview of the Korean pay-TV market.

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