

**Analog Mobile TV:
The World's Most Widely Available Option for Mobile TV**

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Introduction

Mobile TV has created quite a stir in the technology and communications community with a promise of grandeur. This promise is easy to understand in that mobile TV combines the greatest communications trend in the last 20 years, mobility, with the people's love of TV.

Mobile TV, however, has been a disappointment to many. After many years of digital standards melees, the growth of subscription-based digital TV subscriptions has not materialized to the degree that was originally anticipated, despite some impressive service offerings that have been brought to market.

There has been an alternative to the subscription-based mobile digital offerings that has been gaining momentum. The alternative utilizes the existing analog free-to-air broadcast signals by placing a tuner in a mobile phone to receive programming, essentially creating analog mobile TV. The analog mobile TV phenomenon that found its genesis in China has since spread to other regions of the world, dependent only on the existence of available free-to-air broadcast signals.

Telegent has commissioned In-Stat to take a look at this mobile TV execution method: delivering mobile TV to handsets using analog signals, monetized strictly through advertising by the local broadcasters, otherwise known as free-to-air. In looking at the analog TV market, we will provide an overview of analog mobile TV, including a market forecast, and compare and contrast free-to-air analog TV with other delivery methods. We will provide some insights into the way analog mobile TV is consumed, based on primary data collected by Telegent. Finally, we will provide some closing thoughts.

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Overview of Mobile TV

Providers have multiple ways to deliver video to mobile devices with screens of QVGA (Quarter Video Graphics Array; 320 × 240 resolution) approximate size. These include:

- 3G mobile TV services
- Digital broadcast, using separate terrestrial or satellite networks
- Over-the-top
- Analog broadcast

3G Mobile TV Services

3G mobile TV services use an operator's existing 3G network to deliver video service. These 3G mobile TV services may complement or compete with mobile TV broadcasting, depending on the intentions of the mobile operator. There are advantages and disadvantages to both for mobile operators. While mobile operators can rely on their own network and offer more channels via 3G mobile TV streaming services, the video quality may not be consistent. The 3G mobile TV service is only available to those with 3G handsets and plans, so 3G mobile TV services cannot be offered to the entire subscriber base, unlike a mobile TV broadcast service.

There are over 100 mobile TV operators offering 3G mobile TV today, in every region of the world. Some of the 3G mobile TV services have been launched recently, while others have been available for several years. There are still mobile operators who plan to begin commercial deployment of 3G services in 2009 and beyond.

The method of monetization for 3G mobile TV is typically subscription fees. Monthly subscription fees range from a few dollars per month to over \$15 per month, depending on the number of channels offered and the service pricing for the region. Some operators offer hourly, daily, and weekly options to encourage usage as well. We do not expect significant increases in annual ARPU, as mobile operators are looking to advertising, interactive services, and cross-selling content to boost their 3G revenue.

Digital Broadcast

There is a fragmentation of standards for digital mobile TV broadcasting that appears to be the way of the future. In digital mobile TV broadcasting, several standards are being used, each mainly in one country, and that situation is likely to continue in the future. Examples are MediaFLO in the US, CMMB in China, and T-DMB in South Korea. The most widely deployed standard is DVB-H, in terms of number of countries in which the standard is available. In addition to being promoted by the European Union, DVB-H trials or limited services are operating in the Philippines, India, Vietnam, Kenya, Nigeria, Namibia, and Indonesia. Even though DVB-H has the widest deployment, it is fair to say that up-take has been fairly sluggish.

The launch of new digital mobile TV broadcast services in countries where they are currently not offered will drive an increase in mobile TV broadcast subscribers. In addition, as there are more

services there will be larger numbers of handset models available at a range of prices. However, it is important to note the In-Stat predicts that the number of viewers of mobile digital free-to-air services will be greater than of the number of subscription-based mobile digital viewers.

With the exception of one-seg in Japan, most mobile digital TV providers charge a monthly subscription fee of \$3 to \$20, depending on the geography. It is important to note that, unlike 3G mobile TV, handsets capable of receiving mobile digital TV need a special embedded digital tuner chip. This results in a higher per unit cost in the range of \$30 to \$100 to the consumer as well. In geographies such as the US where the operator subsidizes the cost of the handset, the operator has extra pressure to recoup this higher subsidy cost in the form of higher ARPU.

Over-the-Top

Increasing penetration of broadband Internet access by consumers has contributed to an increase in online viewing of video content. As a result, there is an increasingly diverse range of video content available: Professional content providers are offering entire programs on websites, sometimes just a few minutes after airing them on traditional broadcast and cable networks. Websites like YouTube offer viewers access to user-generated content (UGC), and hulu.com provides a mix of current and vintage TV shows and movies.

The Internet can also provide access to TV and video content consumers already “own,” delivered to their homes by cable or satellite providers and stored in digital format on digital video recorders. “Place shifting” represents a way to access that content from a remote location using the Internet.

The content is provided on a best effort basis, lacking the reliability that is expected from TV. Also, much of the valuable live content that drives demand for real time TV such as news, sports, and weather is often not available without a subscription fee as major media conglomerates have purchased those rights.

As the number of handsets with larger screens and data plans has increased, the popularity of consuming over-the-top content has also increased. Essentially, the handset is increasingly becoming another client upon which users can consume Internet video content, making it a competitor of mobile TV services.

The monetization method of this content is usually advertising, making the content “free” to the end user. However, the video is not without cost. Unless the viewing device is using a personal area connection (PAN) like Bluetooth or a local area connection (LAN) such as Wi-Fi, the handset will incur data charges for accessing the cellular network.

Analog Broadcast

Another option for mobile TV broadcasting was brought to market in Asia in 2007 and has since achieved consumer adoption in Asia, Latin America, Eastern Europe, Russia/CIS, the Middle East and Africa. Telegent Systems, a fabless CMOS semiconductor company, has developed a successful single-chip mobile TV receiver that enables mobile handsets to receive analog TV broadcasts.

Telegent attributes its success to three key technology improvements:

- **Power:** reduced power consumption to 250mW, which allows an average of 6 hours of continuous TV watching on a single battery charge, assuming no voice calls.
- **Signal Sensitivity:** 10–15dB better sensitivity than conventional TV.
- **Mobile Picture Stability:** stable picture beyond 430km/h.

Mobile handsets began shipping with analog TV receivers in mid 2007 and have become quite plentiful. By mid-2009, Telegent shipped more than 40 million ATV chips in a two-year period. There are many markets where digital broadcasts have not begun and analog shutoff is years away. Analog TV is free and the consumer just has to buy a handset with a receiver. This makes for an attractive proposition, similar to the one that has prompted consumers to snap up digital mobile TV broadcast receivers in Japan and South Korea, where the digital service is free-to-air.

Similar to digital mobile TV, analog mobile TV requires a separate tuner chip to enable the functionality. The cost to add the TV feature is less than US\$10 per unit. It should be noted however that even though the analog broadcast solution requires an additional TV tuner, the feature can be implemented in low cost models and is therefore able to reach a consumer segment not addressed by higher end phone models, such as those that support 3G streaming solutions.

The World Is Going Digital. Why Does Analog Mobile TV Make Sense?

When comparing analog free-to-air mobile TV with subscription-based digital broadcast mobile TV, no one is going to argue the many advantages that digital broadcasting has over analog. This is not a point of debate. However, analog mobile TV has two very fundamental and compelling advantages: cost and availability. The cost advantage comes in many forms from the cost of the infrastructure implementation to the cost to the end consumer. The availability advantage is that much of the world is currently still broadcasting analog TV signals that are available to be viewed on mobile devices. There are no new standards that need to be enacted and no infrastructure that needs to be deployed. It is a “today” technology. The table below highlights some of these differences.

Table 1. Comparison of Analog Free-to-Air Mobile TV Versus Subscription-Based Digital Broadcast Mobile TV

	Analog Free-to-Air Mobile TV	Subscription Digital Broadcast Mobile TV
Network	Existing global analog terrestrial TV standards, leveraging existing terrestrial broadcast network	Digital network especially designed for mobile
Capital investment required	None	Significant—requires build out of network infrastructure
Spectrum	Leverages existing spectrum allocated for terrestrial TV	Requires acquisition of spectrum
Content	Delivers the same free-to-air programming received by conventional TV sets	Requires content licensing or new content development
Cost of ownership	Need to purchase enabled receiving device	Need to purchase enabled receiving device and pay recurring fee
Global availability	Widespread—available anywhere that TV can be viewed on a conventional TV set	Limited to where digital mobile networks have been deployed
Business model	Advertising	Direct—subscription fee
Benefit to operators	Handset differentiator; attract and retain subscribers	Subscription revenue

Source: In-Stat, 7/09

Granted, consumers globally have shown a willingness to pay for TV programming; however, the willingness to pay for mobile TV can be a topic of debate. The success of pay TV models around the world is often dependent on the willingness or ability of a subscriber to pay. Simply put, there are geographies around the world where consumers do not have the money to generate ARPU for pay TV services similar to MobiTV or MediaFLO in the US. The table below shows a comparison of cellular subscribers, and ARPU generated by region.

Table 2. Comparison of Cellular Subscribers and ARPU Generated by Region

	Population (Millions)	Subscribers (Millions)	ARPU (US\$)	Data ARPU (US\$)
DEVELOPED COUNTRIES				
North America	339	287	\$53	\$12
Western Europe	404	498	\$40	\$9
Developed Asia/Pacific	165	152	\$49	\$18
DEVELOPING COUNTRIES				
Emerging Asia	3,273	1,425	\$13	\$3
EEMEA	692	582	\$17	\$2
Latin America	460	359	\$16	\$2

Source: In-Stat, 4/09

Two quick points jump from the table. The first is the fact that there are geographies where the average mobile subscriber simply does not have the wherewithal to pay for subscription-based mobile TV or for the data services that support over-the-top video. There are surely segments within these geographies that can support premium mobile TV, but these tend to be niches. Second is that the vast majority of the world's subscribers live in regions with lower GDP and thus do not generate the ARPU of more mature economies.

Compelling Arguments...But Are There Devices?

There are a number of compelling handset models on the market with analog TV tuners. Much like the popularity of FM radio in handsets, the adoption of analog mobile TV handsets has been driven by the most powerful force in the mobile industry: consumers. The following figure provides some samples of popular mobile handsets with analog TV tuners in Latin America and Southeast Asia. Initially, consumer purchases of analog mobile TV took place in retail markets, demonstrating strong consumer interest and demand. Operators in emerging markets such as Latin America have since begun to include analog TV handsets in their portfolio, including Telcel, Telefónica, COMCEL, and Claro.

Figure 1. Examples of Analog Mobile TV Handsets



The ZTE i766 was recently launched by Claro in Argentina. Claro, as an official sponsor of the Argentinean soccer team, sees opportunity in enabling subscribers to stay current with soccer matches in the run up to the 2010 World Cup.

The i-mobile TV 535 is a TV phone marketed by Smart, the second largest brand in Thailand following Nokia. Smart expects to generate 40% of its 2009 unit shipments from phones with a free-to-air TV feature.

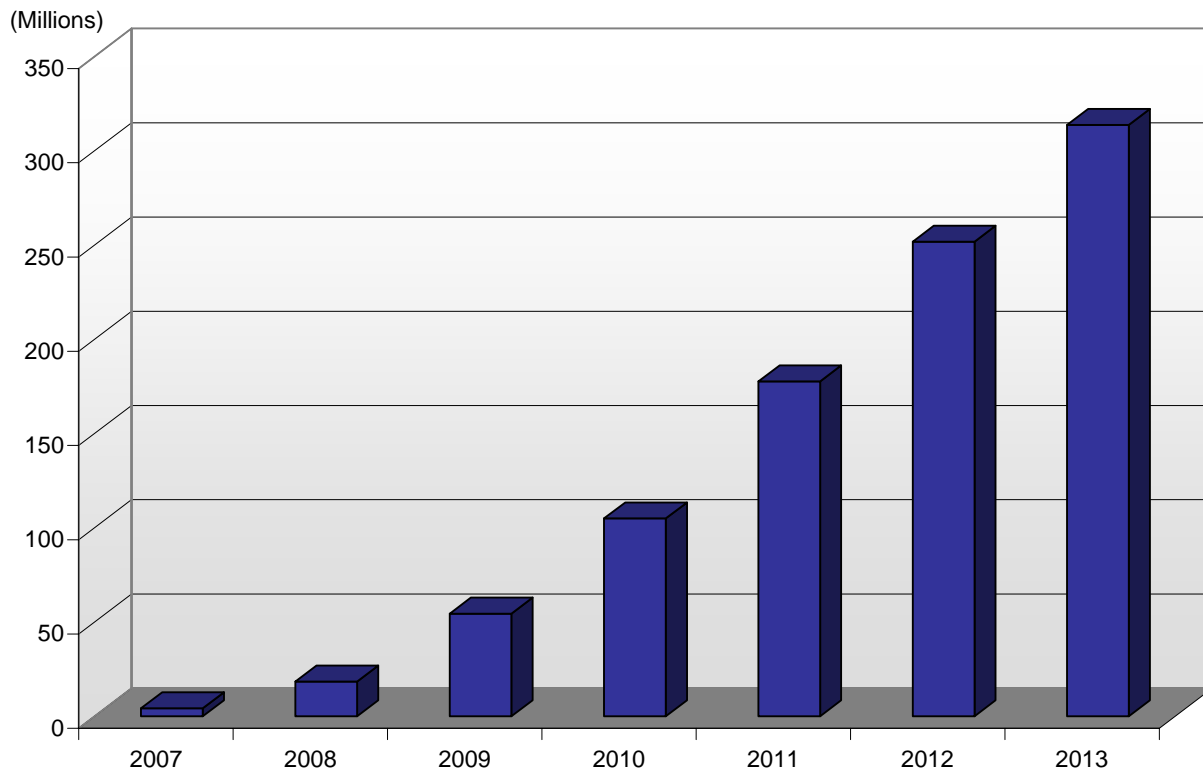
The HT66 is a hybrid GSM/CDMA TV phone sold by HT Mobile, a local brand in Indonesia. This model integrates a TV on/off button on the side that provides one-button access to TV programs.

Source: Claro, Smart, HT Mobile

Analog Mobile TV Outlook

In-Stat expects that analog mobile TV receivers will do well in Asia, Eastern Europe, the Middle East, Africa, and Latin America in the countries that have not yet formulated plans for digital TV. Or, if they have, in countries where the analog shutoff dates are at least five years away. Our forecast for the installed base of analog mobile TV broadcast viewers is below.

Figure 2. Worldwide Forecast of Analog Free-to-Air Mobile TV Installed Base (in Millions)



Source: In-Stat, 7/09

It is important to note that analog mobile TV is not restricted to markets where there is no digital service, whether pay or free-to-air. Analog mobile TV plays a role throughout the lengthy analog to digital transition process, it can coexist with pay TV networks, and it can provide coverage not delivered by digital services. For example, analog mobile TV handsets are being sold in Vietnam even though there is a DVB-H service there. However, the DVB-H service is only broadcast in the largest two cities, with a transmitter in each city. A lot will also depend on the business model for digital mobile TV broadcasting. Analog TV is free-to-air, so the viewer simply has to buy a handset with the capability. The programming is very familiar because it is the same as they receive at home. Some of the digital mobile TV broadcasts are pay-TV, so a viewer has to pay an additional monthly fee to subscribe.

Analog Mobile TV Users' Insights: Survey Methodology

We have spent some time talking about analog mobile TV from a market perspective. Let's now switch gears a bit and look at consumer usage of analog mobile TV. It is important to understand the "how," "when," "what," and "why" of analog mobile TV from the perspective of the current users who have purchased analog TV handsets and are using the feature.

To look at actual usage, Telegent collected consumer usage data using online surveys during the first quarter of 2009. The purpose of collecting the data was to show how consumers in different geographies use the feature. Although uptake originated in Asia, it has spread rapidly to other markets. The goal of the study was to look at these other markets.

Ads were placed on Facebook stating, "Do you own an analog TV phone? If so, please take our survey!" Upon clicking, respondents were directed to the survey URL. There was not an incentive for survey completion.

It should be noted that the survey was not from a random sample. Given the methodology, there will be some inherent bias in the sample, with a skew toward higher educated and higher income consumers with Internet access. However, the purpose of the survey was not to project the results onto the population at large; the purpose of the survey was to provide some insights and color for the usage of analog mobile TV.

It should also be noted that although the survey methodology was self-selecting, data was also verified. Survey results from respondents who reported using handsets that did not include mobile analog TV tuners were removed from the data set. It was assumed that they were receiving video services from 3G, Wi-Fi or other transmission media.

Table 3. The Sample Sizes for Survey

Country	Total Responses
Brazil	287
Colombia	177
Turkey	477
Indonesia	518

Source: Telegent, 7/09

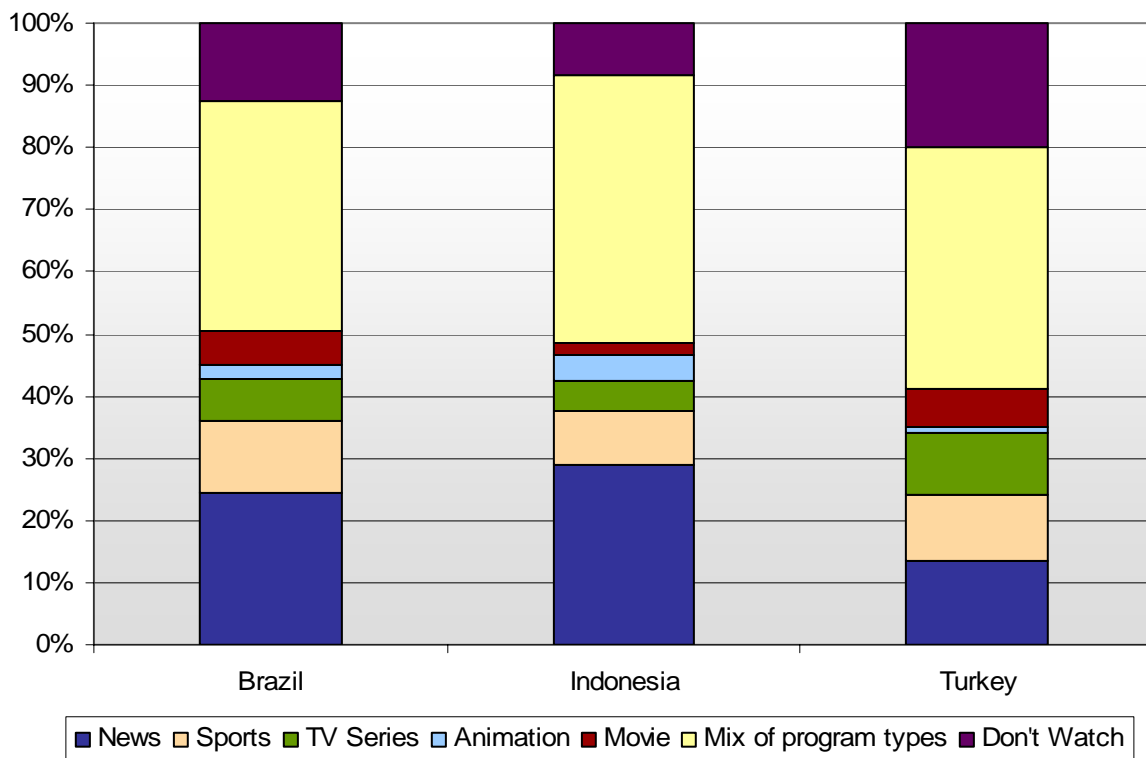
Analog Mobile TV Users' Insights

Programming Watched

In our look into the usage data for analog mobile TV viewing, we see that the usage patterns challenge previous perceptions. Long has it been hypothesized that only short form clip content, also known as “snacks” by In-Stat, clearly dominate viewing. The survey results suggest that this is not the case. Respondents indicate a wide mix of programming choices, including movies.

The content choices are remarkably similar when comparing responses from South America (Brazil), Europe (Turkey), and Asia (Indonesia). As would be expected, there are some regional differences. Indonesian respondents are twice as fond of news content as Turkish respondents. However, one thing is clear: content viewing for our respondents is typified by a wide range of viewing choices.

Figure 3. Programming Watched by Analog Mobile TV Survey Respondents



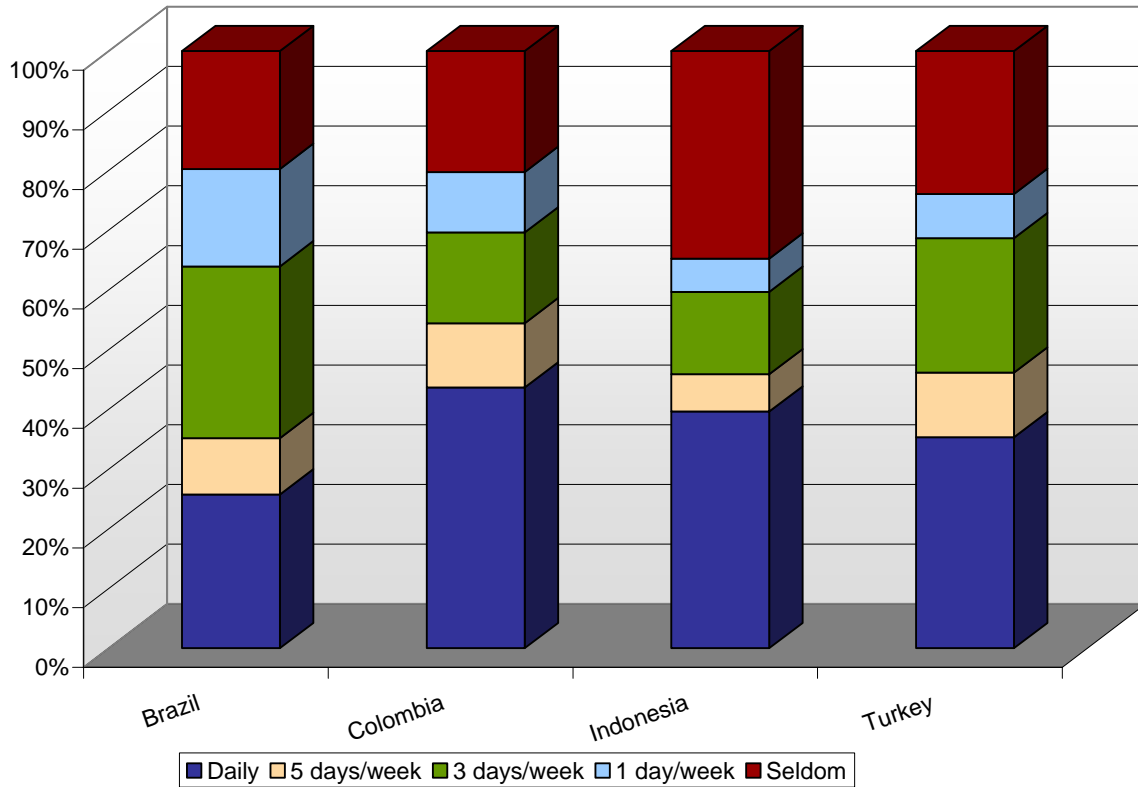
Source: In-Stat/Telegent, 7/09

Frequency of Viewing

Our mobile TV respondents seem to really like mobile TV, with the vast majority of the respondents watching at least once a week. In some geographies, 40% or more of respondents watch it daily.

As to be expected, there are some regional differences in the data. However, this has less to do with cultural differences than it does with geographic characteristics such as commuting distances and the length of time spent commuting.

Figure 4. Frequency of Viewing of Analog Mobile TV Respondents by Country

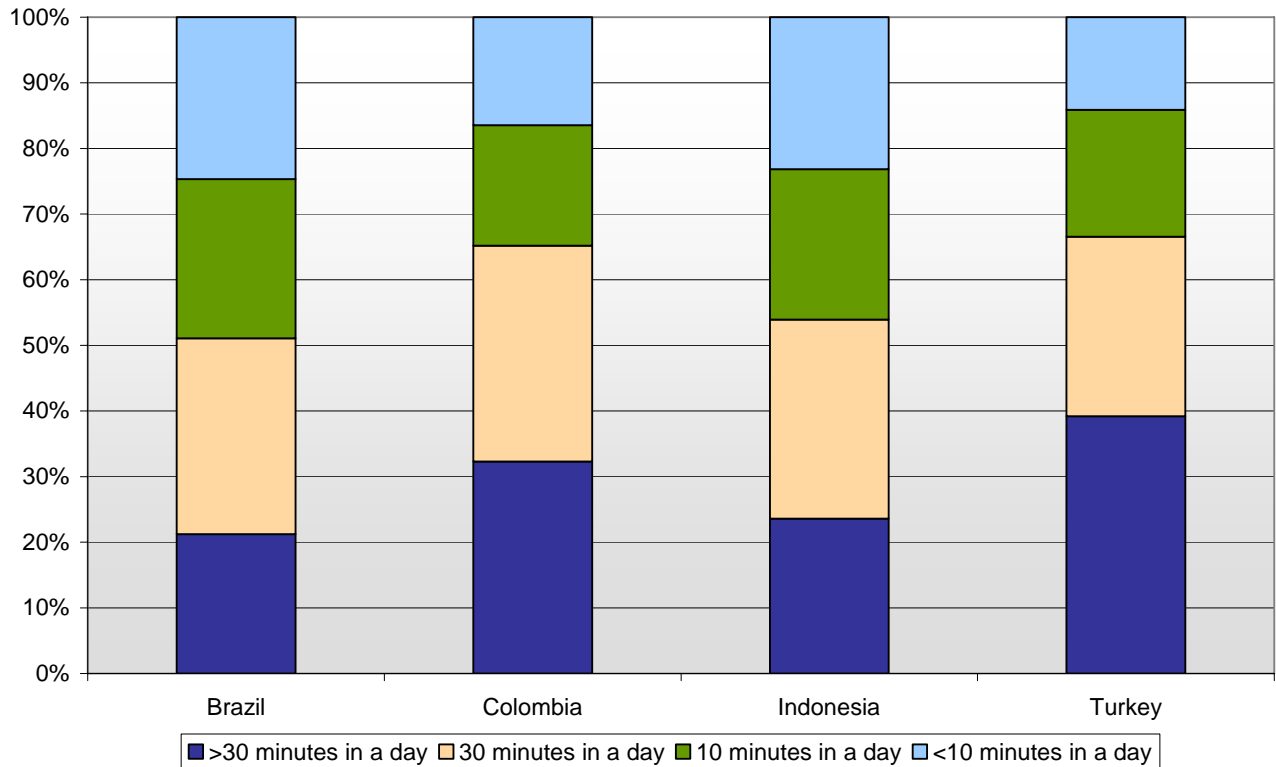


Source: In-Stat/Telegent, 7/09

Length of Daily Viewing Time

A surprising insight from the survey respondents comes from their viewing time. Approximately 2/3 of respondents report watching mobile TV for at least 30 minutes on days that they watch. Once again, the stereotype of small snack consumption of content seems to be inconsistent with survey respondents.

Figure 5. Amount of Time Spent Watching Mobile TV



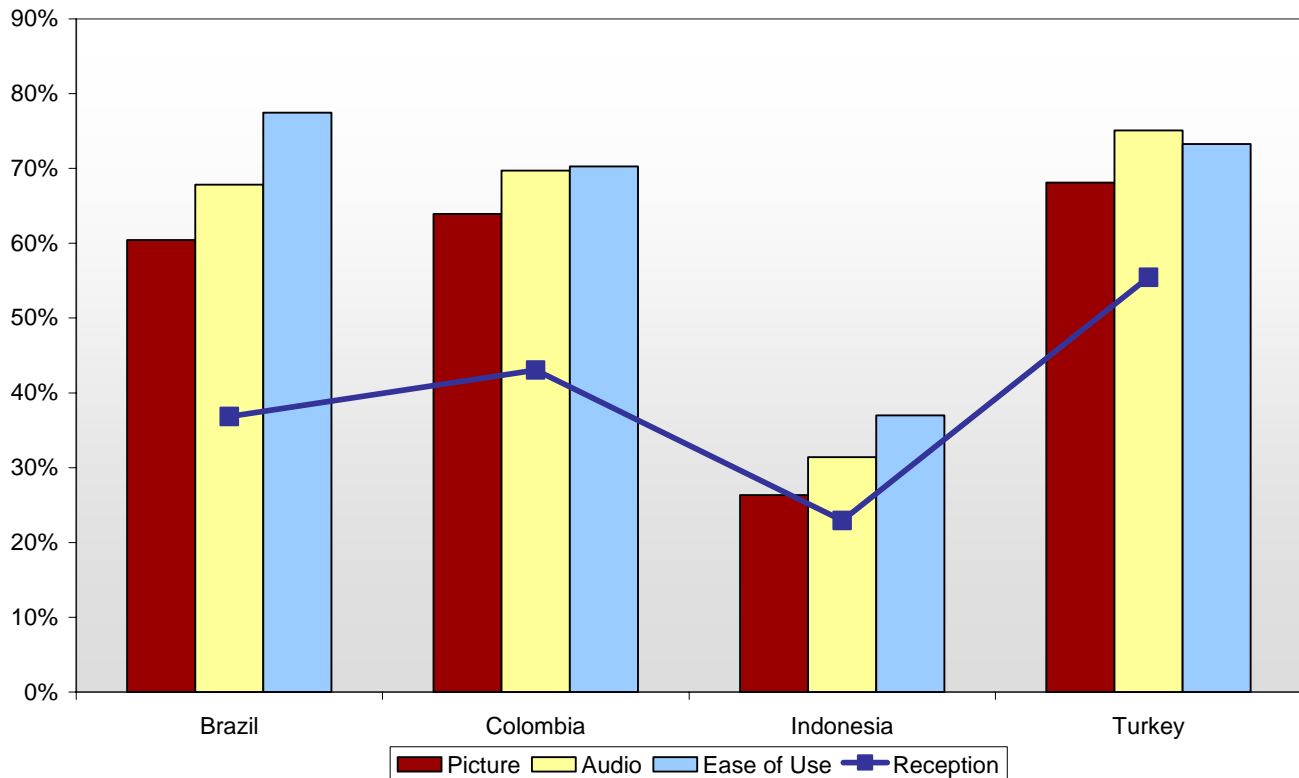
Source: In-Stat/Telegent, 7/09

Mobile TV Viewing Experience

The following chart provides some insights into explaining some of the regional differences in analog mobile TV consumption. The data from our respondents suggests the viewing experience is different in Indonesia.

When respondents were asked to rate the quality of the picture, the audio and the ease of use as Excellent, Good, Satisfactory, Fair or Poor, the vast majority of respondents in most geographies rated the features as good or excellent. A key conclusion is discovered when we overlay the “quality of the reception” on the quality of the picture, the audio, and the ease of use. Where consumers rate signal quality as excellent or good, they also tend to view the user experience as excellent or good. Where consumers rate the signal quality as satisfactory, they tend to view the user experience as satisfactory. Reception seems to dictate the quality of the viewing experience.

Figure 6. Respondents Reporting “Excellent” or “Good” on Mobile TV Viewing Experience Characteristics by Surveyed Geography



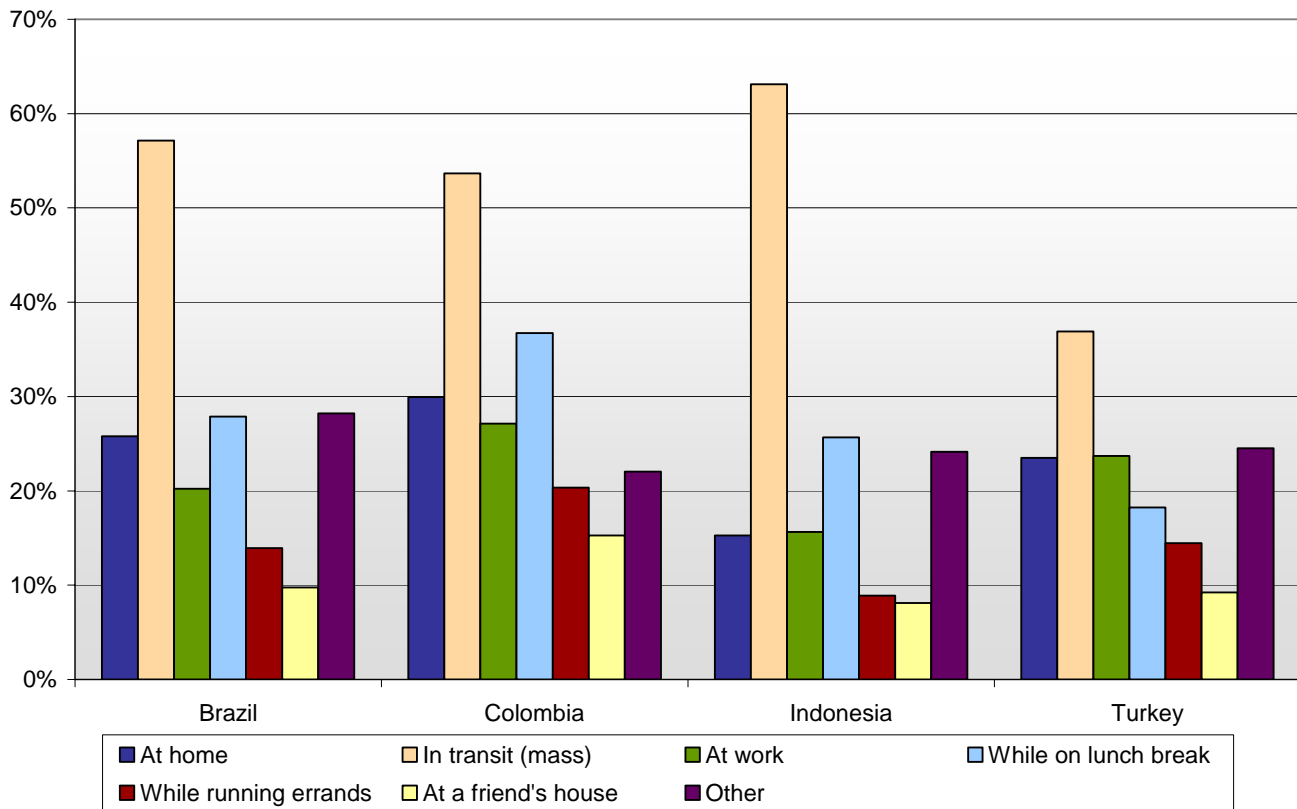
Source: In-Stat/Telegent, 7/09

The country that stands out is Indonesia. It is an interesting anomaly. The most popular response on the quality of their picture, the audio, and the ease of use was “satisfactory,” yet Indonesia is a hot market for analog mobile TV. It seems here that “satisfactory” is often good enough. As has been the case with other technologies such as the transition from CD to MP3 content, consumers are willing to compromise at times in order to obtain the convenience or compelling usage scenarios such as those provided by analog mobile TV.

Circumstance of Use

The aspect of mobile TV consumption that seems to have the biggest cultural difference resides in how mobile TV is consumed. Our mobile TV respondents suggest that the biggest use for mobile TV is in mass transit. At a minimum, over 1/3 of respondents report using mobile TV as part of commuting, regardless of the country of use. That percentage spikes in Indonesia where almost 2/3 of Indonesian respondents report using mobile TV in mass transit.

Figure 7. Circumstance of Use Reported by Mobile TV Survey Respondents



Source: In-Stat/Telegent, 7/09

Conclusion

As the various digital mobile TV standards were grabbing all the headlines, analog mobile TV-enabled handsets were quietly shipping. There were not any fights over analog mobile TV standards. There were no new broadcast towers going up to support analog mobile TV services. By the end of 2009, there will about 54 million analog mobile TV enabled handsets in service.

The success of analog mobile TV is not complicated. It is a simple recipe, as we have highlighted in this paper:

- Although the analog to digital transitions grab headlines, the majority of the world's countries will broadcast analog TV, even after 2013.
- The vast majority of the world's mobile subscribers live in regions with lower GDP and thus do not generate the ARPU of more mature economies to be able to afford subscription-based mobile TV services.
- Client devices are available from a number of companies including ZTE, i-mobile and Hi-Tech
- Mobile users find the content compelling! Viewing is not limited to "snacking," instead fulfilling longer length programming needs as well as a potpourri of content. In fact, approximately 2/3 of respondents report watching mobile TV for at least 30 minutes on days that they watch, and as many as 40% or more of respondents watch it daily in some geographies. Even when picture and audio quality are simply satisfactory, the market continues to embrace analog mobile TV.

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