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DIGITAL MARKETPLACE FOR GLOBAL MEDIA AND ENTERTAINMENT

Report by the iN2015 Digital Media and Entertainment Sub-Committee

Singapore: An Intelligent Nation, a Global City, powered by Infocomm

Contents

Preface

With the convergence of media, telecommunications and computing, the digital media and entertainment sector has undergone rapid changes in the last decade.

Digital media will pervade not only the entertainment industry, but also other sectors such as education, healthcare and lifestyle. With the technology advances of today, digital media and entertainment applications will be interactive and immersive. Barriers between the physical and the virtual will be indistinct. New opportunities and challenges will arise in the management of products and services, business processes and consumption patterns.

With a robust infrastructure, high-speed connectivity and a strong intellectual property rights regime, together with its strategic geographic location, Singapore is well-positioned to take advantage of the tremendous growth opportunities offered by the sector.

The government aims to develop Singapore into a global interactive and digital media capital, to help propel the country's economy forward and enhance the quality of life.

Supporting this national strategy, this report recommends some of the initiatives that the Republic will be undertaking to differentiate itself in this area. These proposals are expected to bridge what we have today with what we aim to achieve tomorrow.

This report is the collaborative effort of the iN2015 Digital Media and Entertainment Sub-Committee, which comprises captains of the international digital media and entertainment industry.

It provides insights and discusses how the industry, the public and the government can work together to transform the digital media industry in 2015. Needless to say, only active involvement from all three parties will lead to success. So, let's get engaged in realising the vision and creating this exciting future for Singapore!

Mr Frank Brown
Chairman
iN2015 Digital Media and Entertainment Sub-Committee

iN2015 Digital Media and Entertainment Sub-Committee

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Executive Summary

The media and entertainment industry is at the brink of a revolution as a result of infocomm technologies. This is transforming the production, processing and distribution of content and services.

In the process, it is opening up an era of new interactive and immersive possibilities, experiences and business opportunities that will radically change the world by 2015 when applied to key economic sectors.

Singapore's Strategic Response

To join in this revolution and embrace its possibilities, the Digital Media and Entertainment (DME) Sub-Committee recommends that Singapore establish itself as a DME capital offering innovative content, services and technologies to the world.

This can be achieved by focusing on two key strategic thrusts:

- Developing Singapore into a centre for the creation and commercialisation of DME technologies, and making available technologies and platforms for media and entertainment companies to create content and services.

- Developing Singapore as a global node that provides core services for storing, trading and distributing digital assets; and providing the infrastructure for the processing, management and delivery of DME content and services.

The Sub-Committee suggests two ways to realise this goal. One is to embark on a technology research and development programme, and the other is to set up a digital assets marketplace.

Technology Research and Development Programme

This will be vital in transforming Singapore into a centre for the creation and commercialisation of new DME technologies. It involves two lines of action:

- Establishing DME resource and technology centres. These will provide the platforms and technologies for the companies to tap into when creating DME content and services. They will offer the latest toolkits and engines, as well as training classes and a resource library to encourage more production of creative content in Singapore.

- Creating and commercialising DME technologies through private sector and government research and development activities locally and in the region. This is a long-term effort that is also part of the larger national agenda to make the interactive and digital media sector, now in its infancy, a valuable contributor to the economy.

Digital Assets Marketplace Programme

There is virtually no such marketplace in existence in the world today. However, Singapore already has many of the necessary requirements to establish one. Among other advantages, the Republic is geographically well situated, has strong intellectual property laws, good infocomm infrastructure and a reputation as a trusted hub.

The marketplace would be a one-stop, always-on meeting place for buyers and sellers to trade digital assets. It takes the IDA's current Digital Exchange for the processing, management and distribution of digital assets and content, to a higher and more sophisticated level.

To realise this plan, it will be necessary to:

- Make Singapore a **digital vault** – a leading Asian digital content bank for all major content owners, where they can store, trade and account for their digital assets and resources. To do this, the Republic will have to build digitisation and encoding capabilities as well as provide the physical capacity for storage that is secure, scaleable and customised.

- Make Singapore the **digital key** that manages the security functions that safeguard content and manage licensing rights. This will be done through providing security key management, licensing, intellectual property, rights and trading management services as well as acting as a clearing house for digital assets.

- Make Singapore the **digital courier** that offers secure distribution services to the players in the digital marketplace. Here, it will be necessary to create business networks for distributing digital assets in the region and beyond, develop integrated services for secured end-to-end delivery, as well as payment management and sales fulfilment of digital assets.

CHAPTER 1
DRIVERS, TRENDS AND IMPACT

Poised for exponential growth, and propelled by the arrival of infocomm technologies and the pervasive availability of high-speed networks, the digital media and entertainment (DME) sector is ushering in a global revolution in seemingly unrelated areas. This is because the convergence of content, interactivity and technology in the sector is changing how content is produced, processed, distributed and eventually consumed.

Drivers of Change

Three developments that are behind this are the widespread adoption of infocomm technology, the increased affordability and availability of infocomm infrastructure and platforms, and the greater advent of the consumer as a creator. All these have brought about major changes in the media and entertainment sector's output and processes, as well as consumer expectations and consumption habits.

For instance, in the analogue era, TV programmes could be viewed only on a television set. Now they can be repackaged on DVDs, watched on a computer and, more recently, purchased for viewing on an iPod media player.

Driver 1: Adoption of Infocomm Technology Across the DME Value Chain

The adoption of infocomm technology across the media and entertainment sector has resulted in the various trends as shown in Figure 1-1.
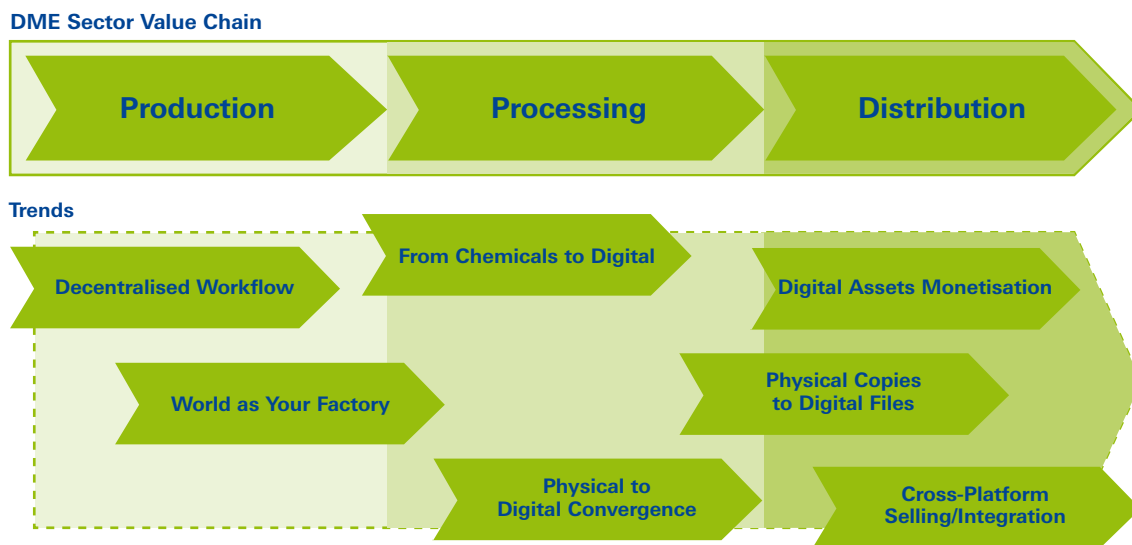
DME Sector Value Chain

Figure 1-1: DME Sector Value Chain and Trends

The widespread adoption of infocomm technology in the DME sector has increased efficiency in the workflow and resulted in cost savings across the sector. This, and the additional opportunities accorded by the convergence of infocomm and media technologies, have propelled companies in this sector to reinvent their products and services, and to collaborate as well as compete on a global scale.

These companies are actively turning to digital technology to differentiate their product and service offerings, and expand their customer base, particularly by delivering their services over broadband networks.

StarHub, for instance, which started off as a telecommunications company, subsequently provided cable TV services, and has moved into broadband Internet and digital telecasts. Search engine Google and Internet telephony service provider Skype have also branched out to video delivery services and telephony services respectively.

Driver 2:
Availability of Infocomm Infrastructure and Platforms

Investments in infocomm infrastructure and platforms during the 'dotcom' era have made infocomm products and services much more affordable to businesses and consumers today. The cost of bandwidth has come down tremendously due to over-investments in submarine cable capacity, creating a surplus in bandwidth supply today.

More advanced technologies invented during that period have also brought down the cost of software and hardware, including screens and storage devices. This has increased the availability and affordability of sophisticated infrastructure and platforms to businesses and consumers alike. As a result, the way we work, live, play and learn continues to evolve with the increasing bandwidth, smarter software applications and multi-functional devices as they become more available and affordable.

Driver 3:
Advent of Consumer as Creator

Where there used to be a clear delineation between those who produced content (e.g. TV shows, music and video games) and consumers, the lines are blurring. The barriers for indulging in content creation have been lowered together with the cost of digital equipment and recording or storage medium. It is now easier for consumers to create and publish their content without relying on traditional publishers. They may even make money from such efforts.

The awareness that anyone can be a creator is resulting in the emergence of new content, new business models and new players. This is especially evident in the online games space, where consumers are increasingly becoming co-creators of the online experience as part of the game design offering. It is also pushing media content companies to innovate rapidly.

Insight:

Towards 2015, cost equations and business dynamics in the sector will be very different from what they are now.
The costs of infocomm connectivity, hardware and software will continue to drop. This opens up opportunities not available before, especially for smaller companies and consumers.
It allows them to focus on niche markets, and sell content without relying on large intermediaries. However, the threat of piracy still looms at large given the high quality that digital copying makes possible. This, in turn leads to more opportunities in areas such as watermarking, digital security services, digital rights management and clearing house services.

Trends in Digital Media and Entertainment

Production

Production → Processing → Distribution

Trends in Digital Media and Entertainment

Decentralisation of Workflow: Increasingly, TV programmes and movies are being co-produced by different studios around the world to maximise their strengths in financial, technological and creative capabilities. For instance, while the blockbuster movie "Lord of the Rings" was shot in New Zealand, the day's filming was sent digitally to London for processing and returned to New Zealand overnight for the director's scrutiny.

Companies collaborate on co-productions for a variety of reasons. These include tax incentives, special capabilities of partners, as well as distribution of risks and high costs of production and development. As the entire workflow becomes decentralised, and demand from growing markets such as Eastern Europe and China increases, more companies around the world will want to collaborate.

The World as Your Factory: In the production world, content used to be produced at the same location and for a specific market. The advent of infocomm technology has allowed the production of content to be outsourced to countries with better capabilities or lower cost. It has also allowed all production activities to happen concurrently and be customised cost-effectively for multiple markets. Companies also find it worthwhile to produce content with a wider audience appeal for export to multiple markets.

As a result, media producers have shifted their customer focus from domestic markets to a larger international audience. With Asia being a fast-growing market for media and entertainment content, the large media conglomerates have realised that localisation of their content would help to further grow demand from such markets. Coupled with the decentralised workflow, more companies are relying on the worldwide resources as their factory. In particular, content localisation will become commonplace as companies seek to maximise the value of their intellectual property.

Insight:

Towards 2015, infocomm technologies will be increasingly used to facilitate collaborations among multiple partners. Singapore companies can take advantage of the country's multi-cultural background and understanding of the Asian market by offering their services as production partners and for localising projects. Singapore can also play the role of project manager for productions made across different locations and time zones. Technology innovators can focus on areas such as the development of toolkits and engines for developing applications, multi-lingual content-production support and "smart" agents for managing personalised media experiences.

Processing

From Chemicals to Digital: Where chemicals like silver halide and bromides are used to process and generate the various film-, tape- and paper-based entertainment products, digital technology increasingly centres around high-end computers, fast networks and large databases.

This has prompted media companies to identify new business opportunities in digitising and repackaging their archived analogue content for distribution over digital platforms.

Physical and Digital Convergence: Unlike content for analogue medium, digital content is fundamentally bits and bytes – encoded data which can be erased, recorded and copied repeatedly, with very minimal quality loss. Many media enterprises will eventually embrace the convergence of their traditional and new digital lines of business. In the process, they will need infocomm to help them carry out such activities as asset tagging, digitisation, localisation and content re-purposing.

Technology can also enable the companies to provide these services on demand. With greater consumer adoption of digital devices, cross-platform media will become commonplace. This also means adding interactive and rich media content.

Insight:

Towards 2015, digital-key management and media storage will increasingly be required by the sector. Companies will need trusted partners to manage the digital keys that unlock their digital assets, as well as storage and processing facilities to handle physical and digital convergence. As such assets proliferate, media standards and certification will be needed to ensure quality and inter-operability.

Distribution

Production | Processing | **Distribution**

Digital Assets Monetisation: In the traditional model of distribution, the commercial prospects of a production were restricted to the screening periods allocated for specific platforms – cinema, DVD/VCD/VOD purchase and rentals, paid and free-to-air broadcasts.

With intense competition tightening these various windows, content owners can turn to newly-available delivery platforms – among them video on demand over broadband PC, IPTV and 3G services – to expand their consumer base and increase revenue streams. These additional channels also provide consumers with more flexibility in accessing content.

Cross-platform Selling and Integration: Complementary content can now be offered through different platforms. Consumers are also asking for more interactivity and flexibility in how and when they can access content. Infocomm has allowed the payment systems for multi-platform distribution to be integrated, and the content to be encoded for distribution to different devices.

This means Hollywood film-makers, for instance, can move from ad-hoc tie-ups with video game producers to highly-structured movie-game integration. The Lord of the Rings, Star Wars Galaxies, Spiderman and King Kong are good examples of such tie-ups.

In the Hollywood blockbuster 'King Kong', Director Peter Jackson's cinematic release was accompanied with several games iterations of the same title. These games are also offered through different platforms such as a multi-platform console games on PC, PS2, Xbox, Xbox 360, a portable platform for the Sony PSP and Nintendo as well as a mobile platform.

Physical Copies to Digital Files: The accessibility and affordability of telecommunication networks are changing the way entertainment is being delivered and traditional notions of distribution, by reducing the roles of middlemen, physical spaces and channels.

For instance, a two-hour movie requires 18 hours to be couriered from the United States to Singapore on six huge film reels for each print[1]. But in digital format, the same movie can be couriered on one 3.5 inch hard drive for all digital screens. And it can be delivered in eight hours over satellite without the need for a physical copy. In time to come, the same digital movie file could be delivered over ultra high-speed international networks in 18 minutes!

The increased amount of digital products and consumer devices are also changing the way consumers receive and enjoy entertainment content. In fact, music content has gone from physical copies such as vinyl records to digital ones, like MP3 files. In between, there have been cassette tapes and CDs. The devices and software applications which play the music have also evolved. The latest is iTunes, a music player application and content library rolled into one[2], a development made possible by the digitisation of entertainment.

Insight:

Towards 2015, with different means to access content in the entertainment world, media companies will deliver services to their customers through a myriad of delivery channels. Content will not simply be sent from service providers to intermediaries and then users. Service providers will need to address issues such as secured and on-demand delivery. This includes the distribution of high-value products like digital cinema content, on-line games and other interactive entertainment services. Service providers will also use consumer networks to distribute their products in specialised communities as consumption patterns evolve.

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1   An island-wide release requires approximately 30 to 40 prints, i.e., 60 to 80 film reels in total
2   Launched by Apple Computer, iTunes is a proprietary digital media player application for playing and organising digital music and video files. It is also
     the interface to the iTunes Music Store for users to purchase digital music and movie files that can be played on iPods

Impact on Economy and Society

The media industry of today will be radically transformed over the next 10 years. The popularity of digital photography, iTunes, and Podcasts, has given but a taste of the diverse possibilities of digital media.

But the impact of this transformation goes beyond the digital media and entertainment sector as it fundamentally changes how, where and when information can be produced, processed and accessed in a number of sectors, from logistics to healthcare, banking to manufacturing.

Going to school in the future may mean logging on to a personalised and interactive environment to organise information, pick up assignments and undertake self-directed learning. Doing homework may entail collaborating with students from different cities on international projects and applying simulation in game-based learning.

In healthcare, interactive and digital media applications like mixed reality and digital imaging are already increasingly used for diagnostics, surgical training and more.

The pervasiveness of interactive and digital media will enhance the competitiveness of economic sectors as digital media becomes "embedded" in applications found within these sectors.

However, the simple digitisation process will offer only limited returns, such as improvements in document archival and storage. It is the effective combination of interactivity and digitisation that allows corporations to unlock new capabilities and transform business processes.

Concepts such as real-time reporting, remote collaboration and high-definition rich media will enable early adopters to harness new value propositions for themselves and their clients.

The Singapore government is taking a long-term view on this matter and has adopted a coordinated approach towards developing the interactive and digital media sector. The IDA is supporting the national interactive and digital media initiative led by the National Research Foundation through the iN2015 DME programmes.

The DME Sub-Committee concurs with this whole-of-government approach, and encourages the imagining of the world in 2015 through the eyes of consumers. The scenarios that follow offer a peek at what the next-generation DME world can offer and the technologies involved in realising this vision, come 2015.

Playing Games in 2015

Robert sits in front of DESTiny, the latest Digital Entertainment STation that has features including a high-definition television, a next-generation video-game console and online media hub. DESTiny's built-in camera senses his presence and quietly comes alive.

It has no keyboard or mouse. Using sensors that translate gestures into user input, Robert loads up Galacticos – a desert battle action game. Almost instantly, he is transported to the virtual environment. The vivid battle-torn terrain rolls out holographically in 3D below him, made possible by the auto-stereoscopic display technology.

The smart fabric in his clothes illuminates with information, and icons when touched initiate critical sequences within the game. When speech is necessary, voice recognition technology kicks in the second he utters a word.

In the game, Robert is one of the two wing commanders tasked to capture a strategic objective deep inside enemy territory. He orders his squad of wingmen with artificial intelligence to move forward and assume an on-guard position. The same artificial intelligence controls the behaviour and actions of 400,000 other independent entities in his game world. With an ultra-fast high speed broadband network, information and command data is real-time and immediate.

Just as Robert is getting ready to bark new orders, he hears a familiar voice – "Don't you leave me out of the fun!" He sees his fellow commander Andrew, who lives at the other end of Singapore, entering the fray with his wingmen. "About time!" says Robert, who has been monitoring the reports on the location of fellow soldiers.

He confirms the game plan with Andrew and both start giving joint-orders for their soldiers to move in. As they confer over their battle plan, the Automatic Story Generation application sets up new fight scenarios. The enemy, also with artificial intelligence adjusts its response based on their strategies and actions, as well as that of the thousands of other players who are sharing the same game world.

Ten minutes into the game, the pair is rapidly closing in on the enemy target. Just then, Robert receives an in-game video stream on his flight panel – it's his daughter using her mobile video phone. She chuckles as she sees her father's video stream mixed with his virtual world elements – his strike fighter plane, pilot helmet, and uniform.

Fortunately for Robert, the secure and universal identification system allows only his loved ones to see the mixed-reality world he is so fond of entering in his spare time. Reminded that he has to pick her up from school, he signs off reluctantly.

Watching Movies in 2015

It is crowded at the digiplex after work. Ben is aware of the situation as he was alerted through his Personal Digital Bot. It is the opening night for "Hyperspace III" a 4D interactive movie. The production is being screened in character-based versions depicted through the eyes of six main characters. The interactions amongst these protagonists are aggregated by any inputs the audience wants to add.

At the entrance, Ben's booking is confirmed via the digiplex's wireless sensor network with his biometric strip, and the gantry gives the all-clear to proceed. He steps forward and picks up a Head Mounted Display (HMD) unit and the digiplex's custom-input device from the dispenser. Once inside the hall, he sits in his "smart" seat which provides motion and scent effects in accordance with the movie producer's wishes.

The movie is about to begin. Ben puts on his HMD unit and selects his preferred character to influence today – Nadya – a supporting actress in the movie. On his custom-input device, he checks the defaults and enters a few preferences on character attributes, setting, frame recall and such. He notices most of the patrons in his row doing the same. Some patrons, though, prefer to watch the story unfold without interfering with it.

Ben smiles. He would be doing that tomorrow – watching the producer's cut of "Hyperspace III" on-line from home…

Nadya appears on screen and Ben, using his HMD unit, establishes contact with the character. As the story moves along, he notes similarities with his own life and it endears the Nadya character to him. He has forgotten she is a reflection of himself as he is influencing her decisions in the movie.

During the course of the movie, he notes Nadya's cardigan and sneakers. Using the custom-input device, he highlights both items on its small display screen. An interactive advertisement appears and he chooses the size and colour he wants of the products. He orders the cardigan for his wife and the sneakers for his daughter. They will be ready for pick-up on his way home.

A few minutes later, he is taken with the production's background music. Pressing a button, Ben downloads the track to his media player for a small fee. As he leaves the hall later, he grins. It has been a good evening.

Schooling in 2015

"Dad, I love these quizzes!" exclaimed Geri to her father who was driving her to school. Geri is an 11-year-old student who enjoys her interactive lessons on history and society as much as her math. Through the telematics-enabled dashboard unit in the car, she was playing 'The Adventures of Little Einstein' – an online educational game for Primary 6 students which covers both her math and science curriculum. It features an advanced verbally cognitive agent that takes on the role of a teacher to guide students through quizzes and problem-solving.

She logs into the REAL System (REmote Access and Learning System) to review her lesson schedule for the day. Through the in-house entertainment system, REAL allows students to enter into their respective institution's central servers that store all data on personal profiles, individual lessons, progress reports, sports interests and other activity charts. A list of activities comes on Geri's touch-sensitive colour display, powered by the dedicated automotive OS and connected to its wireless modem and GPS unit.

In school, Geri calls out the tasks for her first lesson, pre-determined by her teacher. As part of her language immersion, she has to discuss culture with a student overseas, using the collaborative learning mode. As Geri is learning Japanese, she is matched with Sayaka who shares her interest in history among other things. As they communicate, Geri finds some Japanese words difficult to understand. Using facial recognition technology, her computer detects these words and repeats them with an English translation to help in her dialogue. At the same time, Geri learns how people really live in Japan through 'World Cultures', a life simulation application.

Meanwhile, her mother chats online with the teacher to find out Geri's progress. She switches to multi-screen mode to see Geri's reports as they talk. The teacher tells her that Geri's vocabulary can be better and suggests sending some discovery-based word games to her REAL system. Her mother thanks the teacher and logs out.

In the meantime, Geri offers to show her Japanese friend the video report she did of her visit to the Singapore History Museum the day before. At the virtual museum, enabled by the seamless network in existence which allows touch and sound, Geri gets to see, touch and feel the exhibits using her haptic gloves and head mounted display unit.

More interestingly, her multi-purpose mixed-reality communicator enables semantic data to be decoded into audio-visual elements. It allows the image to be projected in a mixed-reality environment. With this set-up, Geri had a one-on-one dialogue on independence with Singapore's first president!

But soon, it's time for her next lesson.

CHAPTER 2
OVERVIEW OF DIGITAL MEDIA AND ENTERTAINMENT INDUSTRY

Market Size

In 2005, the size of the global media and entertainment market based on market spending was estimated to be US$1.34 trillion. It is estimated that this will rise to US$1.78 trillion by 2009, at the Compound Annual Growth Rate (CAGR) of 7.3 per cent.

The Asia-Pacific market that year is estimated at US$276 billion, and expected to increase to US$431 billion in 2009, with a CAGR of 11.6 per cent. This makes Asia-Pacific the highest potential growth market in the world.

Market Size (Industry Spending)
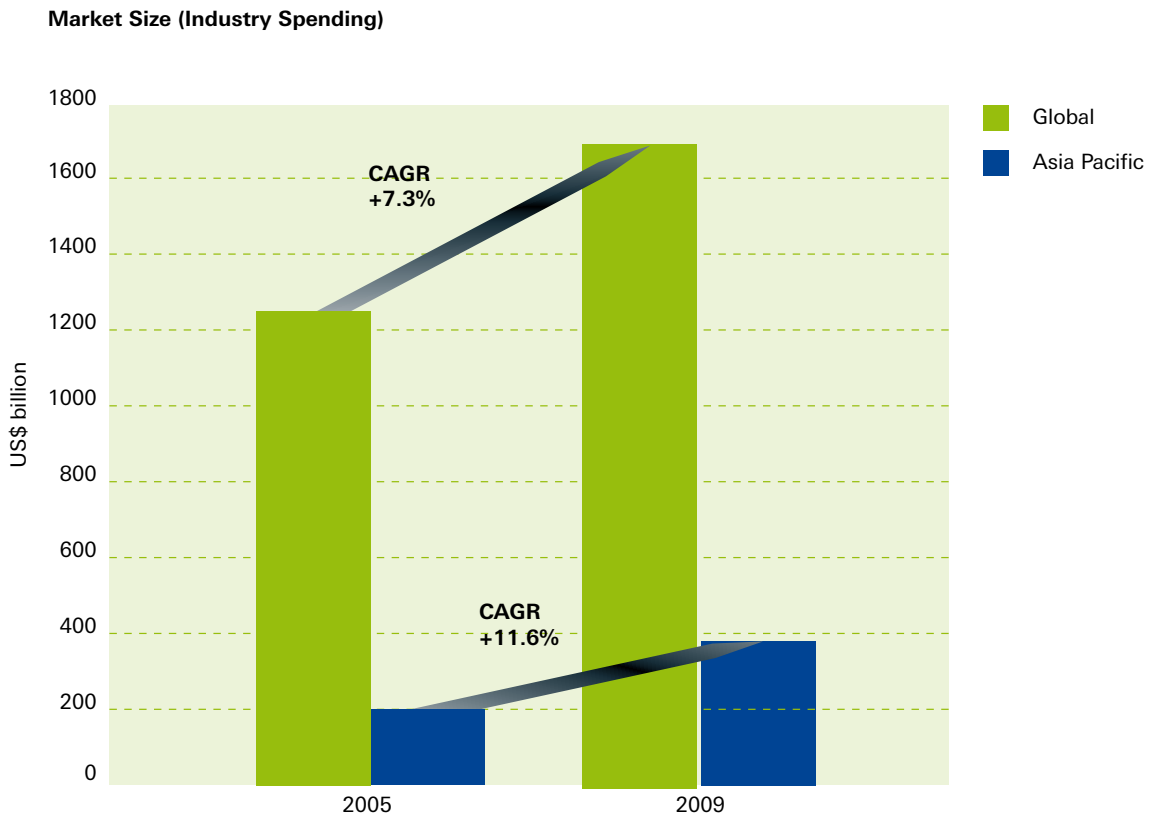
Figure 2-1: Media and Entertainment Market Size

Information Source: PricewaterhouseCoopers LLP, Wilkofsky Gruen Associates in PricewaterhouseCoopers LLP (PwC), June 2005. Global Entertainment and Media Outlook: 2005-2009. New York: PwC

Accountancy giant PricewaterhouseCoopers forecasts that the market's growth in the region will continue to come from new digital revenue streams enabled by broadband technology and networks. These include online and wireless video games, online film rental subscriptions, licensed digital music distribution, music downloads to mobile phones, video-on-demand and electronic books.

Current Landscape

The media and entertainment scene in Singapore is a lively one. It is vibrant with activities in broadcasting, publishing, TV production, film and video, animation, online and mobile content, and services.

The industry's GDP contribution[3] in the year ending March 2005 was 1.7 per cent. The previous year it was 1.56 per cent. Under its Media 21 blueprint to develop Singapore into a global media city, the Media Development Authority has set a goal of a 3 per cent contribution from the sector to the GDP by 2012.

The increase is expected to come from the digital aspect of the media and entertainment industry in Singapore. This nascent sector is growing and effects are already being seen:

- In buses, commuters are entertained by TV programmes from MediaCorp. This is made possible by Digital Video Broadcasting. The service is also available to private car owners.

- In cinemas, audiences are entertained with clearer pictures and sharper sound when watching a digital movie than they would get with an analogue film. To receive a secure digital version of a movie, cinema operators have to install high-end digital projectors, content servers, and change their back-end support and infrastructure to manage secured digital transmission of the movies from abroad.

- In schools, more interactive digital content is being used to help students learn. Infocomm technologies have made it possible for students to also communicate and collaborate with each other on projects. Players in the publishing industry here are exploring the use of interactive and digital media technologies to provide digital text books for the school's curriculum and co-curriculum studies and activities.

- In entertainment, multi-player online and mobile games with interactive environments have taken off.

National Programmes

The government is well aware of the phenomenal impact interactive and digital media will have in the next 10 years, and how it can become a key enabler to support many economic sectors. In January 2006, this sector was selected as one of the three[4] key potential growth areas here. The plan is to build Singapore into a global capital in interactive and digital media, to propel the economy forward and enhance the quality of life.

Research and development in interactive and digital media is seen as vital to the sector's development. A national steering committee and an executive committee have also been formed under the National Research Foundation, to drive the national agenda for R&D in this area.

As the lead agency for infocomm technology, the IDA will play a major role in this area. Its next-generation National Infocomm Infrastructure will be critical in supporting the sector. This infrastructure, which will comprise an ultra high speed fixed broadband network and a pervasive wireless broadband network, will provide cost-effective connectivity for the fast-evolving sector.

The IDA will also put in place soft infrastructure to make it more conducive for service providers to offer next-generation services that are innovative and convenient for businesses and consumers. This will comprise national enabling platforms, policies and standards, among them national payment and privacy platforms.

At the same time, government agencies like the Agency for Science Technology and Research (A*STAR), Media Development Authority and the IDA are working together to create a flagship focal point for interactive digital media here.

Fusionopolis@one-north will be the industry's physical hub here. Companies from all levels and areas will be housed in this 12,000 sqm centre. It aims to foster innovation, experimentation and collaboration in the infocomm and media arena, as well as to incubate and provide test-bed facilities for next-generation applications.

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3   Media Development Authority of Singapore, Annual Report 2004/2005
4   The other two are life sciences and environment technologies

The iN2015 plan for DME will build on several programmes announced by government agencies over the last few years. Among them are the recommendations from the Economic Review Committee made in September 2002 to:

- Foster innovation and experimentation by establishing creative clusters that focus on researching and understanding the impact of new infocomm technologies on the way people live, work, learn and play.

- Position Singapore as a Digital Living Lab to create, test, and deploy world-class innovative solutions.

- Position Singapore as a Global Media City with a thriving media ecosystem and strong international extensions.

The plan will also support the initiatives and efforts outlined by the Media Development Authority of Singapore in the Media 21 blueprint to establish Singapore as a global media city, and the Economic Development Board's 2018 plan to make the island a digital media capital.

It will continue to build on efforts made by the IDA through the Digital Exchange strategy suggested in its 'Connected Singapore' blueprint in 2003. This is to develop the Republic as a leading hub for the processing, management and distribution of digital assets and content, particularly in digital cinema, online games and animation.

In doing so, Singapore will join the United States, Australia and South Korea which all have national initiatives to develop their own digital media industry. An overview of their plans can be found in Annex A.

CHAPTER 3
GOALS AND STRATEGIES

In view of the rapid changes in the digital media and entertainment sector, Singapore's response needs to be comprehensive. The country has to address the gaps across the entire digital media and entertainment value chain, as well as look ahead to seize the opportunities that interactive and digital technologies might create.

The Sub-Committee believes that as the lead agency on the exploitation of infocomm technologies, the IDA is well positioned to:

Establish Singapore as a digital media and entertainment capital offering innovative content, services and technologies to the world.

Goal	Establish Singapore as a Digital Media and Entertainment (DME) Capital offering innovative content, services and technologies to the world	
Strategic Thrusts	Develop Singapore as a centre of creation and commercialisation	Develop Singapore as a global node to provide core services and infrastructure for the DME sector
Strategies	• Make available technologies and platforms for DME companies to create content and services • Catalyse the creation and commercialisation of DME technologies	• Establish a one-stop secured marketplace to store, trade and distribute digital assets • Build world-class capabilities and infrastructure in processing, management and delivery of DME content and services

The Sub-Committee recommends two broad strategic thrusts and key programmes:

• Develop Singapore as a centre of creation and commercialisation through a technology research and development programme.

• Develop Singapore as a global node to provide core services and infrastructure for the sector through a digital assets marketplace programme.

Figure 3-1 shows how the two key programmes can transform Singapore into a global digital media and entertainment capital.
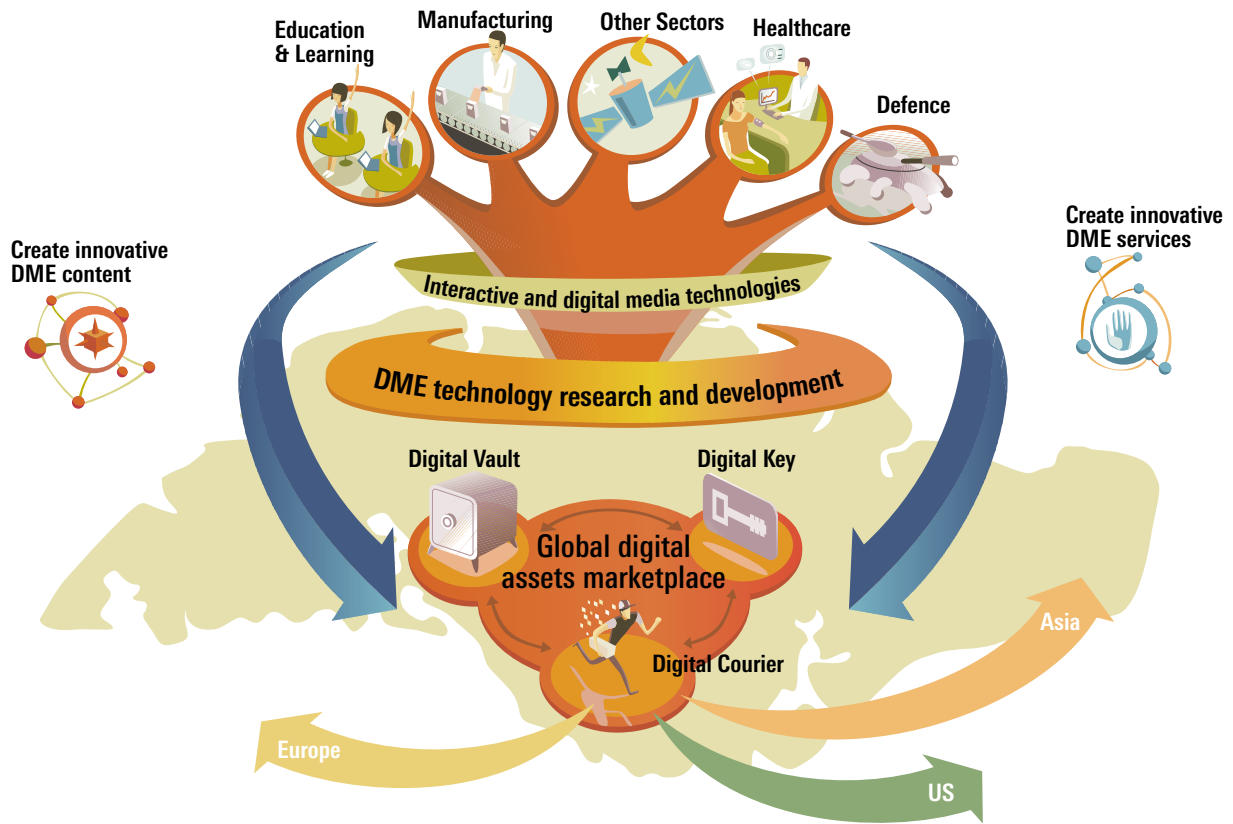
Figure 3-1: Key Programmes of iN2015 DME

In executing the strategies and programmes, the Sub-Committee recommends that the IDA take the lead as:

- **Master Planner:** To design and conduct the national programmes that will ensure key DME functions, innovative technologies and enabling infrastructure are developed and anchored in Singapore,

- **Facilitator:** To engage leading companies, including content owners, publishers, service providers and research institutes, in working together for long-term DME business viability in and through Singapore, and

- **Catalyst:** To initiate and drive business transformation through flagship projects and iconic deployments that would fuel long-term change within and beyond the sector.

Strategic Thrust 1:

Develop Singapore as a Centre of Creation and Commercialisation

With Singapore's intent to focus on R&D in the interactive and digital media sector, the Sub-Committee envisages that a variety of new technologies, platforms and toolkits will emerge. The group believes that the Republic should encourage DME companies here and in the region to jointly use these to create new content and services for this and other economic sectors.

Programme: DME-Technology Research and Development

Production → **Processing** → **Distribution**

DME-Technology Research and Development Programme Focus

Transform Production – One Production, Many Experiences
The aim here is to create new DME technologies, content and services.

The programme adopts a 2-pronged approach:

• DME Technology and Resource Centres. These centres will be set up to provide DME firms with technology tools, resources and training.

• DME Technology Creation and Commercialisation. This sub-programme is to develop new digital media technologies to create the industry's next generation of content and services.

DME Technology and Resource Centres

Today, world-class digital content is produced using cutting-edge software applications, toolkits and engines. This is especially the case in the games and animation sub-sectors where the latest graphics engines and motion-capture technologies are employed to produce engaging and realistic characters, backdrops and story lines.

These technologies are usually out of the reach of individual DME companies because of their high cost. To develop Singapore as a centre of creation and commercialisation, technology and resource centres will be set up to aggregate the demand of DME companies and provide them with access to these technologies, the latest hardware, software and platforms, so as to create next-generation content and services. In addition, they will also provide a digital media library and editing suites, training in technology and master classes.

With these tools made available, DME companies will have the wherewithal to create new forms of content that will have enhanced human-to-computer interactions, and high-definition graphics and create new services, which are highly personalised to meet individual lifestyles.

The problem to access these cutting edge technologies are most imminently felt by the small and medium-size game development and animation studios. Therefore, the Sub-Committee recommends that Singapore concentrate on the games and animation clusters for a start and branch out subsequently to other digital media such as special effects.

In the near-term, the group expects the centre to play the role of a "Technology Well", to which local and regional DME companies will come to draw technology and resources. In the medium term, the Sub-Committee anticipates that these centres will become places where a confluence of interests and talents across the spectrum of digital and interactive formats converge to explore, collaborate and innovate.

By 2015, these centres should be locations where people throughout the region come to explore ideas, collaborate on them and come up with new products, services and technologies.

Video games industry will require proven engines, middleware and toolkits

In the video games industry, one major trend is that many studios now use proven engines, middleware, and toolkits to develop their next engines, middleware and toolkits.

Technology-savvy companies are taking advantage of this by specialising in the production of these tools. For instance, game development company Epic Game's 3D engine, a first-person-shooter released in 1998, was so successful that its core technology became one of the industry's top three 3D game engines.

Over 60 titles have been brought to the market using the Unreal 2 engine. The upcoming Unreal 3 engine has been officially adopted as the middleware layer in next-generation consoles, such as Xbox 360 and Playstation 3. The Unreal technology has transformed Epic Games from a company which developed games to one that develops game technology.

Besides 3D graphics, technology tools specialising in other aspects of video games are also emerging. Among them are realistic physics engines developed by games engine companies like Ageia and Havok, massive-multiplayer online game platforms from BigWorld, a provider of games middleware platforms, and cross-platform development frameworks such as Microsoft's XNA.

DME Technology Creation and Commercialisation

While the US and Japan will continue to influence global directions and developments in the industry, Singapore's work has also been internationally recognised in areas such as modelling/simulation, media processing, security and mixed reality.

For instance, the Institute for Infocomm Research has produced Advanced Audio Zip, an audio coding technology, a more superior compression technology that is lossless. Muvee, a technology start-up, has successfully developed a product called autoProducer that performs automatic video editing. This product allows anyone to automatically turn home videos and still photos into professional-quality video productions in hundreds of styles. Best of all, users of the product do not need prior experience in video editing and each production is created in seconds.

This sub-programme will depend on Singapore's R&D community to create new technologies for the industry and help bring them to the market. Here, collaboration between the R&D community and media companies is essential in order for the new products to be tried out and eventually used widely.

Under this sub-programme, areas for the creation of new "Made-by-Singapore" technologies will be identified for research and development and funds will be provided to help market them. The Sub-Committee recommends that the IDA works with A*STAR and other research institutions on this.

High on the list of technologies for research and development are: human-computer interaction, sensor technologies, ubiquitous network connectivity, and media management.

New technologies that are commercially ready will be introduced to content creation companies by the technology and resource centres. They will also be made available to other economic sectors beyond DME to create new applications and services.

Strategic Thrust 2:

Develop Singapore as a Global Node to Provide Core Services and Infrastructure for the DME Sector

The Digital Asset Marketplace (DAM) Programme

Today, there are few places where digital content trading can take place seamlessly. Generally, sellers and buyers strike deals at face-to-face meetings and during trade shows for such business. With the increasing adoption of digital technology and efficiency in cross-border trade, Singapore can take the opportunity to establish a Digital Assets Marketplace here.

Analogous to a financial stock exchange, this will be a one-stop trusted trading centre for businesses and consumers to buy and sell digital assets. Together with this will be the offering of services such as aggregation, rights management, storing and distribution of assets.

There is currently no such proven marketplace in the world, though several Asian countries and cities have made bids to be the "Digital Content Capital" or "Digital Media City". Singapore has many factors to its advantage to be such a marketplace. It has the trust factor, strategic geographic location, established financial trading status and a strong IP rights protection regime.

In addition, it has a sophisticated technology infrastructure, extensive connections to the region, and people with strong project management and systems integration skills.

To establish the marketplace, the Sub-Committee recommends Singapore to focus on transforming the processing and distribution of content. It will need:

- **Digital Vault** for major content owners to store, trade and account for their digital assets and resources.

- **Digital Key** for the management of security functions to safeguard content, and to manage licensing and rights.

- **Digital Courier** for end-to-end delivery, payment management and sales fulfilment of digital assets.

The DAM programme will also include the continuation of Digital Exchange's efforts to develop Singapore as a Games Exchange, and Trusted Digital Cinema Hub.

| Production | Processing | Distribution |

Digital Assets Marketplace Programme Focus

Transform Processing – One Master, Many Platforms

In the processing component of the DME value chain, media enterprises are integrating digital business lines into their workflow. Where different content masters had to be generated for different mediums, now only one digital master is needed to cater to all these platforms.

Infocomm technology will feature prominently in digital processing and it has simplified things. This includes the creation of the content master and its conversion to various digital formats. These are strategic opportunities that Singapore can seize to add to its planned role in managing and tagging digital assets. These would allow content owners to track, store and retrieve their digital assets on demand without the complexity of monitoring many different digital masters for various platforms.

The central piece of the marketplace ecosystem and a key component of the DAM programme is the **Digital Vault**. This component will address content owners' needs for digitisation, encoding and storage of their content and resources by:

- **Building Digitisation and Encoding Capabilities.** As the switch to digital is in its early stages, there exists an immediate window of opportunity to provide the processing service to convert and encode existing content into the digital format. To seize this chance, government agencies and industry players can work together to identify and plug the current gaps in the local processing industry in terms of equipment, infrastructure and skills. One of them is for the firms to add on the capability to encode the content master for the different digital platforms. Investments in capital equipment, such as telecine machines and encoders, infrastructure in the form of a dedicated high-speed network linking processing facilities and content owners, and manpower training can be made.

- **Growing Storage Capacity and Sophistication.** The capacity for storage is a must for the marketplace to function. What would make Singapore even more attractive in this area would be the provision of scaleable, customised storage services and a compliance with strict security criteria. The government can work with leading service providers, including

data centres and teleports to create storage capacity here that can meet the current and future needs of content owners. The government and service providers can also work together to engage content owners on a regular basis so as to understand their needs better. This will help the providers develop more sophisticated storage services, business and operations models.

The second component of the DAM programme is **Digital Key**. This is to address the content owners' needs for safeguarding and trading their content, as well as managing licensing and rights. To do this, Singapore will need to:

- **Provide Services in Security, Certification and Trading.** To content owners, an ideal marketplace must be able to represent and protect their rights before they can trade their content. As such, there must be companies to provide these services. This can include security key management, a clearing house for digital assets, licensing, intellectual property and rights management, and trading management. Such depth in the marketplace can be built by working with key players and research bodies. Certification capabilities will also be useful to establish Singapore as an authority in the various areas of the sector such as digital cinema and Internet Protocol TV. The Sub-Committee proposed that the government work jointly with the industry to develop these capabilities.

Transform Distribution: One Copy, Many Screens

Production → Processing → **Distribution**

In the delivery aspect of the industry, service providers need to offer secure delivery and on-demand connectivity. Where individual copies of content used to be produced and delivered in the form they would be used, such as newspapers and CDs, or to a specific venue like a cinema hall, more and more content is produced in multiple formats for multiple locations, such as cinema screens, TV screens, computer screens and mobile screens. This creates opportunities for entertainment companies to connect to their customers through a variety of ways.

Content owners around the world are also seeking new ways to earn revenue from their digital assets through reaching new platforms. The advent of new content delivery platforms like Video On Demand on Broadband PC, IPTV, 3G and Digital Cinema, give rise to new channels for content owners and, hence, new markets. A larger opportunity is thus present in the distribution of digital content over multiple platforms, to allow material to travel to the many screens.
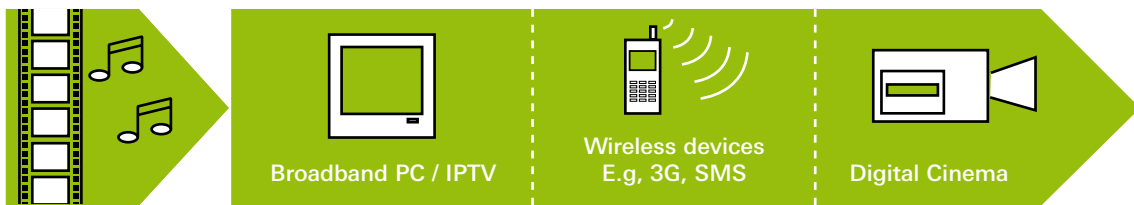

Broadband PC / IPTV | Wireless devices E.g, 3G, SMS | Digital Cinema

Figure 3-2: One Master, Many Platforms

The marketplace programme's third component, the **Digital Courier**, is a result of this need. Secure and robust distribution service offerings can be added by:

- **Creating Business Networks.** Through Singapore companies' business networks, distribution points for content and services can be established in regional markets. Government agencies like the IDA can help Singapore-based companies establish business network distribution points in regional markets through the creation of business alliances, such as the 25-member Games Exchange Alliance[5] set up to help game companies cross last-mile hurdles to get titles to Asian gamers.

- **Providing Integrated Services.** Government agencies like the IDA and service providers will need to continue working on the provision of integrated services like end-to-end delivery, payment management and sales fulfilment of digital assets. This could entail increased collaboration among service providers and content owners. For example, telecommunication operators, e-payment service providers and end-device providers can work closely with media companies to realise a secure, seamless and immediate system for consumers to access and pay for content and services across different devices. Service providers can also work on providing local and international bandwidth to meet the sporadic and ultra high-speed bandwidth needs of the industry.

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5   Games Exchange Alliance – An initiative of IDA, the GXA is a business alliance of 25 member companies that help game companies cross last-mile commercialisation hurdles to place titles into the hands of Asian gamers. Each member provides their respective strengths in distribution, hosting, localisation, billing, and marketing to shorten the time-to-market for game companies.

Continuation of Digital Exchange Efforts

Through the IDA's Digital Exchange, Singapore has taken initial steps to expand its international trading role from being a hub for physical goods to an international exchange for digital assets.

The Sub-Committee recommends for the IDA to build on successes it has seen in the last three years, and continue to develop Singapore as a games exchange and trusted digital cinema hub. These important sectors serve to rally key players in the industry, as well as to focus on mindshare, policy and development needs. Developing these areas well will serve to demonstrate DME companies' ability to manage a wider spectrum of activities and services:

- **Games Exchange:** As established global publishers enter the rapidly emerging Asia-Pacific market, existing hurdles like the fragmented market access and lack of a common e-payment system will continue to hinder their efforts. Their preference for online and mobile distribution, as compared to traditional "box-retail", will mean that they will need to gear up or establish partnerships with new online publishing capabilities, localisation resources, and cross-platform content. The IDA should continue to help publishers address these new challenges by broadening their deployment capabilities and developing new market access through cluster-led collaborations like the Games Exchange Alliance.

- **Trusted Digital Cinema Hub:** Leading content markets like the US, China and India are already gearing up aggressively for the digital transition. To leverage on this major digital move, companies which want to play major roles in distributing digital cinema content will have to develop

a full suite of digital services, such as encoding, localisation, key management and more. It is likely that only a handful of such management and distribution hubs will be needed around the world for regional distribution. As such, doing this successfully presents tremendous growth opportunities. The IDA should continue to attract these companies to Singapore, and develop local capabilities to process, manage and distribute highly-valuable digital content. It should also work with the industry and put in place supporting infrastructure, such as processing facilities, network operation centres and data centres.

Critical Success Factors

The Sub-Committee recommends government agencies to work together closely to develop the DME sector so it can realise the larger national efforts of Media 21 and the National Research Foundation. It suggests the agencies do this by providing a comprehensive response to the challenges and opportunities that digital media and entertainment brings. There should be special focus on the following factors.

Manpower and Education

Manpower is vital for both the interactive and digital media and digital media and entertainment clusters. The Sub-Committee believes that Singapore's creative talents need to be attracted to the industry and groomed to complement the country's strong technical work force. The creation, exploitation and distribution of intellectual property require a strong grasp of both creative and technical skills. As such, the Sub-Committee suggests that Singapore:

- **Start them Young**
  This should begin as early as in kindergarten, as early exposure to digital media can spark a youngster's interest and take root. To ensure a steady flow of high calibre talent to the digital media sector, the government can initiate roadshows, career talks and scholarships in partnership with industry players for promising students.

- **Go Deep and Upgrade Constantly**
  The presence of R&D specialists will be a competitive advantage for Singapore. One way to produce such people would be to strengthen the graduate scholarship programmes aimed at developing a strong and broad base of local R&D talent. Content developers require constant upgrading and profiling of their skills. Therefore, periodic reviews by the industry and education institutions on ways to raise skills and a DME qualification framework are essential.

- **Attract Ready Talent**
  To get ahead quickly in this young industry, the government can work to attract ready foreign talent with in-depth expertise, business knowledge and international market access. A strong push for such top-notch people would also provide international perspective for the industry.

Research and Development
The Sub-Committee fully supports the National Research Foundation's emphasis on R&D in interactive and digital media. The success of such efforts will hinge on how effectively Singapore can bring together the diverse disciplines and foster innovations that cut across disciplinary, sectoral and institutional boundaries. Some approaches are:

- **Strengthening Collaborative R&D**
  One method of strengthening collaborative R&D in the public and private sectors is through a scenario-driven funding mechanism. This would entail identifying key areas with the greatest economic potential and impact for Singapore, and exploring alternative possibilities, to focus R&D efforts in Singapore.

- **Strengthening International R&D Links**
  These tie-ups are important as they can grow into partnerships that allow local companies to tap into cutting-edge and complementary research being done elsewhere in the world. Singapore's strength in a coordinated multi-agency approach will be useful in attracting overseas corporate research labs to set up here for focused research.

- **Attract Top Researchers**
  To attract internationally-renowned scientists to jumpstart new research capabilities here, the government can consider establishing fellowships, residencies and exchange programmes for them. These researchers would also serve as magnets for the most promising local and international students.

Finance and Legal Structures

A media capital can only be as successful as its finance and legal structures. The Sub-Committee acknowledges that Singapore's robust financial and strict IP regimes will put the country in good stead for a strong start. But it believes more needs to be done to ensure that the deals and investments continue to flow through the Republic, and for new content and technology to be commercialised here. To this end, the Sub-Committee suggests having:

- **A Mechanism to Attract Deals**
  While the various areas of the digital media sector will each have its own requirements, a mechanism to attract deals, talent, funds and projects through a basket of financing options is needed. For a start, venture funds and angel financing can be added to the current suite of government grants, funding programmes and tax incentives.

- **Regular Review of the Legal Regime**
  Concerted efforts by various agencies to address issues such as broadcasting and telecommunication regulation frameworks, the interpretation of intellectual property laws, data privacy and protection laws, and licensing inhibitors will help to ensure that Singapore's legal regime remain current and relevant. This will also serve to accelerate the commercialisation of new contents, services and technologies created through R&D, hence reinforcing Singapore's position as a global digital media test-bed.

- **Market Access**
  Generating international market access is important as it allows Singapore-based companies to access other markets for digital trade and settlement. The Sub-Committee recommends the IDA help Singapore-based companies establish peer nodes in regional cities through business alliances with their affiliated partners in these places. These companies can either create the alliances or lead them.

CHAPTER 4
CONCLUSION

For Singapore's digital media and entertainment sector to be transformed, government agencies, local players and the people sector must foster and embrace the possibilities. With a strong resolve in fulfilling the compelling vision for iN2015, the close partnership among the private, public and people sectors is a strong formula for success.

The growth of the DME sector is intertwined with the infocomm industry. Technology companies, telecommunication operators, digital intermediaries and e-payment providers are partners in the rise of the digital media sector. Online and mobile technologies are revolutionising how users communicate, consume and co-create content.

Similarly, on-demand computing power will become increasingly important to support intensive realism in areas such as games and animation.

This surge in DME possibilities means that content owners will increasingly become more concerned about protecting their intellectual property because of its value. In areas such as digital cinema, security considerations for storage and access distribution require specialised manpower to manage the entire process.

Digital media and the way entertainment services will be consumed will be radically different over the next 10 years. At the same time, the global adoption of new DME products and services will introduce new challenges for businesses.

Building on existing capabilities and continually innovating, Singapore can become a digital maketplace for the global media and entertainment industry where businesses can congregate, create and trade digital assets. The Republic also has the potential to become a global focal point and a centre for the regional and international distribution of digital content.

With the government's commitment towards research and development, and the capacity for the island to be a leading access point for next-generation digital media and entertainment services, Singapore is well placed to be a digital media magnet and super node.

Backed by a conducive business environment supported by world-class manpower and infrastructure, Singapore can indeed become the heartbeat of digital action across the globe.

With the iN2015's vision integrated with the whole of the government's push for leadership in the areas of interactive and digital media, jointly championed by Singapore's companies and people, not only can we imagine our world in 2015 – we can make IT happen!

Annex A: Digital Media Sector In Other Countries

Digital media is also viewed as a fast growing industry in several countries. Here is what three countries are doing to help their sector:

- **Australia:** To better manage regulatory issues that have risen from the convergence in the broadcasting, radio and telecommunications sectors, and to facilitate the innovation and introduction of new services, the Australian Communications and Media Authority was formed on 1 July 2005 through the merger of the Australian Communications Authority and Australian Broadcasting Authority. The agency seeks to support the growth of major, globally-competitive Australian industries producing digital content and applications. The country released its Digital Content Industry Action Agenda in November 2005. Here, it points out that its focus will be on investment and investment frameworks; exports; skills and training; R&D; and intellectual property, statistics and standards.

- **South Korea:** The country aims to be the world leader in online games and mobile content by 2007. Digital broadcasting and digital content development are highlighted in IT839 Strategy, the government's plan to develop the infocomm industry. The Korean government is carrying out a wide range of activities for the digital sector. They include selecting standards and expanding coverage to support Digital Multimedia Broadcasting; establishing a nationwide network by end-2005 for Terrestrial Digital TV; and developing a terrestrial Digital Multimedia Broadcast transmitter-receiver, and telecom and broadcasting convergent server and devices by 2007. South Korea has set up dedicated structures to develop its cultural content sector with a strong emphasis on digital content. These include the Korea Game Promotion Centre and Korea IT Promotion Agency. In 2005, the government set aside 107.1 billion won (~S$175 million) for "hardware" such as broadcasting and image production facilities, and "software" such as content development and marketing.

- **United States:** The US today has a strong base of traditional media companies that are fast evolving to become digital service providers. Among them are News Corporation and CBS. It also boasts digital media powerhouses Google, Yahoo!, MSN, AOL, Pixar and Apple. Hollywood is going digital in all aspects, from production to distribution and consumption of movies and TV shows, as well as games. The US is also home to many cutting-edge, interactive, digital media research laboratories affiliated to corporations and universities.

Other Asian countries and cities which have announced plans to grow their media and digital media sector include Thailand, Malaysia, Hong Kong, New Zealand and China. In Malaysia, a creative multimedia cluster has been established within its Multimedia Super Corridor, to build a community of multimedia producers and distributors. In Thailand, the Software Industry Promotion Agency is actively promoting digital content development projects in manpower development, animation and multimedia co-production, and applied R&D in animation and multimedia.

Hong Kong announced its Digital 21 Strategy in 2001. It identified digital entertainment as one of the areas it will develop. The Hong Kong administration is pushing to build up a critical mass of digital entertainment companies in the SAR that are capable of producing creative and high value-added content. In addition, it has set up a Digital Media Centre. This is a state-of-the-art digital content creation facility committed to provide leading technologies, expertise, hardware and software support to local digital content creators.

Annex B: IDA Secretariat for Digital Media and Entertainment Sub-Committee

Name	Designation
Mr Thomas Lim	Director Education, Learning, Digital Media & Entertainment Infocomm Development Authority of Singapore
Ms Kimberley Foo	Assistant Director Digital Media & Entertainment Infocomm Development Authority of Singapore
Ms Ong Ling Lee	Assistant Director Digital Media & Entertainment Infocomm Development Authority of Singapore
Mr Robin Phua	Executive Manager Digital Media & Entertainment Infocomm Development Authority of Singapore
Mr Derek Lim	Senior Consultant iN2015 Infocomm Development Authority of Singapore
Mr Narayanan A.	Assistant Manager Digital Media & Entertainment Infocomm Development Authority of Singapore

Annex C: Additional Industry Consultation

Companies	Representation
Content Next (USA)	Mr Robert Spears Vice President
DFC Intelligent (USA)	Mr David Cole Founder and President
Digital Hollywood (USA)	Mr Victor Harwood President
Digital Media Association (USA)	Mr Jonathan Potter Executive Director
Digital Media Wire (USA)	Mr Ned Sherman Chief Executive Officer
Economic Development Board	Ms Jacqueline Tan Head Media & Digital Entertainment
Egg Story Creative Productions	Mr Nickson Fong Filmmaker / Director
Electronics Arts (USA)	Mr Todd Heringer Director Operations and Planning
Entertainment & Media Management Institute UCLA Anderson School of Management (USA)	Ms Gigi Johnson Executive Director Ms Linda Zukowski Director Coporate and Foundation Relations
Entertainment Technology Centre at USC (USA)	Mr Charles Swartz Chief Executive Officer and Executive Director
GlobeCast (USA)	Mr Jerald Cole Director Studio Operations and Special Projects
Institute of the Future (USA)	Mr Alex Pang Research Director Ms Lea Gamble Director Strategic Partnerships Mr Sean Ness Business Development Manager

Companies	Representation
MediaCorp Technologies Pte Ltd	Mr Mock Pak Lum Chief Executive Officer Mr Jack Chiam Chief Information Officer Mr Tay Joo Thong Group Chief Technology Officer Mr Yeo Kim Pow Director Broadcast Engineering Ms Michell Yeoh Associate Director New Media Business
Mobile Media Institute (USA)	Ms Janet Pearce Stenzel Director Mr Craig A. Cochrane Director
Nanyang Polytechnic	Mr Daniel Tan Joint-Director School of Design – Digital Media Design (DMD) Mr Yang Tien Deputy Director (Animation) DMD
Pacific Internet Ltd	Mr Alex See Toh Senior Manager Sales Mr Andy Mohamad B. Ibrahim Manager Games, Content & Community
PricewaterhouseCoopers	Mr Ong Chao Choon Partner Technology, Infocomms and Entertainment Practice Mr Tan Shong Ye Partner Technology and Data Service Practice
Reuters	Mr Lee Kah Whye Business Manager Media SEA & South Asia

Companies	Representation
Sony Pictures Entertainment (USA)	Mr Michael Arrieta Senior Vice President Digital Sales and Marketing Mr Bob Billeci Senior Vice President Technology & Operations International Networks Mr Brian LaKamp Senior Vice President Technology Ms Superna Kalle Vice President International Networks Mr Anthony Beswick Vice President Operations & Technology World-wide Product Fulfillment Mr Scott J. Sherr Vice President Corporate Development
Sun Microsystems (USA)	Mr Dough Twilleager Chief Games Officer
Temasek Polytechnic	Mr Moses Wong Director Temasek Design School
XM Asia Pacific	Mr Ken Mandel Chief Executive Officer & Regional Director

Infocomm Development Authority of Singapore
IDA is committed to growing Singapore into a dynamic global Infocomm hub. IDA uses an integrated approach to developing info-communications in Singapore. This involves nurturing a competitive telecoms market as well as a conducive business environment with programmes and schemes for both local and international companies.
For more information, visit *www.ida.gov.sg*

Singapore Computer Society
SCS, established since 1967, is the premier professional body for IT practitioners and IT users in Singapore. With a membership of over 22,000, it is an invaluable network for its members. SCS administers various certification programmes that help individuals gain professional recognition for career development.
For more information, please visit their website at *www.scs.org.sg*

Singapore infocomm Technology Federation
SiTF is Singapore's national infocomm industry association. It brings together 500 corporate members from MNCs and local companies, who collectively account for over 80% of the industry revenue. The SiTF assists its members in business development, market intelligence, overseas trade missions, networking and alliances.
For more information, please visit their website *www.sitf.org.sg*