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(De)convergence in TV: a comparative analysis of the development of Smart TV

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Tom Evens

Abstract

Against the backdrop of media convergence, Smart TVs are developing rapidly in large parts of the world. Smart TV refers to the integration of broadband Internet and social media features into TV sets. From a media business perspective, the proliferation of Smart TV services may put pressure on the market structure of the TV landscape, and urge for new business models in order to capture the dynamics of media convergence. By means of a comparative analysis in four European markets (Belgium, Germany, the Netherlands and the United Kingdom), the development of Smart TV is sketched in terms of viewing patterns, business models and standardization. The conclusion is that national TV markets are evolving quite differently, so that service providers must adapt their marketing strategies to reflect local market conditions. Hence, the success of Smart TV ultimately depends on the local package of value-added services and the amount of strategic partnerships with content owners, TV broadcasters and pay-TV operators.

Key words

Media convergence, Smart TV, viewing patterns, business models, standardization, comparative analysis, Europe

Introduction

There seems to be a widespread recognition amongst industry leaders, policymakers and media business scholars that industry structures and business models in television broadcasting are being increasingly transformed by digitization and media (de)convergence on many levels (Lotz, 2007). The introduction of ever more screens in our lives and increasingly faster network technologies have enabled a wide variety of alternative screens and sources of TV content trying to conquer a share of the audiences' viewing time. This evolution calls for new kinds of services and has the potential to change the current television market (Given et al., 2012). Against the backdrop of media convergence, Smart TVs are a prime example of such converged media platforms, and have been rapidly developing in large parts of the world. Smart TV's, also referred to as 'Connected' or 'Hybrid' TV, describe a



trend of the integration of broadband Internet and social media features into TV sets. Smart TV's enable access to Internet-based services including catch-up services, video-on-demand and social networking sites, and allow for an advanced level of consumer interactivity and personalization (Shin et al., 2013). From a media business perspective, the proliferation of Smart TV services may put pressure on the market structure of the TV landscape, and urge for new business models in order to capture the dynamics of media convergence (Meyer, 2006).

Although the global market for Smart TV is rapidly expanding and marked by intense competition between primarily Asian vendors including Samsung, Sony and LG, its success should not be taken for granted. The sale of Smart TV sets in Europe has increased in the last two years, but studies suggest that consumers are hardly overwhelmed by the (new) entertainment experience. In combination with persistent TV viewing patterns, Smart TV's disruptive impact on the industry's business models is uncertain. We therefore need to explore the dynamics of Smart TV markets and systematize the current debate on how the Smart TV market will evolve in Europe. Hence, the paper questions whether and to what extent media (de)convergence, and more in particular Smart TV, is changing the TV landscape in terms of TV viewing patterns, business models and standardization. Since the scope of most research on Smart TV is on Asia, this paper brings in a European perspective and takes into account the different market circumstances in which Smart TV needs to develop. Using a literature review and secondary data analysis, the paper includes a comparative study to the evolution of Smart TV in four – two big, two small – European markets: Belgium, Germany, the Netherlands and the United Kingdom. Based on a media business approach, the paper will come up with a forward-looking perspective on the evolution of viewing patterns, business models and standardization in the European Smart TV market.

The paper is structured as follows. In the first section, a brief literature review on media (de)convergence discusses the difficulties of researchers in defining the concepts and in reaching consensus on how convergence should be empirically evidenced. The literature review brings together the research on convergence in the TV landscape, and its implications for viewing patterns, business models and standardization. The second section sketches the state of Smart TV in Europe and discusses the latest evolutions regarding the viewing patterns, business models and standardization of Smart TV. The third section compares the introduction of Smart TV in four European markets with regard to the evolution of viewing patterns, business models and standardization. In the final section, conclusions will be made about the evolution of Smart TV in Europe and how industry players and regulators can best address the complexity of national TV markets in a global landscape.



Media (de)convergence in TV: a literature review

Literature shows that researchers across academic domains struggle to define the concept of ‘media convergence’ and that there is limited agreement on how convergence should be conceptually grounded or empirically evidenced. Convergence has often been considered a technology-driven phenomenon, but Jenkins (2004) claims that convergence is more than simply a technological shift and argues that convergence fundamentally alters the relationship between technologies, industries, markets, media texts and audiences. Dwyer (2010) rejects a technology-determined account of media convergence, and claims that powerful industrial and governmental factors interact to shape the impact of new technology. Media convergence can therefore be analyzed at different levels including cultural, industrial, technological and regulatory levels. Whereas the media industry is coping with the effects of convergence, Appelgren (2004) stresses the importance of divergence, which paradoxically tends to appear as a result of convergence. Digitization, it is claimed, has caused an explosion of information available and a fragmentation of media audiences. Moreover, the diversification of distribution outlets is accompanied by the creation of niche content focusing on a certain topic or a specific community. Since television programming is increasingly dispersed across a multitude of digital platforms and connected devices, (de)convergence might impact on the TV industry.

Viewing patterns

Digitization has spurred the development of converged and mobile devices, providing access to media content across multiple platforms and enabling interactivity with audiences (Roscoe, 2004). It might become increasingly difficult to consider linear viewing in isolation from mobile and other connected services, albeit that video consumption patterns remain highly device- and context-dependent (Courtois et al., 2012). However, the rhetorical space surrounding new technologies, i.e. the viewer has a higher level of flexibility and control over the viewing experience, largely tends to overlook the persistency of audience behavior. Online viewing demands a more active audience whereas most studies indicate that TV viewers still find pleasure in stumbling upon a program and zap during commercial breaks (Quail, 2012). In this context, Cha and Chan (2012) conclude that TV and online video platforms satisfy different viewer needs, referring to the distinction between ‘lean forward’ and ‘lean back’, to illustrate the complementary function of online video platforms. Research into viewing patterns suggests continuity, and shows that average TV viewing has even increased over the last years. Despite these findings, digital TV content is increasingly detached from the regular screen and consumed through a wide array of devices, at a moment (and place) determined by the viewer. Especially younger people tend to disconnect from the regular screen as the main access medium and personalize their TV consumption (Barkhuus, 2009). Albeit that the trend towards non-linear viewing will continue, it has been contended that the impact of on-demand viewing crucially



depends on contextual factors including the level of broadband infrastructure developments, pay-TV penetration and persistent sociocultural habits (Baccarne et al., 2013).

Business models

As consumption patterns change, TV broadcasters and video service providers need to innovate business models in order to fulfill the evolving needs of their viewers. TV companies have responded to convergence by migrating towards a diversified multi-platform approach to the production and distribution of content, maximizing consumer value and return through a multitude of outlets of which conventional TV is just one (Doyle, 2010). Launching streaming video platforms helps broadcasters in teaming up with changing viewing patterns and capturing a share of the economic value that is created in the burgeoning online video market (Waterman et al., 2013). The convergence between TV and Internet indeed calls for new business models: innovation is no longer driven by technologies, but by business strategies. McPhillips and Merlo (2008) argue the industry is now in the stage of experimenting with new business models, as the old and new models first learn to co-exist, until they ultimately converge. Nevertheless, industry convergence does not necessarily imply that all firms will deploy the same business model. Rather than using a single value creation logic, media firms will implement multiple business models to treat convergence differently in different customer segments. Research shows that the arrival of multimedia strategies following media convergence has increased the level of concentration of (cross)media ownership resulting in a handful of conglomerates controlling the media landscape (Chon et al., 2003). Jin (2013), on the contrary, sees de-convergence as the new business model and describes how media firms strategically decrease their magnitude in order to survive in the turbulent market. Deconsolidation may add to the further fragmentation of the media industries and leave more space for newcomers.

Standardization

The establishment of multimedia companies and the blurring lines between content and infrastructure may necessitate changes in the policies developed for media regulation. Flew (2014) argues that media regulation cannot continue to be primarily based upon the platform of delivery when convergence has dislodged the technological bases that used to tie the content to platforms. He suggests the differential regulatory requirements for broadcasting and telecommunications services do not hold in an era where global video streaming platforms such as YouTube and Netflix are universally available. Although many of these global video platforms have ‘television-like characteristics’, they are not subject to the same rules that apply to traditional broadcasting services. Convergence between television broadcasting and Internet platforms therefore requires a revision of the regulatory framework in order to create a level-playing field between traditional and new media services. Michalis (2014) points to the false dichotomy between content and infrastructure, and



stresses the interdependence between content and transmission. Despite converging regulatory frameworks, however, prevailing institutional regulatory structures reinforce this artificial distinction. One important requirement is that policymakers, together with standardization bodies (like ETSI), help in establishing (global or regional) technical standards. Garcíá Leiva et al. (2006) provide an overview of the standardization policies for digital television transmission in Europe, Japan and North-America, and highlight the importance of coordination between government, regulatory bodies, broadcasters and device manufacturers to introduce digital television services. Common technical standards create greater efficiency and compatibility between devices, eventually spurring market penetration of new TV services (Galperin, 2002).

State of Smart TV in Europe: trends, strategies and standards

According to research firm Strategy Analytics (2013), the market for Smart TV has experienced rapid growth. Global Smart TV shipments grew 55 percent to reach 76 million units in 2013, accounting for about one third of all total TV sets sold during the year. The report found that Europe is the leading market for Smart TV in terms of penetration of shipments: 45 percent of all TV sets shipped in Europe being Smart TVs. It is expected that the industry will be worth \$95 billion by 2015 by which time virtually all mid to high-end TV sets will include some form of Internet connectivity. Based on these optimistic forecasts, Smart TV represents one of the biggest growth opportunities in consumer electronics since Smart TVs are steadily integrating into a multi-platform offering alongside smartphones, tablets and laptops. In terms of market share, Samsung retained its leadership position in the Smart TV market with a 26.4 percent share. Major competitors LG and Sony both have around 14 percent market share with all Smart TV vendors completing the top 5 being Asian companies.

Table 1. Global Smart TV vendor market share (Strategy Analytics, 2013)

Smart TV vendor	2012 (%)	2013 (%)	Change (%)
Samsung	25.4	26.4	+1
LG	11.9	14.4	+2.5
Sony	15.7	14.3	-1.4
Panasonic	7.7	7.0	-0.7
Sharp	5.6	4.9	-0.8
Others	33.6	33.0	-0.6

Viewing patterns

The arrival of broadband TV services clearly has an impact on viewing patterns, marked by a gradual shift towards non-linear TV viewing. As viewing patterns change and consumers get more familiar with on-demand viewing practices, the convergence between TV and Internet is emerging. In this context, Smart TV represents a huge opportunity to bring together all online video platforms in the living room. Bae and Chang (2012) show that adoption of Smart TV is driven by the functional



attributes and the perceived relative advantage with regard to traditional TV sets. Another study, by Lee (2012), confirms that perceived usefulness is the most significant indicator for Smart TV acceptance. The results suggest that the successful deployment of Smart TV crucially depends on an optimal user experience, and is determined by its consumers, rather than its suppliers. Adoption of Smart TV gradually increases and is the highest in China, with 39 percent of homes having such devices. Adoption of Smart TV in Germany (19 percent) is comparable with Italy (18 percent) and the United Kingdom (17 percent), with France (7 percent) clearly lagging behind (Ofcom, 2013). The adoption of Smart TVs does, however, not automatically imply that consumers are actually using the Smart TV functionality. According to Analysys Mason's *Connected Consumer Survey* (2013), conducted in five countries in Europe (France, Germany, Poland, Spain and the United Kingdom) and the USA, only 43 percent of Smart TV owners do connect their TV set to the Internet, especially younger viewers. Research by Ofcom (2013) provides a more optimistic account, noting that the majority of Smart TV owners have effectively used the Internet functionality on the TV set. Use of the Internet functionality is the highest in Italy (81 percent of all Smart TV owners) among nine key markets, with the United Kingdom (78 percent) as second highest and Japan as the lowest (59 percent). By far the biggest share of non-linear viewing on Smart TVs is captured by free-to-air broadcasters' catch-up services (up to 78 percent in China). This might imply that overall viewership increases due to multi-platform strategies, but nevertheless put pressure on the advertising-based business models TV broadcasters rely upon today.

Business models

Smart TV opens up a new market environment for content owners and TV broadcasters to by-pass traditional gatekeepers (e.g. cable operators), but also involves new intermediaries that are keen to control the viewing experience (e.g. vendors and manufacturers). All parties are therefore expanding partnerships in order to benefit from economies of scale, reduce operational risks and development costs, and secure access to content and distribution. Content owners, TV broadcasters and technology vendors are increasingly working together to find business models in order to make Smart TV commercially successful and change the way consumers watch TV programming. This reconfiguration of business activities from value chain organizations to the fluid structure of an ecosystem, and the continuous efforts in fine-tuning business models form the major strategic challenge for TV companies (Evens, 2014). With regard to Smart TV business models, a distinction between open and closed ecosystems need to be made. Open business models generally support common standards and provide a platform for various partnerships. Players including LG, TP Vision (formerly Philips), Panasonic and Toshiba (forming together the Smart TV Alliance) have embraced open platforms that invite third-party content and service providers to join and deploy their own revenue model. Hence, these providers have a large level of freedom to develop and run their apps on the Smart TV platform



of all device manufacturers that have agreed on a common standard (via software development kits). In contrast, Samsung and Apple are betting on closed ecosystems with proprietary technology that allow them to curate and control the supply of third-party applications. Part of their strategy is a refusal to participate in standardization bodies that ensure interoperability between all Smart TV platforms. Instead of an open ecosystem, they have established walled gardens that give access to preferential content and service providers (after reaching a business agreement) (Begen et al., 2011). Smart TV apps are monetized through media downloads (apps), subscriptions and – to a much lesser degree – (targeted) advertisements (in-app, pre-roll video ads). New ways of monetization allow TV broadcasters to create new revenue streams and compensate declining advertising income.

Standardization

The European Commission, in 2013, published its Green Paper to prepare for a fully converged audiovisual world and invited key stakeholders to share their views on the market conditions, interoperability and the implications of converged media services for European legislation. With regard to Smart TV, it was stated that the most salient issue for the development of the connected TV market is the lack of common standards and the proliferation of proprietary technology. The connected TV market is indeed characterized by a high level of fragmentation and standards which is due to the dominant strategies of device manufacturers (DG IPOL, 2013). HbbTV (Hybrid Broadcast Broadband TV) was formed in June 2009 as a pan-European cross-industry consortium (broadcasters, middleware, hardware), bringing together two similar French and German standardization projects. HbbTV is an open standard for multimedia and interactive TV services, and has been approved by ETSI (European Telecommunications Standards Institute). As an open distribution model, HbbTV is network operator-independent and does not require a proprietary set-top box. With pilot projects in most European countries, HbbTV is the main standard for connected TV services. Other connected TV standards in Europe are YouView (a collaboration between TV broadcasters and network operators in the United Kingdom) and DVB-MHP (a system supported by network operators). However, the lack of default standard creates market fragmentation, and makes it difficult for new innovations to reach critical mass and recoup investments in research and development (OECD, 2014). Hence, European regulators are discussing whether or not public intervention is needed to address this fragmentation so as to support the development of the European Smart TV market and take leadership in this Asian-dominated industry. The development of a European standard would also fit within the ambition to create a single digital market, and regulate (discriminatory) commercial negotiations between individual platforms, content owners and service providers as to ensure equal access to content and distribution.



Methodology

In the remaining part of the paper, a comparative analysis of the development of Smart TV across Europe is presented, with specific emphasis on its impact on viewing patterns, business models and standardization. Previous research has identified market size as a significant factor in assessing economic conditions, constraints and challenges TV firms face in smaller markets, referring to the limited availability of resources, economies of scale problems, concentrated markets, restricted consumer choice and so on (Picard, 2011; Trappel, 2011). Therefore, four European markets – two big (Germany, United Kingdom), two small (Belgium, the Netherlands) – have been included in the analysis in order to assess the role of market size in the development of Smart TV. First, these countries have been selected based on the accessibility of research data, and the researcher's relative familiarity with each of these markets. Second, the countries have been selected so as to guarantee diversity of research findings (e.g. the different connected TV standards being used in Germany and the United Kingdom).

The comparative analysis is largely based on a literature review and document analysis including market reports, policy documents, corporate press releases, industry databases, trade magazines and so on. Hence, the study is based on secondary data analysis since interviews with representatives of all players in the four selected countries were practically impossible due to constraints of time and especially budget. Document analysis as a research method has gained popularity in media business research over the years, and refers to an 'integrated and conceptually informed method, procedure and technique for locating, identifying, retrieving and analyzing documents for their relevance, significance and meaning' (Altheide, 1996, p. 2). In order to guarantee consistency between the countries, we have tried to rely on the same database when comparing the different parameters of the countries (e.g. pay-TV penetration, broadband penetration, adoption and use of Smart TV, share of linear viewing). Being aware of different techniques for data collection (e.g. measuring linear viewing time) used in different European countries, the research data underwent a careful selection and interpretation. As a result, the validity and reliability of the comparative analysis has been increased.

The development of Smart TV in four European countries

As mentioned earlier in the paper, four countries (Belgium - BE, Germany – DE, the Netherlands – NET, and the United Kingdom - UK) have been selected for a comparative analysis. Table 2 provides a descriptive overview of key market variables that mark the development of Smart TV in each of the selected countries. In this perspective, the availability of high-speed broadband infrastructure, the proportion of digital and pay-TV services, and TV viewing patterns (live and time-shifted) can be used to assess the development of the Smart TV market. For example, broadband enables people to drop



their pay-TV subscription (e.g. cord-cutting) and have cheaper (and often free) access to online video platforms.

Table 2. Overview of Smart TV market development

	BE	DE	NET	UK
<i>Geography</i>				
Area (km ²)	30,528	357,168	41,543	243,610
Population (mln)	11.100	80.210	16.820	63.705
TV households (mln)	4.8	39.2	7.4	25.9
<i>Network infrastructure</i>				
Fixed broadband	73%	65%	88%	73%
Mobile broadband	46%	51%	69%	66%
<i>TV services*</i>				
Digital TV	89%	81%	81%	100%
Pay-TV	97%	64%	99%	54%
<i>Smart TV</i>				
Adoption	10%	19%	17%	17%
Use	6%	14%	14%	13%
<i>Smart TV ecosystem</i>				
Standardization	HbbTV	HbbTV	HbbTV	YouView
Broadcasters involved	Limited	Many	Many	Many
<i>TV viewing</i>				
TV viewing time 2010 (min)	153	212	184	225
TV viewing time 2012 (min)	152	222	196	241
Time-shifted viewing	7%	17%	4.5%	11%

Sources: European Audiovisual Observatory (2013), European Commission (2014), Ofcom (2013)

* Data include all pay-TV services, including basic access charge (e.g. cable) and additional subscription bouquets.

Viewing patterns

The Smart TV ecosystem is developing strong both in Germany and the Netherlands, and continues to grow in the United Kingdom. About one fifth of TV households owns a Smart TV (one out of six generally uses the Internet functionality) with penetration of Smart TV sets increasing rapidly (an annual growth of more than 50 percent in the Netherlands). The popularity of Smart TV can be partially explained by the availability of third-party video applications, which increase a consumer's utility of purchasing a Smart TV. In the Netherlands, both public (NPO) and private broadcasters (RTL and SBS) have developed popular apps for Smart TV (e.g. NPO attracts 65,000 viewers per day, resulting in approximately 850,000 page views). Also in Germany and the United Kingdom, public and private broadcasters provide a wide array of information-rich and video apps. Hence, Smart TV is



supported by the content owners and TV broadcasters both in small and large countries. In contrast, Belgian broadcasters (except for RTBF) show no interest in joining Smart TV platforms; this lack of on-demand video apps helps explaining why Belgium lags behind in the adoption and use of Smart TV. Despite the increasing use of Smart TV in all selected countries, linear TV viewing remains the leading way of watching TV programs. In fact, average TV viewing has even increased since the first Smart TV services were deployed (in 2010). Time-shifted viewing has been on the rise in all countries, but remains a minor share of total TV viewing (up to 17% in Germany) until now. The rising proportion of time-shifted viewing goes hand in hand with the increasing penetration of digital TV services, which, by means of the service providers' equipment, facilitate the recording of TV programs. Nevertheless, it can be concluded that the proliferation of on-demand video platforms complements, rather than replaces, linear TV viewing at this time.

Business models

In addition to the manufacturers' strategies to build either open or closed ecosystems, TV broadcasters are integrating Smart TV as part of a multi-platform strategy. By increasing presence via multiple screens and platforms, broadcasters are eager to enhance an interactive viewing experience, and engage with the viewers. Broadcasters see opportunities in extending viewership and reaching out new audience segments that are more difficult to target in a traditional TV environment. In addition, return-path data allows for a better understanding of consumer behavior that can be monetized via interactive and targeted advertising. Further revenues could be made by selling videos (transactional or subscriptions) and applications (like games), or enabling interactive shopping. YouView, the standard for connected TV in the United Kingdom, has been successfully implemented by all major public and private broadcasters. Although the original goal of YouView was to bring the BBC iPlayer catch-up service to the regular TV screen while preserving FreeView as a free, universally accessible DTT platform (aka Project Canvas), it seems that YouView has been hijacked by the telecom world as a 'pay-lite vehicle'. Indeed, open technical specifications have allowed pay-TV providers like BT, Virgin and Sky to develop branded boxes that provide paid-for access to video services. Partly paid by the BBC's license fee, YouView has enabled pay-TV providers to charge £229 for a box that give access to sports and film channels. In Belgium, RTBF is the only broadcaster that has launched an application on Smart TV. Hence, the development of Smart TV in Belgium is stuck in a chicken-and-egg situation: consumers see little utility in Smart TV because TV broadcasters fail to provide video apps, and vice versa. It remains unclear how this vicious circle can be broken, although the expected arrival of popular video services like Netflix could be part of the solution.



Standardization

Germany was the first country to deploy HbbTV in 2010, adding teletext services via satellite broadcasting. The Working Group Smart TV of the *Deutsche TV-Plattform* was established in 2009 and aimed at bringing together device manufacturers and TV broadcasters to agree on the HbbTV standard. Meanwhile, more than sixty German broadcasters are using HbbTV for their interactive content. In the Netherlands, the *HbbTV Forum Nederland* was established in 2012 to stimulate the rollout of HbbTV services in the Netherlands. The underlying motivation was that agreements with all partners of the media value chain are needed to make HbbTV a success. However, the large cable operators UPC and Ziggo, and telecom provider KPN (with a cumulative market share of over 80 percent) are not involved in the organization. In Belgium, there have been no initiatives to coordinate HbbTV activities between TV broadcasters, distributors and device manufacturers so far. Whereas almost all European countries bet on HbbTV, the approach of YouView seeks to define a specific standard for the United Kingdom. Unlike HbbTV that constitutes an open standard, YouView risks of creating a technological island in a global market. YouView is a partnership between the main TV broadcasters and broadband providers backed by standardization body *Digital TV Group*, and has therefore been opposed by trade association *techUK*, representing the UK technology industry. Instead, techUK proposes the adoption of the HbbTV standard to align the United Kingdom with the rest of Europe. The harmonization of YouView with the HbbTV standard could offer more choice to the UK viewers, enhancing the ability to connect with additional content from across Europe. Furthermore, there would be plenty of opportunities for UK content owners and broadcasters to export their content to the rest of Europe.

Conclusion

In this paper, the focus has been on the development of the Smart TV market, and its impact on the TV landscape. Smart TV is a prime example of the burgeoning multi-platform ecosystem in which content owners and TV broadcasters are embracing media convergence and spreading their programs via multiple screens and platforms. Such multi-platform strategy provokes, however, diverging audiences and creates fragmentation on the viewer side. This creates new challenges for TV broadcasters to serve their audience in the best possible way, targeting the consumer with the right content via the right device. In the context of Smart TV, viewing patterns, business models and standardization have been investigated in four European countries. The conclusion is that the market is developing strong in Germany, the Netherlands and the United Kingdom whereas Belgium clearly lags behind. Ownership and use of Smart TV sets is rising, but have had no dramatic impact on viewing time until now. Even more, TV viewing time has increased showing the complementarity between linear and on-demand TV viewing. TV broadcasters are especially developing on-demand video



applications that are in most instances monetized via transactional downloads and subscriptions.

Whereas most countries bet on HbbTV as European standard, the United Kingdom has developed its specific standard to deploy connected TV services. Being a technological island in a global market, it must be seen whether this is the right strategy since HbbTV is likely to benefit from economies of scale.

The paper clearly shows that national Smart TV markets develop differently, and that viewing patterns, business models and standards diverge across Europe. National TV markets are evolving quite differently, depending on a number of specific factors (e.g. broadband infrastructure development or digital TV penetration). Significant differences between markets require that service providers must adapt their marketing strategies to reflect local market conditions. Indeed, Smart TV providers must embrace the ‘Think globally, act locally’ strategy built around local consumer trends and tastes. Its success ultimately depends on the local package of value-added services presented in the local language. First, the lack of compelling applications, and the limited differentiation in this supply, can be helped by an increasing amount of partnerships with local content owners, TV broadcasters and even pay-TV services. Second, poor user interfaces and the complex integration with as many companion devices as possible can be overcome by standardization, which makes interaction between TV set and human actor intuitive. Hence, the real challenge for Smart TV is to create a genuine viewing experience that seamlessly integrates the efficiency of traditional broadcasting with the interactivity of the Internet so that consumers effortlessly embrace the smart functionality of their TV sets. Only by establishing a European market, using common open standards and encouraging third-party applications to join, Smart TV can be a truly successful.

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