The potential for multimedia and interactive technologies in Asia

Timir M. Premjee.

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The Potential For Multimedia And Interactive Technologies In Asia

By

Timir M Premjee

The Potential for Multimedia and Interactive Technologies in Asia

"Will Demand Justify Investment?"

Presented by

Timir M. Premjee

Consultant, MTA-EMCI

November 24, 1995

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ITV Transport Modes to the Home

- **Asymmetrical Digital Subscriber Link (ADSL)**
- **Hybrid Fiber Optic-Coaxial Cable (HFC)**
- **Fiber to the Curb (FTTC)**
- **Direct Broadcast Satellite (DBS) / Wireless Cable -- Multichannel Multipoint Distribution Service (MMDS)**

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ADSL

- **Digital signals sent over twisted-pair copper telephone network**
- **Characteristics:**
  - **Switching capability can provide VOD**
  - **Uses existing telephone network, with minimal additional distribution costs**
  - **Poor picture quality**
  - **High costs of subscriber terminals and switching**
  - **Provides one channel at a time to multiple TVs in one home**
  - **Subscribers need to be close to central office/headend**
- **Interim Technology**
- **Hongkong Telecom (VOD Test); Telecom Australia (Melbourne VOD Test)**

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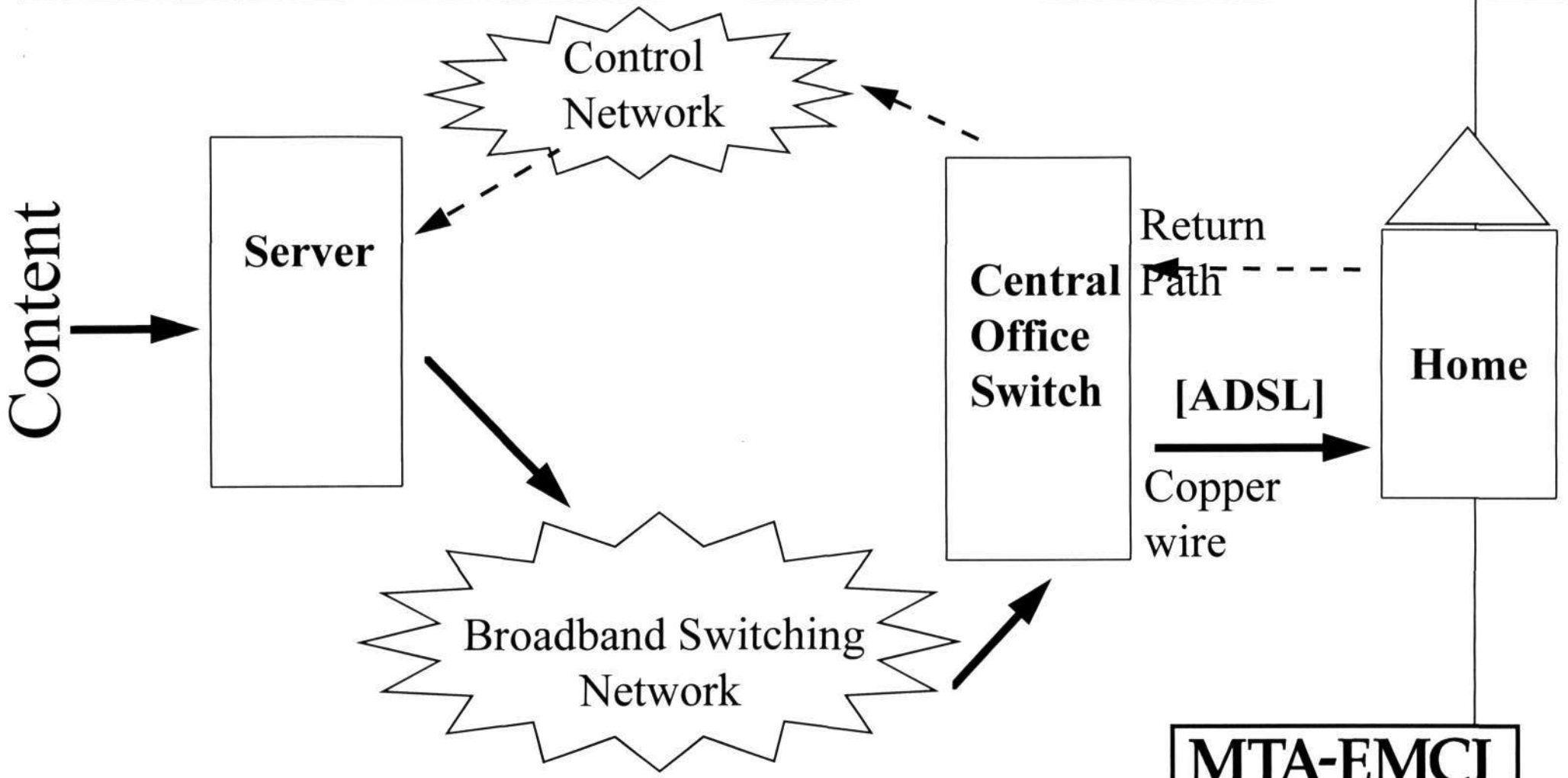
ADSL Diagram



HFC

- **Hybrid fiber optic and coaxial cable network**
- **Characteristics:**
  - **Support full-service network (video, voice and data)**
  - **Can use existing cable network, with fiber upgrade to trunk lines**
  - **Less expensive than full fiber to the curb network**
  - **750 to 1,000 MHz bandwidth**
- **Most Used Technology in the US**
- **Time Warner (Orlando); Cox Cable (Omaha); and OptusVision (Australia)**

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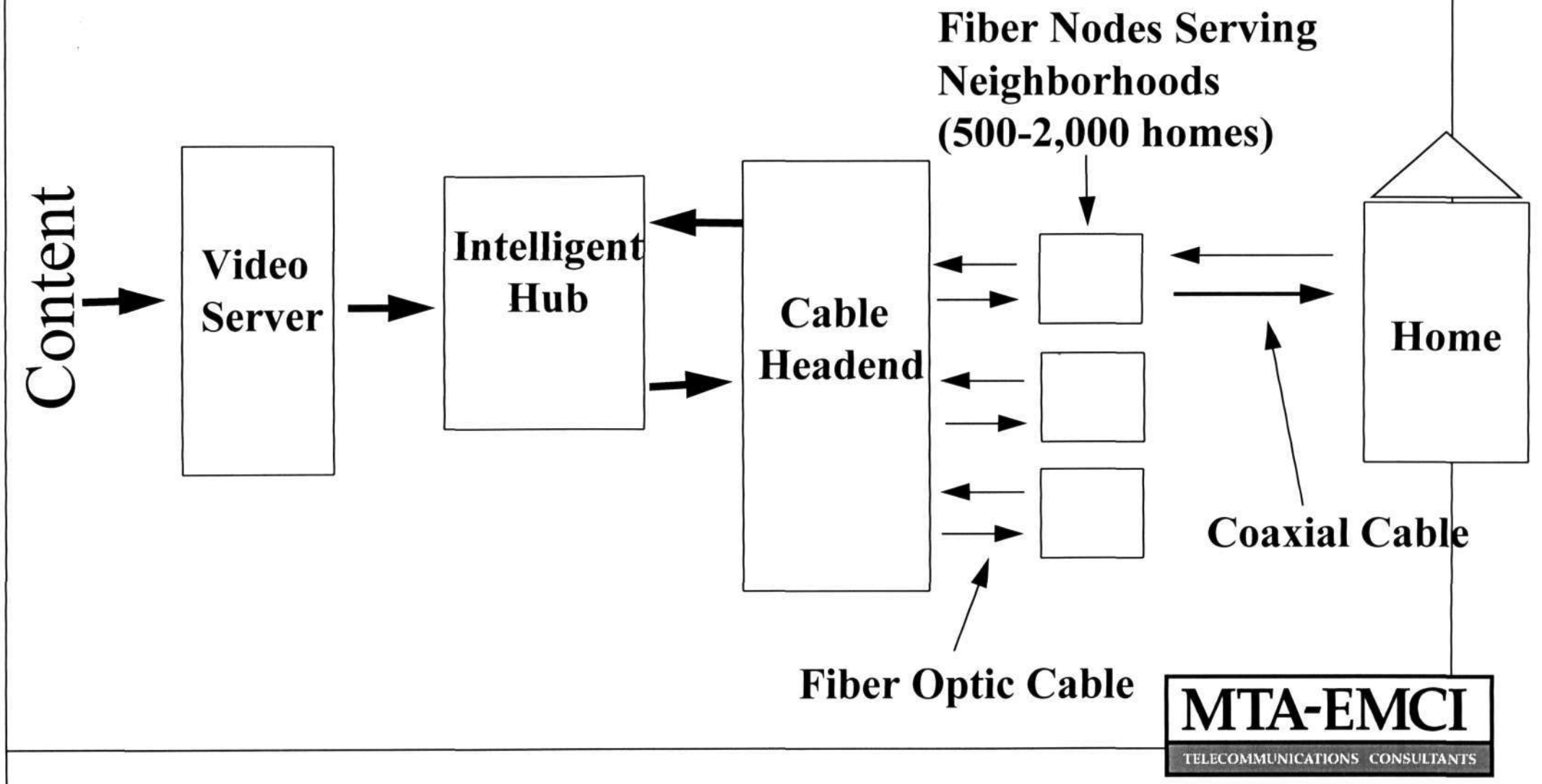
HFC Diagram



FTTC

- **Fiber optics to the curb**
- **Characteristics:**
  - **Support full-service network (video, voice and data)**
  - **Bandwidth capacity greater than 1,000 MHz and unlimited return path**
  - **More expensive than HFC**
  - **Complex technology is barrier to entry**
- **Bell Atlantic test (New Jersey)**

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DBS

- **High power satellites transmit to 50 cm. dish**
- **Digital Transmission; 200+ channel capacity**
- **Characteristics:**
  - **Enhanced pay per view (Near VOD)**
  - **Lower capital costs per home reached than wired networks**
  - **Universal coverage within satellite footprint**
  - **High consumer equipment cost**
  - **One-way technology**

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Digital MMDS

- **Microwave distribution to roof-top receiver**
- **Characteristics:**
  - **Pay per view / Near VOD**
  - **Low costs (operating and consumer)**
  - **Channel capacity constraint**
  - **Line-of-sight requirements**
  - **One-way technology**

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Current ITV Tests in Asia

- **Japan**
- **Hong Kong**
- **Australia**
- **Singapore**
- **Korea/Malaysia**

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ITV in Japan

- **Nippon Telecom and Telegraph (NTT)**
  - **Plans to lay fiber cable in every major city by 2010**
  - **In September 1995, began interactive tests in three locations involving 130+ content providers**
- **Interactive Broadband Network**
  - **Using NTT fiber infrastructure, 300-500 cable home test of VOD and news-on-demand in Urayasa beginning in 2nd Q. 1996**
- **Mitsui, Tokyo Telecommunications Network, Tokyo Electric Power, Tokyo Cable TV**
  - **Testing VOD and home shopping on Tokyo Cable TV**

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ITV in Japan (cont.)

- **Tokyo Cable TV and Sega Enterprises Inc.**
  - **Currently testing interactive Sega games over cable**
- **Fujitsu**
  - **Testing VOD, interactive games, educational shows, karaoke and info. services in 300 - 1,000 homes each in several cable systems**
- **IBM**
  - **Hooked up 4 schools for interactive learning in Okizaki and eventually planning to connect 20 schools. Students use PCs to access the VOD system**

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ITV in Hong Kong

- **Hong Kong Telecom**
  - **Began testing VOD technologies in Septmeber 1994**
  - **Just completed a VOD market trial of 400 homes**
  - **Technology Used: ADSL over phone lines**
  - **Interactive Multimedia Services (IMS) rollout:**

July, 1996-VOD, home shopping and infomercials;
1997- Home banking, electronic yellow pages and TV-on-demand;
1998-Network games and educational services.

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ITV in Hong Kong (cont.)

- **Wharf Cable**
  - **Began offering "Cable-On-Demand" on November 1, 1995**
  - **Current services: Entertainment-On-Demand; News-On-Demand.**
  - **Planned services: Shopping-On-Demand (1st Q., 1996); Games-On-Demand (2nd Q. 1996).**
  - **Fully interactive to homes in the fiber-optic footprint via a set top converter.**
  - **Fiber-Optic roll out plans ("ITV 500"):**

Y.E. 1995	**100,000 Homes Passed**
Y.E. 1996	**500,000 Homes Passed**
Y.E. 1998	**1,500,000 Homes Passed (Network Completed)**

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ITV in Singapore

- **Television Corp. of Singapore (TCS)**
  - **Launched a first-stage interactive television system in July 1995**
  - **Viewers participate in programs such as game shows and variety shows, and may express their opinions during current affairs programs**
  - **Requires use of a telephone instrument**

- **Singapore Telecom**
  - **Plans to offer VOD as part of the IT2000 vision.**
  - **VOD technical trial end of 1995; market trial in 1st Q. 1996 to last 18 months**
  - **Trial will offer infotainment (movies, music, videos, sports children's shows), news-on-demand, learning and home shopping**
  - **Phase 1 will include 20 in-house homes; Phase 2 will include 280 public users**

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ITV Plans in Australia

- **Telecom Australia**
  - **VOD test in 300 homes in Melborne (began 4th Q. 1995)**
  - **Broadcasts 7 channels over telephone lines**
- **In Touch TV - Australia (Interactive Systems Inc.)**
  - **Technology test underway on one TV network.**
- **Foxtel (News Corp. and Telstra)**
  - **Plans to link 4 million homes by fiber cable by 1999 to deliver voice, data and video including digital interactive TV and other services**
- **OptusVision (Optus Communications, Continental Cablevision and Kerry Packer Publishing)**
  - **Building a hybrid fiber-coax cable system to also deliver voice, data and video including VOD and interactive services**

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ITV in Korea and Malaysia

- **Korea -- Korea Telecom**
  - **Conducting a trial in 85 homes offering karaoke, sports, children's programs and documentaries**
  - **Using ADSL transmission over copper telephone lines**
  - **Plans to expand test to major metro areas**

- **Malaysia -- Telecom Malaysia**
  - **Approved a budget which could lead to 50 home VOD test**
  - **Currently testing technical aspects of system**
  - **Rangkaian Tenaga Sdn. Bhd. and Stamford College Berhad are to offer interactive learning via transponder space leased from Measat.**
  - **Proposed Multimedia Development Corporation to plan the establishment of a Multimedia Super Corridor (MSC).**

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Potential Interactive Services Subscribers over Fiber Cable/Fiber-Coax (by 2000)

Total HH ⇨ TV HH ⇨ Homes Passed by Fiber ⇨ Potential ITV Subs

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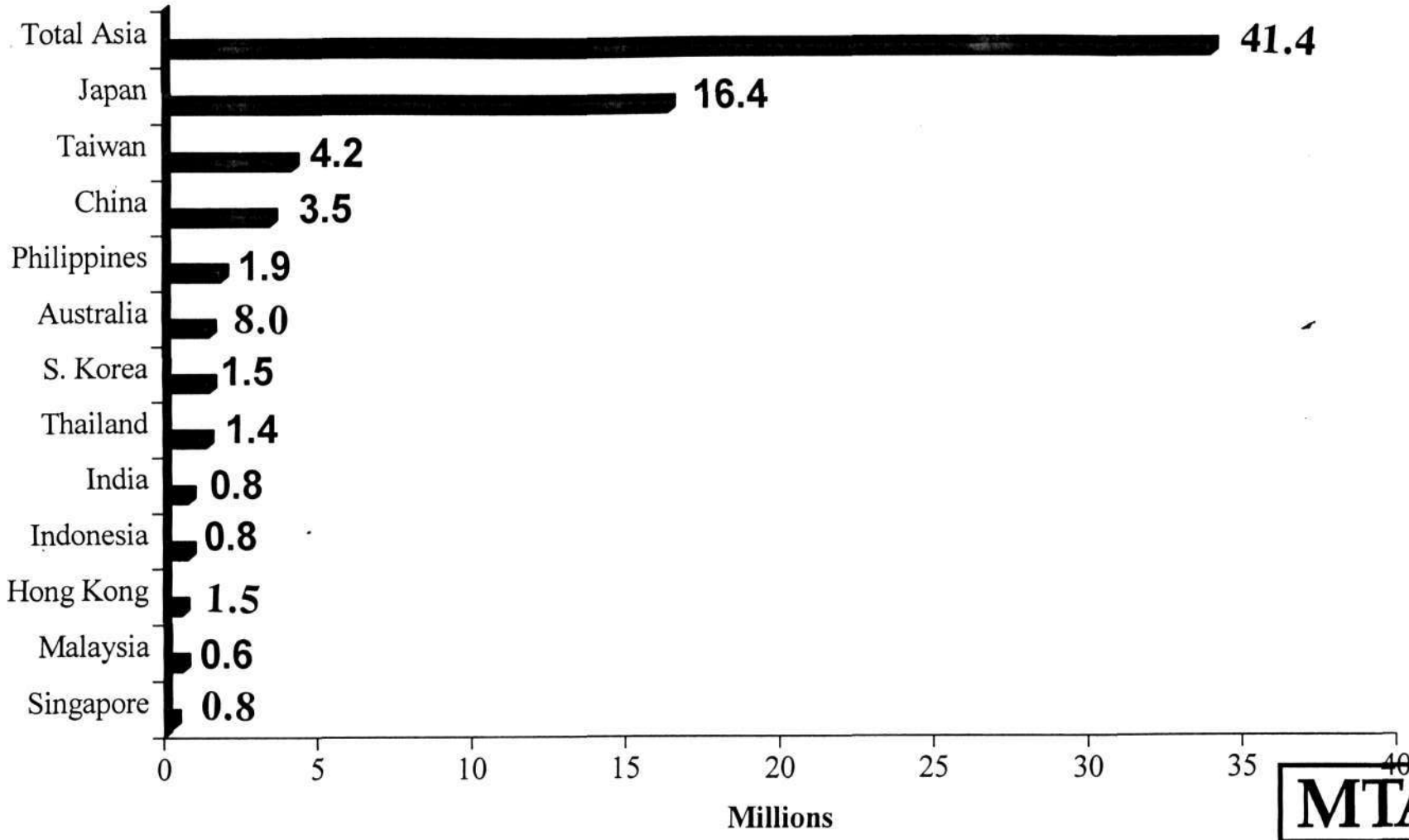
Homes Passed by Modern Fiber Cable Systems (by 2000)



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Source: MTA-EMCI research

Potential Interactive Services Customers over Fiber Cable/Fiber-Coax (by 2000)

- **Interactive TV Services**
  - **Potential ITV subscribers - fiber cable homes passed**
  - **Different countries, languages and cultural settings**
  - **Need for specialized, local content**
  - **Japan represents about 1/2 of total potential ITV market**

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Primary Consumer Research Findings - Japan and Hong Kong

■ Interactive Services Preferences:

1. **VOD/NVOD**
2. **Home Banking and Shopping**
3. **Online/Internet/Information**
4. **Interactive Video Games**
5. **Telecommuting**

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Video-On-Demand

- **High Interest in VOD for Recent Movies and TV Show Reruns**
- **High Potential Profile:**
  - **Dissatisfied with variety and quality of movies on TV**
  - **Own many electronic products (VCR, laser disc player)**
  - **Frequent video renters**
  - **Dissatisfied with video rental stores**

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Home Banking and Shopping

- **About Half as Much Interest as VOD**
- **High Potential Profile:**
  - **Major city suburbs**
  - **Younger, well educated, females**
  - **Married with children at home**

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Online/Internet/Informational Services

- **Somewhat Lower Interest Than in Home Banking and Shopping, But Strong Among Early Adopters**

- **High Potential Profile:**
  - **Younger, well-educated, males**
  - **Current cable/satellite TV subscribers**
  - **PC owners**

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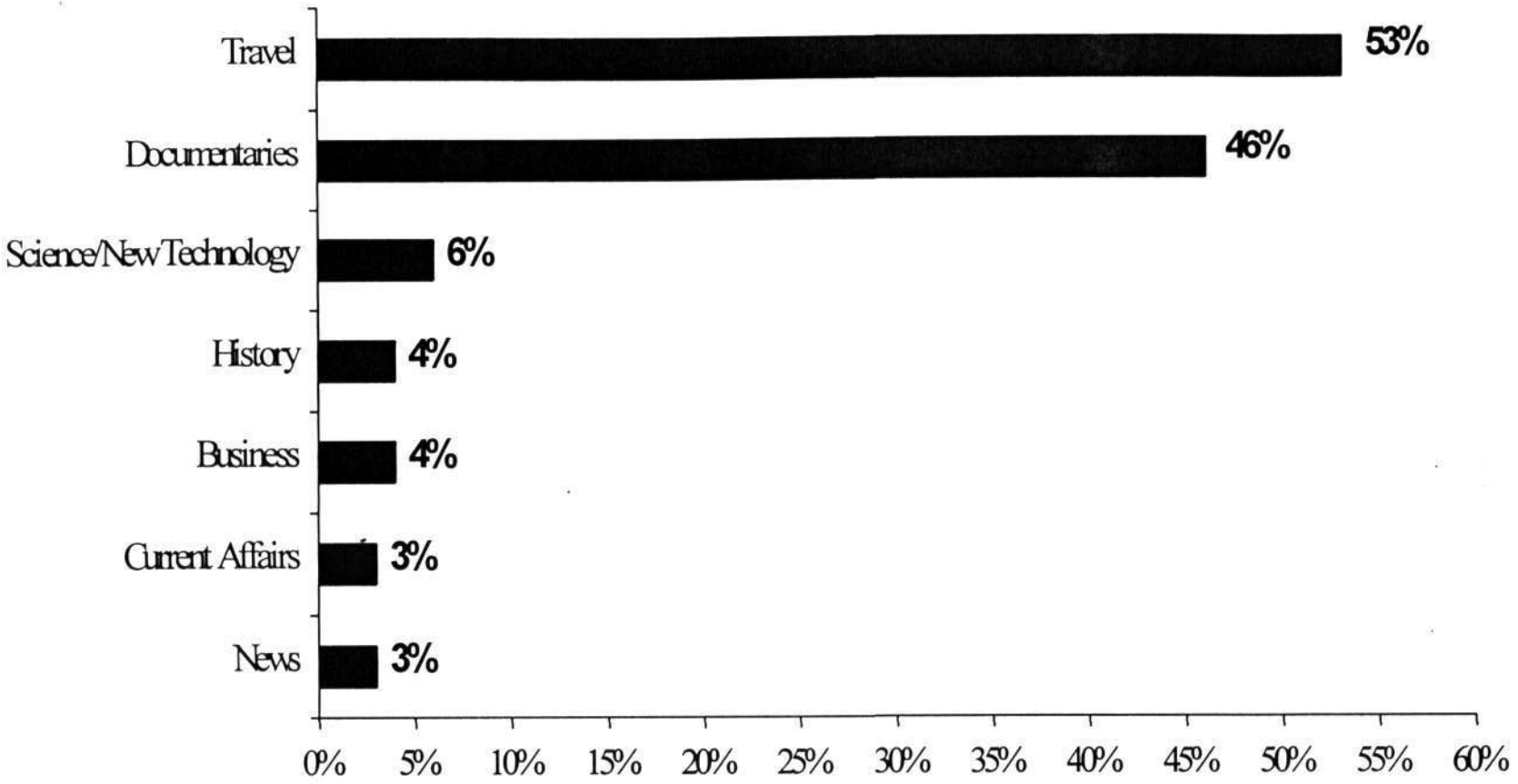
Informational Services of Highest Interest



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Source: MTA-EMCI research.

Interactive Video Games

- **Highly Targeted Interest, Concentrated Among Young Males**
- **High Potential Profile:**
  - **Younger, males**
  - **Video game (Sega/Nintendo) owners**
  - **Rents videos often**
  - **Current cable/satellite TV viewers**

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Telecommuting

- **Interest Coincides with Job and Commute**
- **High Potential Profile:**
  - **Younger, well educated, males**
  - **Long daily commute to work**
  - **Specific types of work**
  - **Medium size city - far from major market**

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Conclusions: Demand for ITV

- **Demand for Interactive Services**
  - **Demand for Package of ITV Services**
  - **Affordability**
  - **Competitive environment**

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Conclusions: Likely Asia-Pacific Countries to Invest in ITV

- **Does Demand Justify Investment?**
  - **ITV now: Japan, Hong Kong, Australia, Singapore, Korea, Taiwan**
  - **ITV future: Thailand, Malaysia, Philippines**
  - **ITV Uncertain: China, India, Indonesia**

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Presented by

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November 24, 1995

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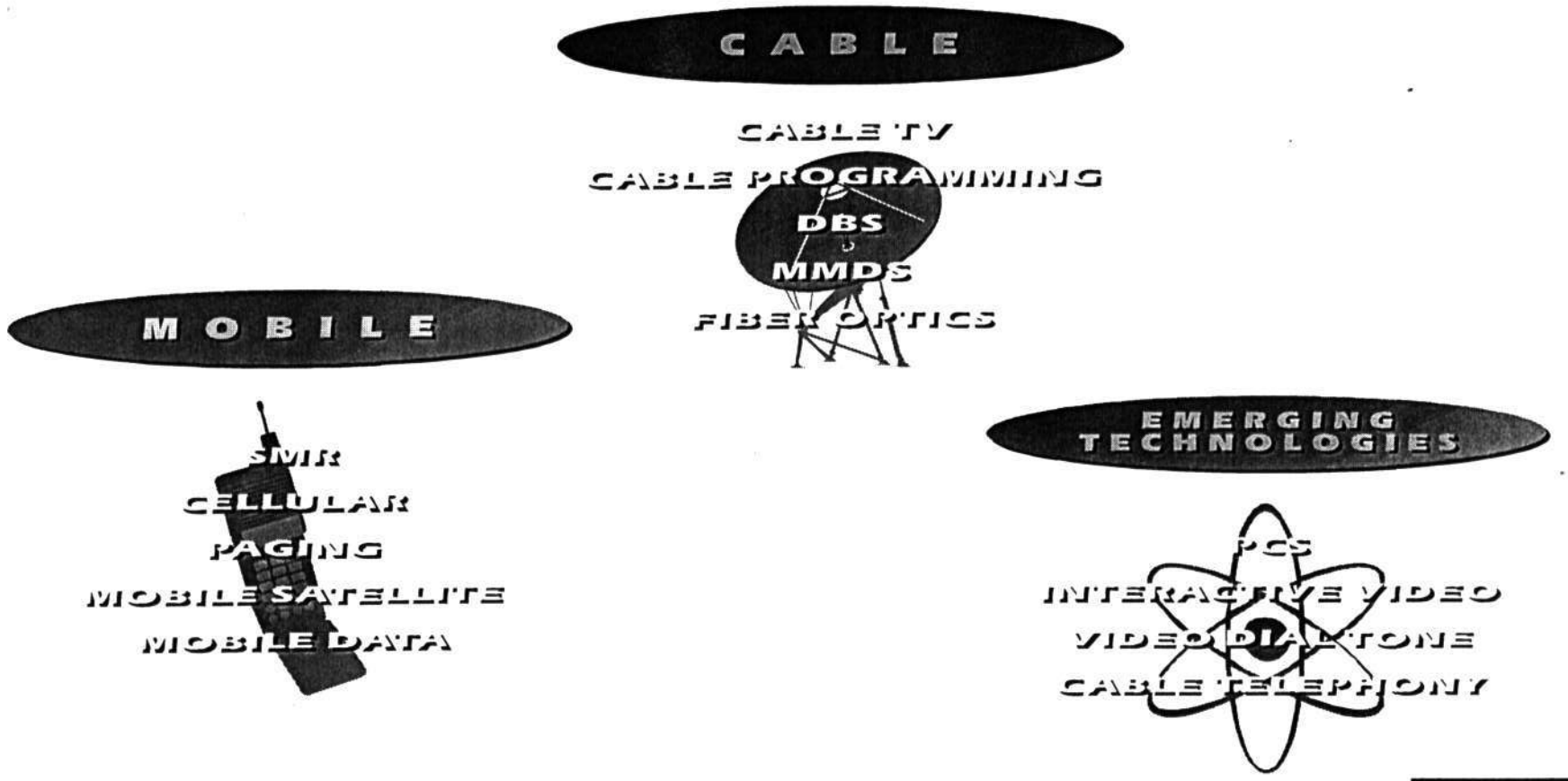

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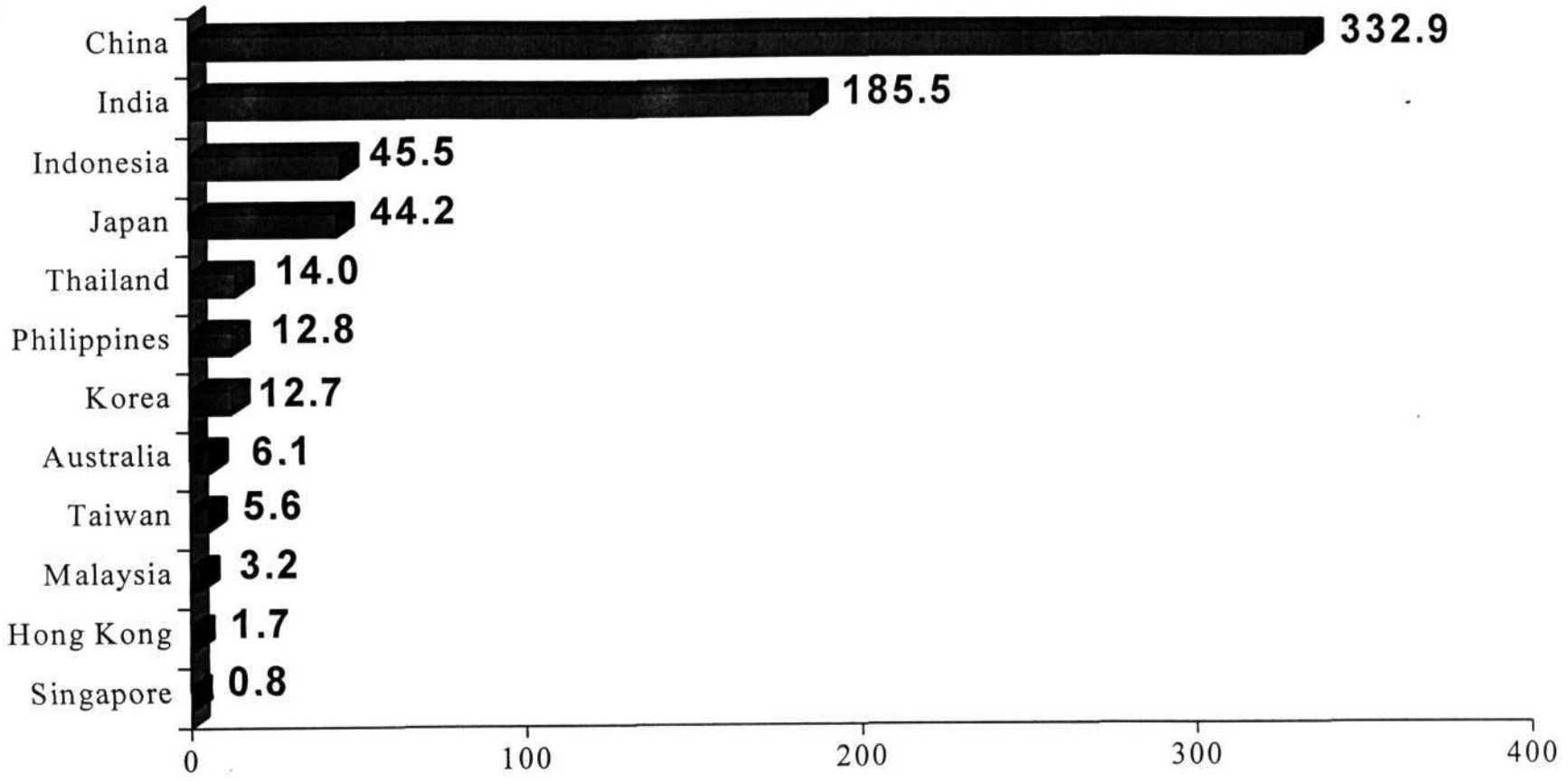
Total Households in Asia (1995)



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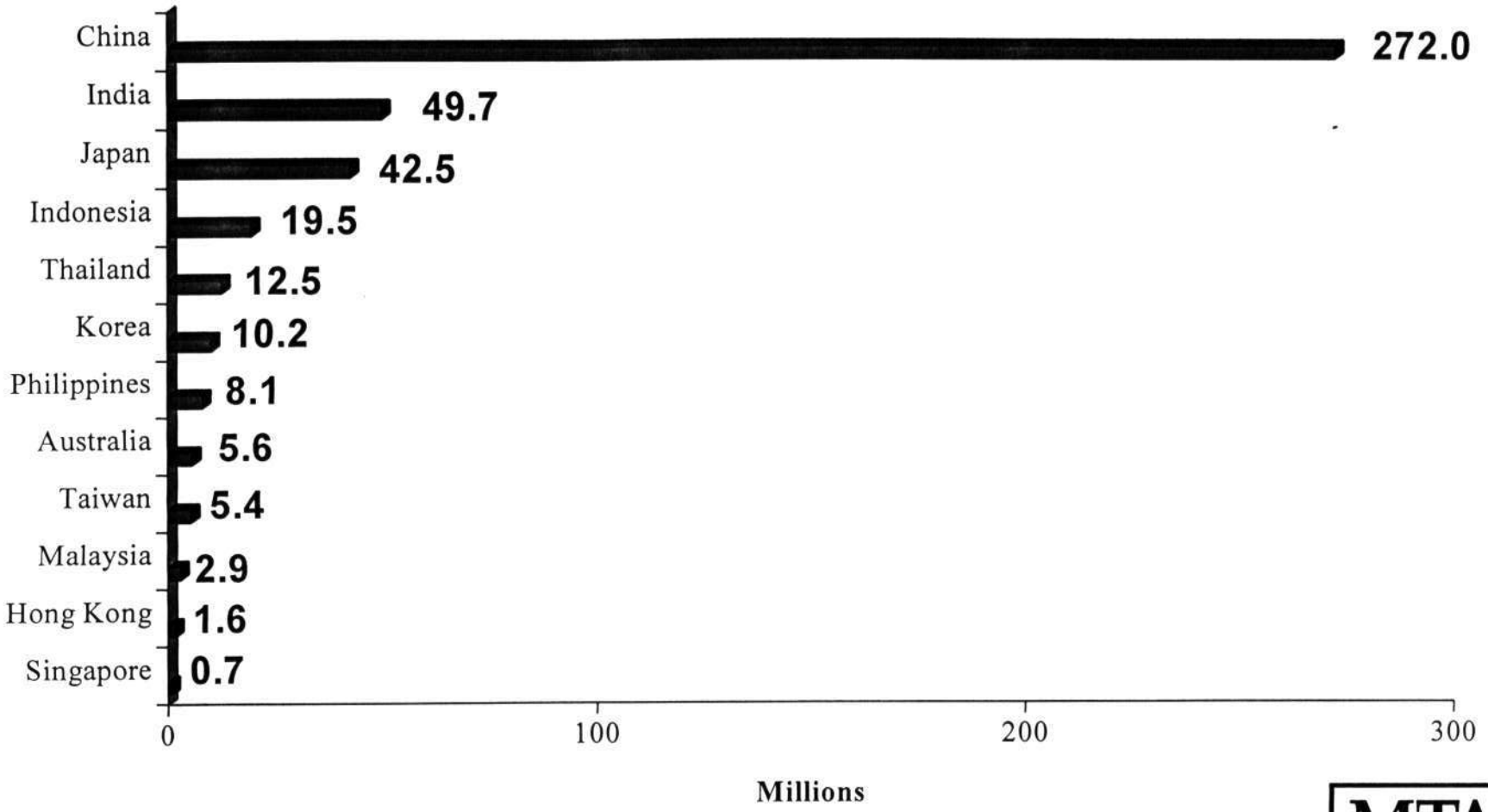
Source: MTA-EMCI, *Asia-Pacific Cable and Satellite Markets:* 1995

Total TV Households in Asia (1995)



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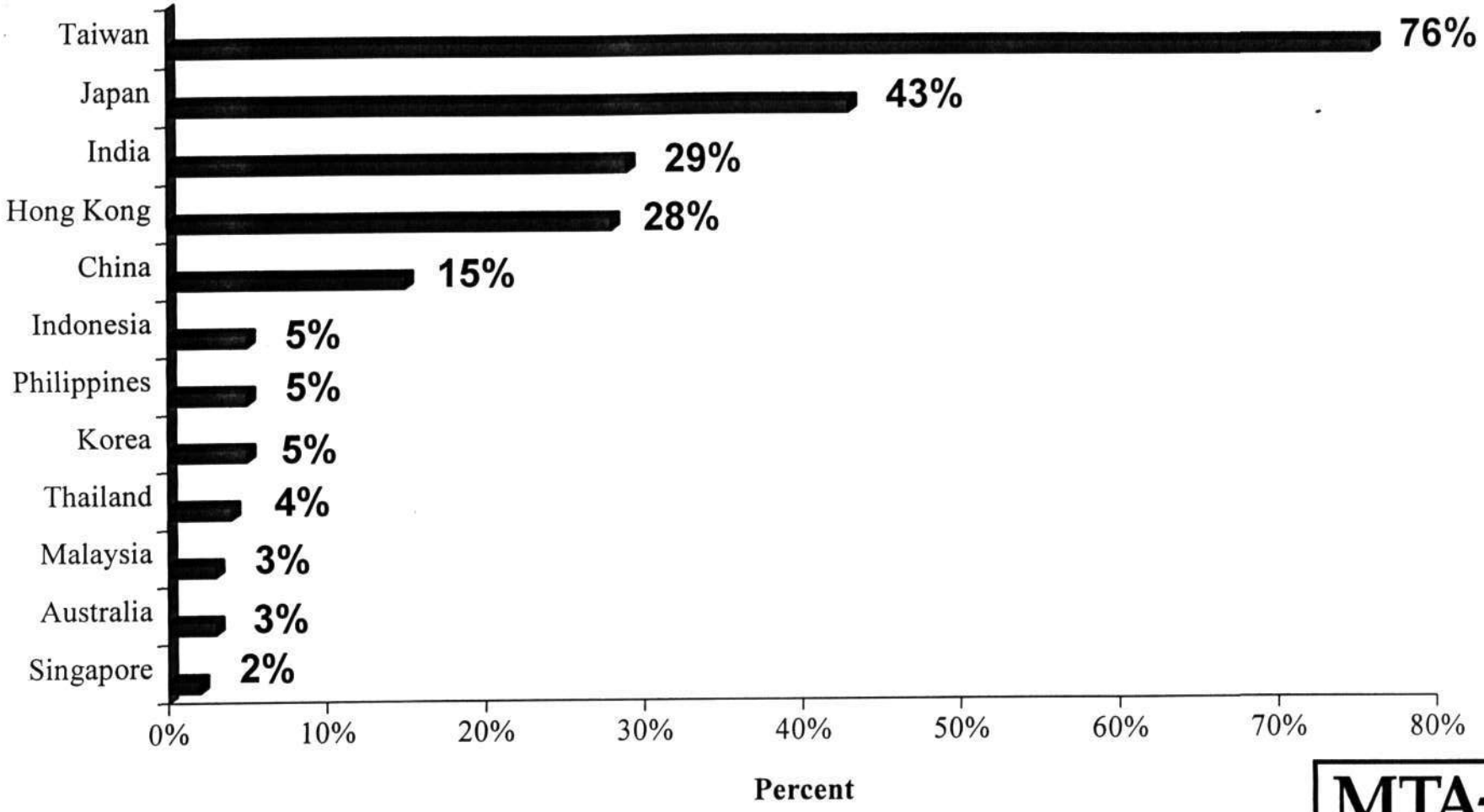
Source: MTA-EMCI, *Asia-Pacific Cable and Satellite Markets:* 1995

Total Cable and Satellite TV Penetration of TV Households in Asia (1995)



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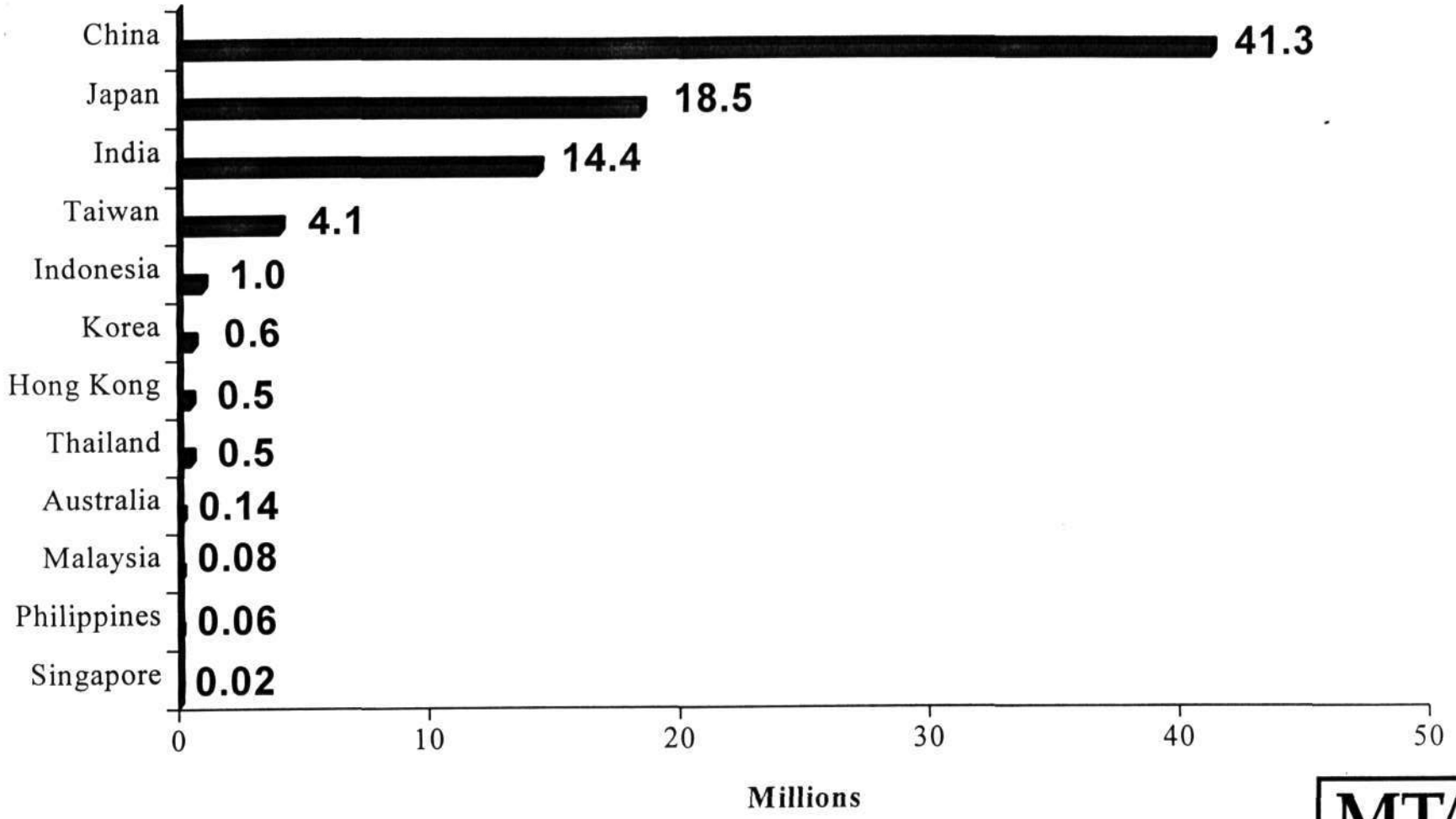
Source: MTA-EMCI, *Asia-Pacific Cable and Satellite Markets:* 1995

Total Cable and Satellite TV Homes in Asia (1995)



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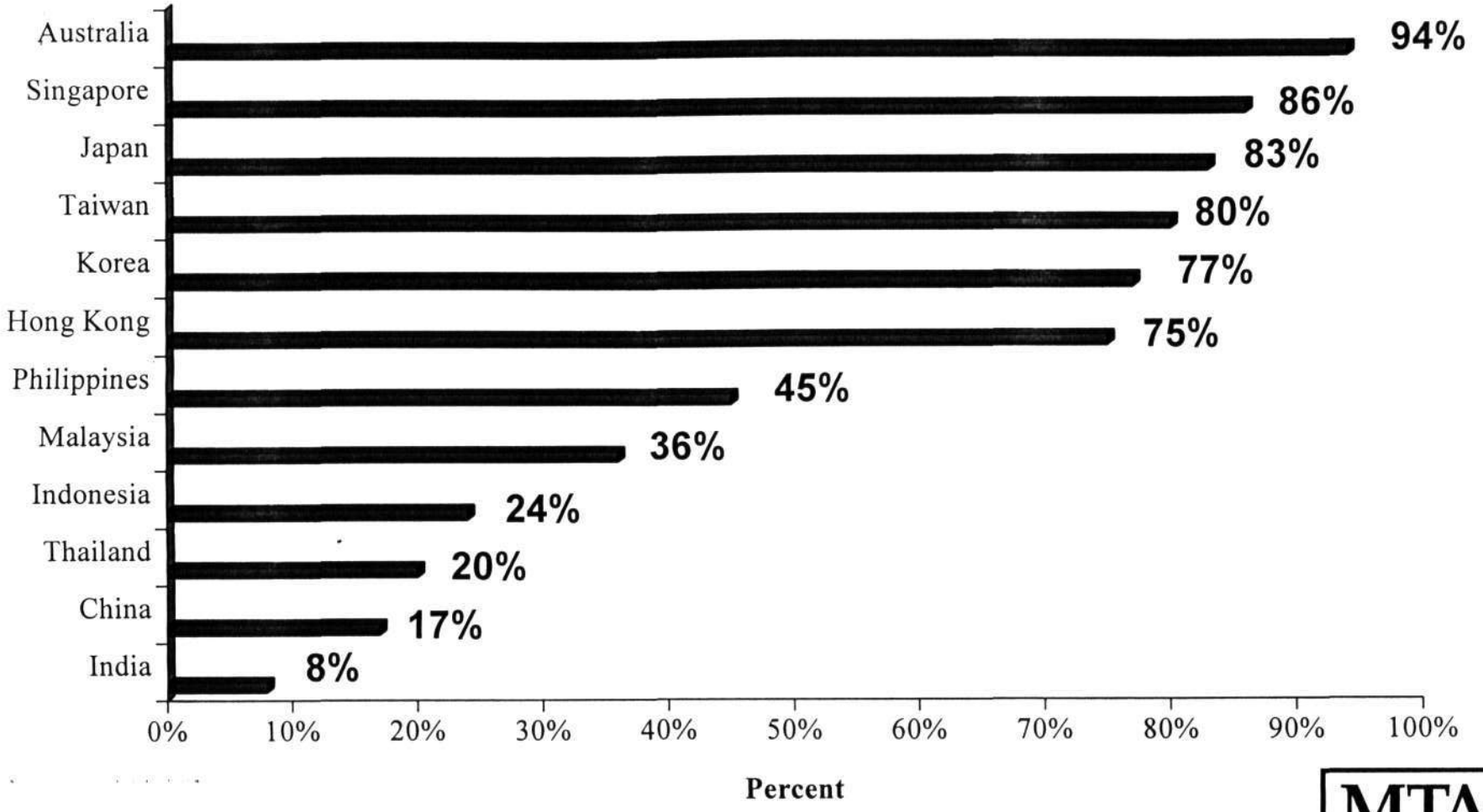
Source: MTA-EMCI, *Asia-Pacific Cable and Satellite Markets:* 1995

VCR Penetration in Asia (1995)



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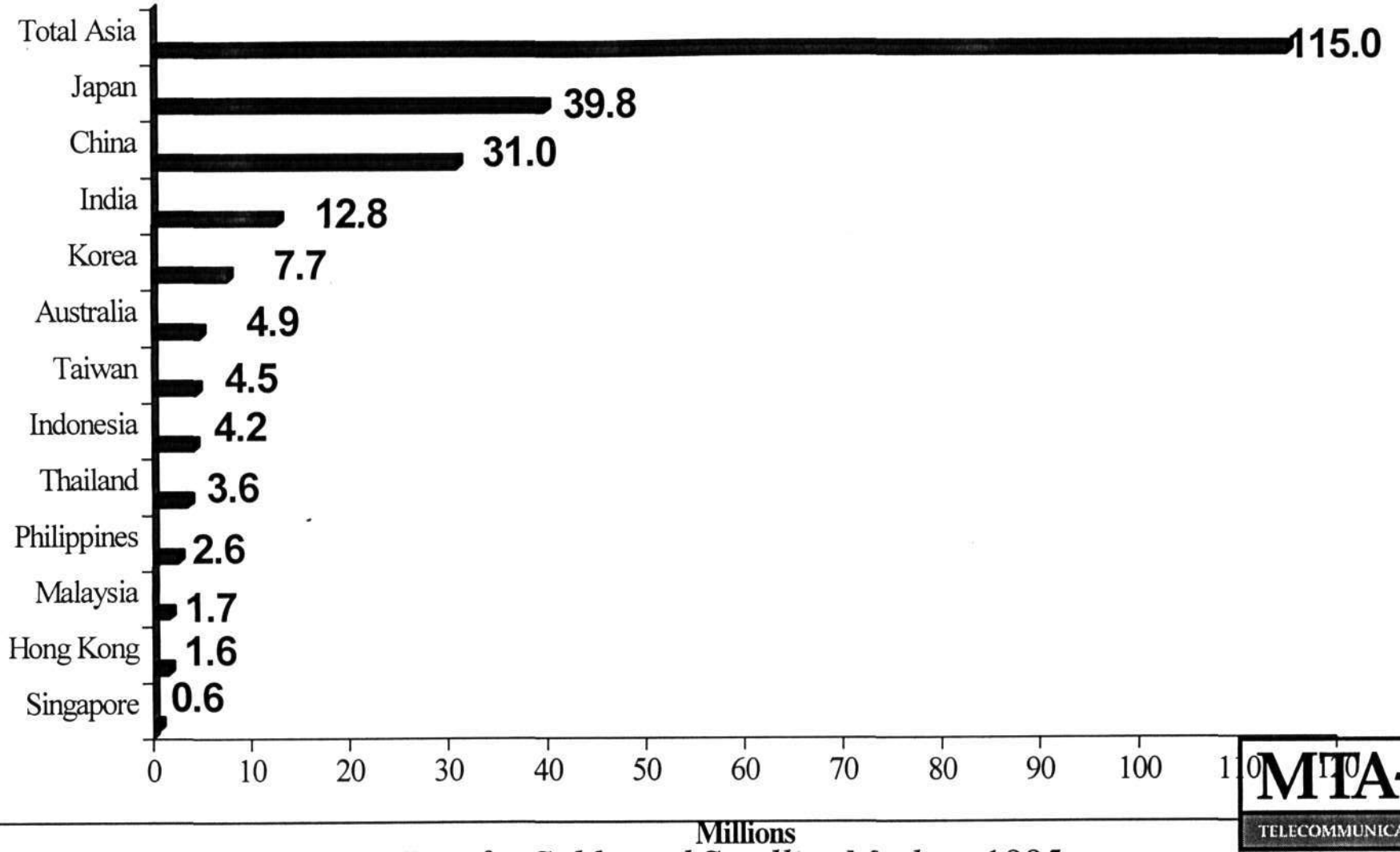
Source: MTA-EMCI, *Asia-Pacific Cable and Satellite Markets:* 1995

Addressable Households in Asia (1995)



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Source: MTA-EMCI, *Asia-Pacific Cable and Satellite Markets:* 1995

SPEECH OUTLINE:

I. Introduction

II. Multichannel TV Environment in Asia

- A. Total Households (HH)
- B. Total Television Households (TVHH)
- C. Total Cable and Satellite Penetration of TVHH and Cable and Satellite Homes
- D. VCR Penetration
- E. Addressable Households in Asia

III. ITV Transport Modes to The Home

- A. Asymmetrical Digital Subscriber Link (ADSL)
- B. Hybrid Fiber Optic-Coaxial Cable (HFC)
- C. Fiber to the Curb (FTTC)
- D. Direct Broadcast Satellite (DBS) / Wireless Cable -- Multichannel Multipoint Distribution Service (MMDS)

IV. Current Interactive TV Tests and Trials in Asia

- A. Japan
- B. Hong Kong
- C. Australia
- D. Singapore
- E. Korea and Malaysia

V. Potential ITV Subscribers

- A. Homes Passed by modern fiber cable (by 2000)
- B. Potential ITV Subscribers by 2000

VI. Primary ITV Consumer Research Findings in Japan and Hong Kong

- A. VOD/NVOD
- B. Home Banking and Shopping
- C. Online/internet/information
- D. Interactive Video Games
- E. Telecommuting

VII. Conclusions - Will Demand Justify Investment?

A. Demand for Interactive Services
B. Likely Asia-Pacific Countries to Invest in ITV

Title Slide: The Potential for Multimedia and Interactive Technologies in Asia

Assessment of Market Trends in Asia for Interactive Services. Will Demand Justify Investment?

Good Morning Ladies and Gentlemen. First of all I would like to thank Mr. Labrador for giving me this opportunity to speak here this morning in such distinguished company.

I am a consultant at MTA-EMCI, a telecommunications consultancy based in the United States in Washington, DC, with offices in London, and now an office right here in Singapore. In fact, we have decided to concentrate much of our effort on this office as a lot of our recent work has centered around trends in the industry in the Asia Pacific region. Although the company has been in business for over 30 years, we've undergone a lot of changes in the past few years including a name change from Malarkey-Taylor Associates to MTA-EMCI.

Slide 2: Introduction, MTA-EMCI

MTA-EMCI provides market research, engineering and financial analysis in cable and satellite TV, wireless cable, cellular, paging and other communications technologies. When Mr. Labrador and I spoke, we both agreed that as an introduction to this conference, it would be a good idea to provide the conference attendees with a panoramic view of some of the market characteristics of interactive and multimedia technologies before we plunge head long into a deeper discussion of the technologies involved. Since most of the recent startup activity in our industry has primarily concentrated in Asia and the U.S., I will share some of our research and analysis of the potential market for interactive and multimedia TV services in Asia, focusing on some primary consumer research findings from work in Japan and Hong Kong. These will be useful in our attempt to answer the question, "will consumers demand and/or other competitive forces justify the investment for interactive TV services in Asia? And, if so, which Asian countries will most probably be the leaders in offering interactive services?"

Slide 3: Total Households in Asia - 1995

MTA-EMCI recently completed a study of cable and satellite television markets in the Asia-Pacific region. The report contains profiles of cable and satellite industries in 12 Asia-Pacific countries, projections of addressable markets, cable subscribers, satellite dish homes, and revenues through to the year 2005, and detailed programming information on all terrestrial, cable and satellite channels. The study called Asia-Pacific Cable and Satellite Markets: 1995, was published in June of this year.

I will begin by presenting some data from this study illustrating the current television and multichannel TV environment in the Asia-Pacific region. Currently there are approximately 665 million households in the region, ranging from 333 million in China and 186 million in India to 800,000 in Singapore.

Slide 4: Total TV Households in Asia (1995)

Asia-Pacific Television Households have been growing steadily over the past five years. In 1990, there were about 380 million households in the region, growing to 430 million today. In the region as a whole, TV penetration of total households is currently at about 64%. Households in many countries such as Japan (27% of total households), Taiwan (3.1%) and Thailand (1.7%), often have two or more TV sets.

Slide 5: Total Cable and Satellite TV penetration of TV households in Asia (1995)

The early 1980s saw the emergence of satellite broadcasting in the Asia-Pacific region. Hong Kong's STAR TV launched five satellite channels at the beginning of the decade. NHK started a two channel satellite broadcast service in Japan. Zee TV brought satellite programming to India, while Palapa began transmitting satellite services from Indonesia, and Optus became Australia's first satellite broadcaster.

Since the 1980s, three Asian giants, China, India and Japan, have had rudimentary, low bandwidth CATV systems which retransmit terrestrial broadcast TV signals and sometimes also transmit other satellite channels at nominal costs to subscribers. Recently, modern, fiber-optic/coaxial cable television systems, providing an array of terrestrial and satellite channels for compensatory monthly fees have started in Japan, Singapore, The Philippines, South Korea and a few other countries, and fiber cable systems are about to launch in Australia, Hong Kong and elsewhere in the region.

A new television era is dawning in most Asia-Pacific Countries. Scarcity and restrictions on television program availability are being transformed into an abundance of video programming choices, including interactive television and multimedia services.

Currently, cable and satellite television penetration of TV households in the region is about 19% overall. Taiwan's cable and satellite penetration is the highest, at approximately 76%, followed by Japan at 43% combined, and India and Hong Kong at 29% and 28% cable and satellite penetration respectively. MTA-EMCI forecasts combined cable and satellite penetration in the region to reach approximately 33% by 2000 and 47% in 2005.

Slide 6: Total Cable and Satellite TV homes in Asia (1995)

This slide shows the same data in terms of cable and satellite homes in the region in 1995. In total there are about 82 million cable and satellite homes, ranging from 41 million TV homes in China to 20,000 in Singapore .

Slide 7: VCR Penetration in Asia (1995)

In the Asia Pacific region about 28% of TV households own a VCR, with the highest VCR penetration in Australia and the lowest in India. Video rentals however range from country to country. For example in Japan and Hong Kong, where VCR ownership is high, consumers are quite interested in renting, and in fact do rent video cassettes quite frequently. In contrast, in India where VCR penetration is only 8%, consumers hardly rent videos any more as cable now offers many movies and has almost replaced video rentals.

Slide 8: Addressable Households in Asia (1995)

Addressable households represent the segment of total Asia-Pacific markets able to afford cable and satellite television service, assuming an approximately US $25 to US $30 monthly subscription fee. Across the region, addressable households have increased from a total of 96 million in 1990 to about 115 million in 1995. Japan had the largest addressable market in 1995 at almost 40 million households, while China was next with 31 million addressable households.

Due to rapidly developing economies and rising income in many Asia-Pacific countries, MTA-EMCI forecasts addressable homes in the region to grow from 115 million in 1995 to 139 million in 2000 and 171 million in 2005, representing a 56% increase over the 11 year period.

The number of addressable households in each country is an important factor to consider when evaluating the market potential for interactive television services. In other words, how many households will be able to afford to subscribe to and pay for interactive services? I will return to this after reviewing some of the current interactive tests and trials being conducted in Asia.

Slide 9: ITV Transport Modes to the Home

Currently, there are four existing technologies that allow for interactivity between the home and the service provider. All of these technologies are now being used in various trials around the world. Some companies have in fact opened up their services to subscribers as we will find out later in this presentation.

Slide 10: Asymmetrical Digital Subscriber Link (ADSL)

ADSL technology can be used to provide "Video Dial Tone" service. It is an interim technology for telephone companies to transport through their existing twisted-pair copper telephone network which can provide VOD because of its switching capability. Hongkong Telecom and Telstra (formerly Telecom Australia) have employed this mode of transport for their recent video-on-demand tests.

The advantage to telephone companies is that ADSL uses existing infrastructure and only incremental distribution costs are incurred. On the other hand, there are several disadvantages. Costs of subscriber terminals and switching are high and subscribers must be located close to the headend or the central office as distance leaves the already poor picture quality open to more distortion. Moreover, unlike regular cable television where subscribers can use several televisions in one home to receive a choice of several channels, ADSL technology allows only for one channel at a time in multiple TV homes. ADSL is therefore considered to be an interim technology that telephone companies will use as they gradually upgrade their networks to utilize superior technologies.

Slide 11: ADSL Diagram

Using the telephone Subscribers call the central office to order a program. The order is then processed at the central office switch and the appropriate orders are sent up to the network server which acts as a jukebox dispensing content as it is ordered. The server sends these signals to the broadband switching network, back to the central office switch and then to the home over the copper wires.

Slide 12: Hybrid Fiber Optic-Coaxial Cable (HFC)

HFC combines fiber optic and coaxial cables to provide subscribers with high band width, full two way video, voice and data interactivity. This is currently the architecture of choice for ITV in the United States, Australia and Europe, and it is also expected that HongKong Telecom and other Asian telecoms will eventually move toward an HFC network. HFC networks can also be cost effective compared to an FTTC network as the existing cable network can be fiber enriched up to the trunk lines.

Slide 13: HFC Diagram

Fiber optic lines are deployed up to an area node that then distributes the signals via coaxial cables to a neighborhood of between 500 to 2,000 homes. Communications between the subscriber and the area nodes take place over coaxial cables via a set-top-converter in the subscriber's home. Once again, the video server

dispenses the content to the intelligent hub and the signals are sent downstream via the headend to the nodes and finally to the home.

Slide 14: Fiber to the Curb (FTTC)

Fiber infrastructure deployed all the way to the curbside provides the highest bandwidth capacity and full two-way video, voice and data interactivity. But since FTTC requires substantially more fiber optic cables and switching intelligence, it is also the most expensive technology to utilize. At this time, one of the biggest problems of this technology is its complexity. The Bell Atlantic test on VOD and interactive information and transaction services that used FTTC technology in the United States encountered difficulties due to the technological constraints.

Slide 15: Direct Broadcast Satellite (DBS)

Digital Direct Broadcast Satellite services such as DirecTV in the United States provide clear, laserdisc quality transmission, high channel capacity, and although not being fully interactive, have the potential of providing Near VOD. In this case, the same movies can be shown on six channels with start times of ten minutes apart. Dedicating 30 digitally compressed channels to pay-per-view enables five different blockbuster films to be available on NVOD at ten minute intervals. The other advantages of DBS is that it's a relatively low cost technology per home reached than are wired networks and areas within the satellite footprint are completely covered therefore requiring less of an investment in infrastructure compared to other wired technologies. However, costs of equipment to consumers are high and therefore, subscriber take-up is not expected to be as high as wired networks.

Slide 16: Digital MMDS

MMDS is also a one way technology which requires the use of a telephone to order programs. Therefore, this technology can at best provide near VOD and pay-per- view. In Hong Kong for example, Wharf Cable is providing pay-per-view over digital MMDS to subscribers that do not live in fiber optic upgraded areas. This technology is also limited by the line-of-sight limitations and channel capacity constraints. DBS is also being considered as a transitory technology for interactive and multimedia television while companies upgrade their fiber optic infrastructure.

Slide 17: Current Interactive Television Tests and Trials in Asia

Interactive television services are beginning to be tested in a few Asian countries. In particular, in the following slides, I will present to you some examples from Japan, Hong Kong, Australia, and Singapore, South Korea and Malaysia.

In some cases, the initial stages of these interactive tests are being conducted over telephone lines using ADSL or video-dial-tone transmission. In most of these tests, later phases and full roll-out will most likely be over a fiber-optic cable or fiber-coaxial cable system.

Slide 18: ITV in Japan

NTT, Japan's largest telecommunications company and one of the largest telecom companies in the world has plans of laying fiber optic cables in every major city in Japan with a population of over 100,000 by 2010. By 1997, NTT expects to have a fiber to the curb link to all major business areas in 12 of Japan's largest cities and by the year 2000, 38 other major cities across the country are expected to be cabled. This broadband network is specifically being built to achieve advances in Japan's current position with regards to multimedia and ITV.

While NTT is not considering to provide any kind of programming, the company will lease excess capacity on its network to cable operators who wish to provide broadcast or VOD services. In early September of this year, NTT began interactive tests in three locations using fiber-to-the curb architecture. The tests involve more than 130 content providers including Sony and NEC.

In another interactive trial, Interactive Broadband Network is testing VOD and news on demand in Urayasu (a Tokyo suburb) using NTT's infrastructure. The initial lab test was conducted in March of this year, while the consumer test is expected to begin around the 2nd Quarter of 1996 and run through the 1st Quarter of 1997.

VOD and home shopping is also being tested on Tokyo Cable TV system by a groups of companies including Mitsui, Tokyo Telecommunications Network, Tokyo Electric Power and Tokyo Cable TV.

Slide 19: ITV in Japan (cont.)

In another trial, five hundred Tokyu Cable homes are participating in a trial where Sega Enterprises Ltd. is testing interactive video games over cable. In this trial, consumers are allowed to play a large variety of video games for free. Sega plans to charge subscribers between US$ 18.80 and US$ 27.50 for unlimited monthly usage.

Fujitsu is currently running a test of VOD, interactive games and game shows, educational programs, karaoke and informational services in several cable systems in about 300 to 1,000 homes per system.

In Okizaki, IBM has hooked up four schools for interactive learning. Using personal computers to access the VOD system, students can watch a lecture and then participate in a question and answer system with a live teacher. IBM is eventually planning to connect 20 schools to the system.

Other large cable groups are currently building fiber cable systems capable of providing interactive services including VOD. These companies include: Titus (a joint venture between C. Itoh & Co., Itochu, Toshiba, Time Warner and US West International) and Jupiter (a joint venture between TCI and Sumitomo Corporation).

The Ministry of Posts and Telecommunications (MPT) is also actively promoting interactive TV research and development. Not only is it willing to provide low interest or zero-interest loans to those that are willing to invest in research and development of interactive TV systems, but they have also convinced NTT to take a lead in the country's fiber deployment plans.

Slide 20: ITV in Hong Kong

Hong Kong Telecom began testing VOD in September 1994. The test of 400 households just finished up this summer. The VOD test included movies, TV Favorites and children's programs and used ADSL modems over telephone lines.

Hong Kong Telecom plans to launch a full-scale VOD, home shopping and infomercials service by mid-1996 with other interactive services following in 1997 and 1998. The new service, called Interactive Multimedia or IMS, will eventually also include home banking, educational services, electronic yellow pages, TV-on-demand and network games.

Slide 21: ITV in Hong Kong (Contd.)

Recently, Wharf cable announced its own platform for interactive television dubbed "Cable-on-Demand." Starting November 1 of this year, they have begun providing "entertainment-on-demand" which includes movies and television programs, and news-on-demand in Cantonese which is produced in-house. Planned services to be launched next year include shopping and games on demand. Sega Communications will be the content provider for games on demand and various local retailers will provide content for the shopping on demand channel. Viewers in fiber optic upgraded areas are now also able to subscribe to HBO Asia on a monthly bases through set top converters. While many of Wharf Cable's subscribers are in still confined to using their telephones to order on-demand services since they are still not reached by fiber optic cables, Wharf Cable expects to complete their fiber optic upgrade from MMDS by the 1998 at which point they will reach over 1.5 million homes.

Slide 22: ITV in Singapore

In July this year, terrestrial broadcaster Television Corporation of Singapore launched an interactive system which allowed viewers to participate in certain

programs such as game shows, variety shows and current affairs programs, using their telephones.

Singapore Telecom is planning to launch a VOD trial in accordance with the IT2000 vision. Later this year they will begin the technical trial and the market trial will begin in the first quarter of 1996 and may last up to 18 months. Phase 1 of the test will include 20 in-house users, while Phase 2 will include 280 public users. Singapore Telecom's test will offer: (1) infotainment services (such as movies, music videos, sports, documentaries, children's entertainment and concerts), (2) news-on-demand, (3) learning and (4) home shopping. The trial's goal is to ensure continued communications infrastructure and interactive services to Singaporeans. Phase 1 of the trial will use ADSL modems while Phase 2 will use a fiber-coax network.

The country's sole cable company, Singapore Cable Vision is spending about US$ 360 million to ensure that all of Singapore's 780,000 households are connected to a fiber cable system with interactive services capability. 100,000 homes are expected to be passed by the end of this year and by the first quarter of 1998.

Slide 23: ITV plans in Australia

Telecom Australia launched a 300 home VOD test in Melbourne this October. Using ADSL technology and digitally compressed video, Telecom Australia is broadcasting 7 channels over telephone lines. VOD programming includes movies and special interest features.

Another company called In Touch TV (owned by Interactive Systems Inc.) has a interactive technology test underway on one TV network. Two other TV networks have agreed to participate and have obtained the necessary approvals for use of VEIL technology and the public switched telephone network and the final phase of securing funding is in progress.

Since the deregulation of the telecommunications industry in Australia in 1992, a number of competitors have been making plans to lay down wires of broadband fiber cable networks to deliver voice, data and video including video-on-demand. Among those companies are Foxtel (owned by News Corp. and Telstra) and OptusVision (owned by Optus Communications, Continental Cablevision and Kerry Packer Publishing).

Slide 24: ITV in Korea, Malaysia and China

Interactive services are currently being tested or plans in three other Asian countries.

In Korea, Korea Telecom is currently conducting an interactive trial in 85 homes offering karaoke, sports, children's programs and documentaries. The company plans to expand the test to the major metro areas of Korea.

In Malaysia, Telecom Malaysia recently approved a budget which could lead to a VOD test in about 50 homes. Telecom Malaysia is currently testing technical aspects of the system.

Recently, the Prime Minister of Malaysia made a proposal build a Multimedia Super Corridor which would be placed under the guidance of a Multimedia Development Corporation and under his own supervision. The objective of the MSC will be to increase awareness in such information technology as well as stimulate investment and advances in Malaysia's infrastructure.

Slide 25: Potential Interactive Services Subscribers over Fiber Cable/Fiber-Coax (by 2000)

My following discussion about potential interactive services subscribers is limited to interactive services available over a some type of fiber-optic, wired cable system. In looking at the potential interactive subscribers, we will need to first determine the number of households with potential to subscribe, in other words, the number of homes passed by a modern, fiber optic-coaxial cable system.

Total HH => TV HH => Fiber Cable Homes Passed => Potential ITV Subs

Slide 26: Homes Passed By Modern Fiber Cable System (by 2000)

Based on existing fiber cable infrastructures and likely roll-out plans in each Asia-Pacific country, MTA-EMCI estimates that about 34 million homes in the region will be passed by a modern fiber cable system by 2000.

Slide 27: Potential Interactive Services Customers over Fiber Cable/Fiber-Coax (by 2000)

The number of homes that will subscribe to interactive TV services will be a subset of :

1. The number of addressable homes, or those with enough disposable income to afford a monthly subscription fee of about US $25 to US $30; and

2. Those who are passed by a modern fiber cable system offering interactive services.

Market size of interactive services across the Asia-Pacific region as a whole really does not mean too much. Potential interactive multimedia customers are concentrated in several countries in the region, each country with different languages and unique cultural environments. Therefore, similar to the requirements of television programming, interactive multimedia services and content needs to be customized for each country individually.

Of the total potential market for interactive services by 2000, Japan represents half of the market, or about 16 million of the estimated 33 million potential customers.

Slide 28: Primary Customer Research Findings - Japan & Hong Kong

I would now like to share with you an overview of some primary consumer research findings that MTA-EMCI and other research companies have conducted in the past year involving interactive TV services. The research primarily focuses on Japan and Hong Kong, but I will make references to other Asia-Pacific countries as well.

In two studies conducted among upscale, affluent consumers in Japan and Hong Kong, respondents ranked five interactive services (shown on the slide) as to how interested they would be in receiving the service. In Japan, respondents included current compensation cable, satellite TV subscribers and non-pay TV subscribers in two markets:

(1) a Tokyo suburb and (2) a distant medium size town. In Hong Kong, the sample included both cable subscribers and nonsubscribers.

As in America, video-on-demand (or VOD) and near-video-on-demand (or NVOD), or movies repeating on staggered starting times on different channels, were most preferred over home banking and shopping, online/internet/informational access services, interactive video games and telecommuting.

Slide 29: Video-on-Demand

VOD is a service than enables the customer to watch any movie or show in the service provider's library, at any time, and instantaneously, with the push of a few buttons or by following on-screen commands. NVOD is a mode of VOD that allows access to these shows or movies only at times that may be a few minutes apart. This is sometimes referred to as staggercasting.

Consumers were interested in VOD for both recent and older movie releases as well as previously broadcast TV shows. In both Japan and Hong Kong, the

penetration of VCRs and laser disc players is quite high, and consumers rent videos often.

In Japan, for example, in 1992 there were approximately 9,300 video rental stores; and Japanese households rent an average of 14 videos a year, each costing from US$4 to US$6.

Respondents in Japan and Hong Kong complained about the inconvenience of renting videos, picking up and dropping off video rentals on time. Often selections were "out of stock," so VOD was viewed as giving flexibility to choose and watch videos at desired times.

High potential customers for VOD in the region include those that are dissatisfied with the variety of movies that are available on television. Many countries receive only old movies on television. Moreover, these movies are often less popular movies that are relatively inexpensive for broadcasters to acquire. Also, viewers that own electronics products inherently may have a higher degree of interest and affordability for VOD services. Those who rent videos often would benefit from the added convenience of not having to go to the video stores while the poor quality of video cassettes will become a thing of the past.

Numerous studies conducted in the US indicate that video-on-demand would be the initial key driver of interactive television services.

Slide 30: Home Banking and Shopping

Home banking or shopping allows customers to be able to take care of various banking or shopping related transactions remotely or from home with use of a TV or computer, and by following on-screen commands or with the push of a few buttons.

Among the countries surveyed, Japan and Hong Kong, home banking and shopping services had about half the level of interest as did video-on-demand.

The high potential users in the Asia-Pacific region for home banking and shopping services are likely to be those that will benefit from the convenience and the time saved by making these transactions from home rather than having to make the extra trip. While younger, well educated females are expected to have the highest interest for home shopping, leaving the traditional methods of shopping behind, and being comfortable with using the new technology, both men and women who are married and have children will see the benefit in being able to spend more time at home with the family and taking care of shopping or banking while with the family.

In countries like Japan, Hong Kong and Taiwan, where Shopping is dominant, and even a social activity, interactive home shopping services such as electronic store catalog ordering, would have more appeal than in countries like Australia. Consumers were also quite interested in using interactive TV shopping services to receive information about products (infomercials).

In Japan, home banking was especially attractive to those living in major cities and close-by city suburbs. Although the Japanese are already used to paying bills using automatic bank withdrawal, consumers were interested in interactive home banking because they would not have to wait in line at a bank machine each month to transfer funds to pay bills. Unlike many Americans, the Japanese seem to trust their banks or similar service providers.

Slide 31: Online/Internet/Informational Services

Online/internet and informational services are mostly available currently with the use of computers and modems. These services provide the customer with access to computer networks which contain informational, entertainment and transactions-based services. Online or internet services also provide the user with the ability to communicate with others on the internet or through electronic mail.

Consumers in the U.S. and Asia are just being introduced to such services mostly over computers. In the U.S., online services, such as America Online and Prodigy, and internet access are currently very popular and is being tested using high speed modems over cable television wires as well as telephone wires.

In our research, online/Internet access and informational services included services that had somewhat lower interest levels than home banking and shopping. In Japan and Hong Kong among upscale consumers, early adopter types were most interested in online and informational services. These were younger (mostly ages 20-30), college educated males. As in the US, current pay TV subscribers and the few home computer users were also most interested in these services.

Slide 32: Informational Services

Furthermore, when asked what types of interactive informational services were of interest, more than half were interested in travel and documentaries (including those on animals, nature, history, and war). Fewer were interested in interactive science, history, business, current affairs and news information.

Slide 33: Interactive Video Games

Interactive video games include all types of games from Sega and Nintendo to chess and Backgammon. Users can play against themselves or interactively, in real time, against other players across town or in other locations. Our research in Japan and Hong Kong shows that interest in interactive video games is mostly common among younger males.

Others who are high potential users of interactive video game services include those that already own video games, as this will provide video game owners with a

forum to compete with a large pool of players. The service also provides users with an opportunity to try out various games before buying the game as many video game software manufacturers have the capability to run live interactive promotions on such a service. Those that rent videos often or are subscribers of cable or satellite television will be interested in the service as it will provide them with a change from the regular television or movie programming, while being able to afford such services as well, albeit somewhat at the expense of video rental stores.

Slide 34: Telecommuting

Those most interested in telecommuting, or using a home computer hooked up to the work place to work from home, were living in areas where they had long daily commutes. In Japan, where people often commute up to two hours both ways, initial interest in telecommuting was high. However, several Japanese said that telecommuting would never be feasible for them as their company culture of daily contact with their co-workers was required and others had jobs which required in-person customer contact such as sales.

In Hong Kong and Singapore, interest in telecommuting was non existent. While in other countries like Japan and Australia, depending on a person's commute and type of job, interest in telecommuting would be higher.

Slide 35: Conclusions - Demand For ITV

As some of the consumer research findings indicate, specific interactive services appeal to different types of consumers. In certain countries like Japan and Hong Kong, demand does seem to justify investment if a provider can offer a package of local, custom tailored interactive services including VOD and others. In these countries, most consumers also have the disposable income to enable them to afford paying up to US $25 or US $30 per month.

In these two countries as well as in Australia, Taiwan and Singapore, the competitive multichannel TV and telephone environments may also warrant the investment in new, interactive services as a way to differentiate product offerings and provide additional value added services. As currently, in the US, video and telephony competition is accelerating the introduction of new services. In order to grow and thrive in increasingly competitive environments, cable television and telephone companies are developing and beginning to test new services.

Slide 36: Conclusions - Likely Asia-Pacific Countries to Invest in ITV

For the three reasons just discussed, demand seems to justify investment in interactive TV services in Japan, Hong Kong, Australia, Singapore, Korea and Taiwan

in the next five or so years. Over the next ten years, as sufficient disposable income increases among an emerging middle class, countries such as Thailand, Malaysia, and the Philippines would have good potential for interactive services. The remaining three, China, India, and Indonesia, do not look as good for development of interactive services at least over the next ten years.