

Global Value Chain Analysis on Samsung Electronics

February 2012

The Commercial Section of the Canadian Embassy in the Republic of Korea commissioned this report to the Korea Associates Business Consultancy Ltd. (www.kabeltd.com)

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1. Executive Summary

1.1. Purpose of the report

The objective of this work is to produce a global value chain report on Samsung Electronics Corporation (SEC) which has two divisions in the information and communication technologies section, mobile media and connected vehicle development, with the aim of outlining innovation entry points for Canadian companies by identifying Samsung's organizational structure, and how Canadians, especially SMEs, can engage in the various stages of Samsung Electronics' value chain.

1.2. Samsung Group and Samsung Electronics

Samsung Group is the largest group or Chaebol in Korea. Samsung Electronics is the largest subsidiary with a 2011 Korean consolidated income of C\$150 billion. Samsung Electronics has 144 consolidated subsidiaries of which 18 were newly consolidated at the end of 2011. Samsung Electronics consists of three core divisions:

- Device Solutions, a Business to Business (B2B) division handling semiconductors, other chips and Liquid Crystal Display (LCD) and other components.
- Digital Media & Communications (DM&C) is basically a Business to Consumer (B2C) Company producing phones, computers and televisions and everything in between.
- Samsung Advanced Institute of Technology (SAIT) is the research power of Samsung that also handles (at the moment) new business.
- The two business divisions handle nine product divisions.

1.3. The Samsung Value Chain

As a hi-tech company, Samsung Electronics and affiliates are determined to maintain leadership in all areas related to mobile and media technologies. The intellectual spearhead of this is Samsung Advanced Institute of Technology (SAIT). The way in which this institute and its related organs around the world begin the preparation for the development of new products is the first of the three layers of product development. The next two are at the centre of the Digital Media and Communications division and at each product division.

Procurement of components is in principle based around Samsung Electronics Device Solution division and affiliates. Products not made by this division are procured through a transparent process. These are then assembled in the appropriate factories of the division around the world.

Device Solutions and Digital Media divisions divide into two, one as a B2B operation with marketing and logistics focused on Korean and Incheon airport, and the other as a B2C company with a sophisticated logistics and global Enterprise Research Planning (ERP) system managed by Samsung Electronics Logitech and Samsung Digital System (SDS). Sales and Marketing come under a different management structure, which is based on geographic area, rather than product, working with outsourced logistics and

vendors in each market. In 2007, Samsung was ranked 7th out of the 25 leading companies for its integration in this field.

1.4. Mobile media and connected vehicles value chain

1.4.1 Mobile media

A further section in this report looks at the value chain from the point of view of the mobile product division, tracing each step for the basic vision, and analysing the R&D system in depth and noting that production is heavily concentrated in Korea, China, and Vietnam triangle. Sourcing decision trees for research and products includes mobile products, most especially the smart pad form building blocks for connected vehicles.

1.4.2 Connected vehicles

The value chain of connected vehicles is a forward looking construction that highlights the fact that product development is the key and the evolving eco-system has a much higher degree of outsourcing at this stage. Likewise the final product will be shared among B2B relations with Original Equipment Manufacturers (OEMs), consumers and system integrators like SDS. The role of Seoul Commtech, Samsung's navigation company is emphasised.

1.5. Affiliated companies to contact

The section lists the product development organizations and the producing companies that are a potential list of companies around the world to note, which produce or assemble mobile devices or components.

1.6. Contacting Samsung

Since product development is so important to the product areas researched for this report further attention is given to the ways to approach Samsung and especially its product research and development sections. General advice on how to become a supplier is also given.

1.7. Tips for Canadian companies

Further advice to Canadian companies is given in this section including consideration on pros and cons of hiring ex-Samsung executives to assist in the process as well as ten tips on how to get the attention of Samsung.

1.8. List of contacts

An appendix lists selected contact names and addresses of potential partners.

2. Introduction

2.1. Objective of study

The objective of this work is to produce a global value chain report on Samsung Electronics' two divisions in the information and communication technologies section, focusing on mobile media and connected vehicle development, with the aim of outlining innovation opportunities for Canadian companies by identifying entry points in Samsung's organizational structure, and how Canadians can engage in the various stages of Samsung Electronics' value chain.

2.2. How to approach Samsung

Samsung has been difficult to crack for Canadian small and medium enterprises (SMEs) and innovators. A Global Value Chain (GVC) analysis of the company is intended to increase the potential for Canadian companies to be introduced into Samsung's product and solutions ecosystem.

There are 83 Samsung companies in Korea, which have a complex interrelationship within the Samsung Empire, plus hundreds of overseas subsidiaries. This report concentrates on Samsung Electronics, but refers to three other members of the group, which are relevant to the sectors studied: Samsung Advanced Institute of Science (SAIT), Seoul Commtech Co., Ltd. and Samsung SDS.

SEC is the major centre of most activity, but it may not always be the easiest company to interface with. Canadian companies may find other routes through the Samsung ecosystem to success.

2.3. Future Technology – Mobile Media and Connected Vehicles

The technology used (and future technologies which will be used) in both areas of interest is similar and relies on some of the same “smart” concepts. Thus, advances in mobile media will also leverage into advances in connected vehicles. Mobile media (embracing phones, tablets and other devices) is currently much more advanced in terms of consumer usage and rapid technological development than connected vehicles, where only certain aspects have been developed in common usage such as navigation using Global Positioning System (GPS) and certain telecommunication functions. But on board computers are current in many new vehicles, and implicit in all future auto designs. One of the issues is to see how far these two dimensions, using the same technology, are working together or separately in Samsung and in subsidiaries both in Korea and globally.

The aim of this report consists of three purposes;

1. To follow these two product areas through the eyes of one of the largest companies in the world, Samsung Electronics and its subsidiaries.
2. To map as best as can the value chain from basic research to the delivery of the product to the customer.
3. To identify those stages where Canadian companies might benefit in finding a market, and work towards partnership with a company that will be at the core of multiple new technologies.

3. Company Overview

3.1. Samsung Group

Samsung Group is a Korean Chaebol (conglomerate) led by its Chairman Lee Kun-Hee, son of the founder. The group consists of 83 companies incorporated in Korea, some with closer links than others, some independently listed on the Seoul stock exchange. Each major company has affiliates in Korea and overseas, and the group collectively represents about 1000 business entities globally. This report considers only the value chain of Samsung Electronics. It should be noted that the Group is loosely coordinated through the Chairman's office, and there is, at this time, no formal holding company. However the group companies act as a family – for example the containers of Samsung Electronics' products would normally be handled by Samsung Electronics Logitech, through systems maintained by Samsung SDS on a global ERP system and these two entities would handle insurance through Samsung Fire and Marine Insurance. The 83 firms that are tied together in this complex structure provide 13% of South Korea's gross exports.

3.2. Samsung Electronics Corporation

In 2011, Samsung Electronics Corporation Ltd. sales exceeded C\$150 billion (165 trillion Korean Won), a 7% increase over 2010. The company employed 190,464 employees directly and through subcontracts an estimated 800,000 globally in 2010. The bets that Samsung Electronics placed successively in the past on investment to become the leader in production of Dynamic Random Access Memory (DRAM) chips, liquid-crystal display screens and mobile telephones have paid off handsomely.

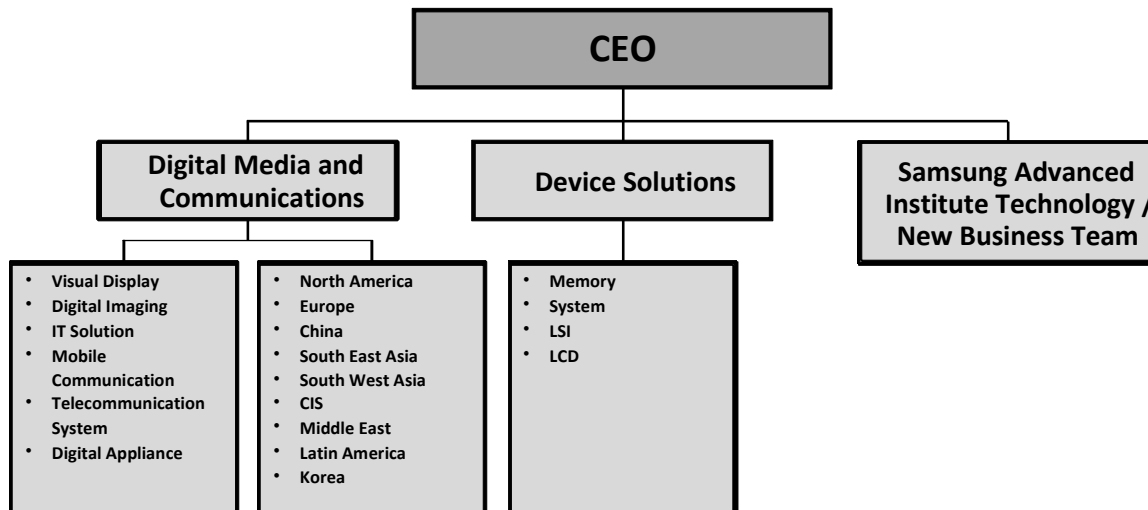
In the next decade, the group plans to branch out further, investing C\$20 billion in five fields in which it is a relative newcomer: solar panels, energy-saving Light-Emitting Diode (LED) lighting, medical devices, biotech drugs and batteries for electric cars. Although these industries may seem quite different from each other, Samsung's strategy is based on the belief that they have two crucial things in common. They are about to grow rapidly, thanks to new environmental rules (solar power, LED lights and electric cars) or exploding demand in emerging markets (medical devices and drugs). Plus they would benefit from a steady injection of capital that would allow large-scale manufacturing and thus lower costs. By 2020, Samsung group predicts that it will have sales of C\$50 billion in these new areas, and that Samsung Electronics will have total global sales of C\$400 billion.

3.2.1. Management Structure by Product and Region

Samsung's macro organisational structure can be summarized as shown in figure 1 below. This shows Samsung divided into three main areas, two business divisions, DMC (digital media and communications business) and Device Solutions (mainly memory but also LCD and other components), and the SAIT grouped with the new business team. Below these macro groupings are nine individual product divisions. A further consolidation of product divisions into these two divisions is planned for 2012.

Figure 1 shows the way that Samsung thought about its businesses in 2011-2012. Note that SAIT is seen as an equal part of the organisation, and that the new business team is reporting through SAIT. The sales and marketing for Digital Media and Communications is divided into regional sales areas, but sales are concentrated in Seoul for the Device Solutions business.

Figure 1: Samsung Electronics Organisation



Source: Samsung Electronics Sustainability Report 2011, pp 7ⁱ

3.2.2. Samsung Overseas

Samsung is growing rapidly overseas, and every month a higher proportion of manufacturing, sales and a gradually increasing volume of Research and Development (R&D) take place outside of Korea. The total gross value of Samsung's domestic and overseas trading is about C\$180-190 billion. Increasingly production is taking place overseas, for mobile phones in Vietnam and to a decreasing extent in China. However China is seen as the future of all Samsung major component manufacturing and the company has about 30 subsidiaries in China.ⁱⁱ

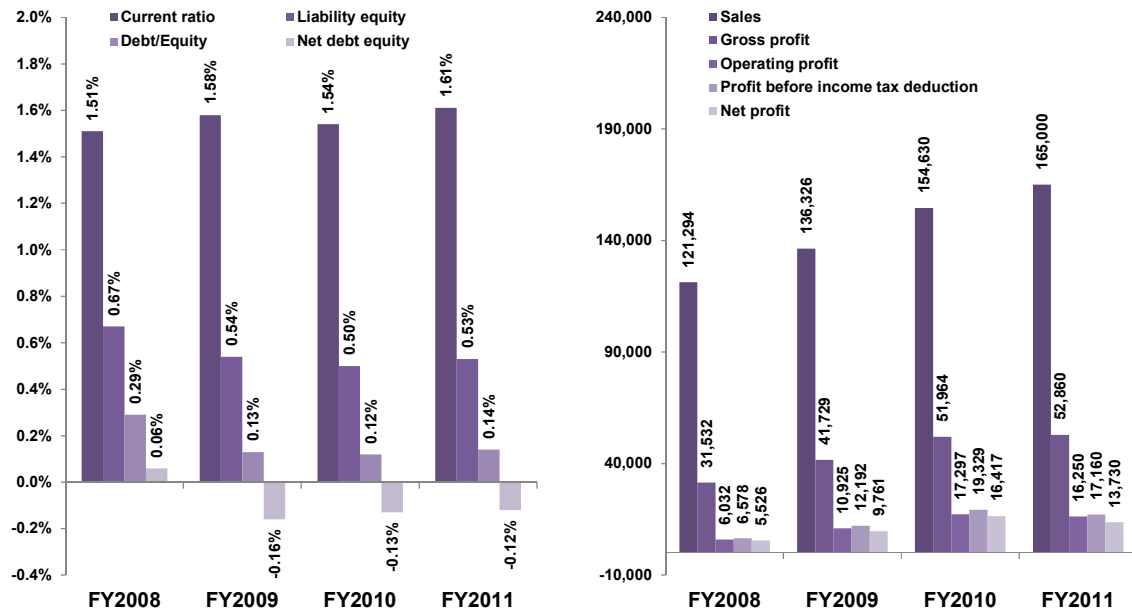
Samsung has listed its company in two overseas stock markets, the London Stock Market and the Luxemburg Stock Exchange.ⁱⁱⁱ

Samsung has research and development representatives' offices and sales offices worldwide. There are 18 R&D centres across the globe. For sales, in Asia Pacific countries, Samsung has 18 sales representative offices, five offices in Commonwealth of Independent States (CIS) countries and Baltic countries, 16 offices in European countries, 13 in Middle East and African countries, six offices in North America and six in Latin America.^{iv}

Samsung Electronics had 144 consolidated subsidiaries in 2011, of which 18 were newly consolidated through the acquisition of Medison - a Korean medical equipment company – not including Samsung Gwangju Electronics and SESZ.

3.2.3. Business description: Financial summary

Figure 2: Samsung Electronics Financial Summary

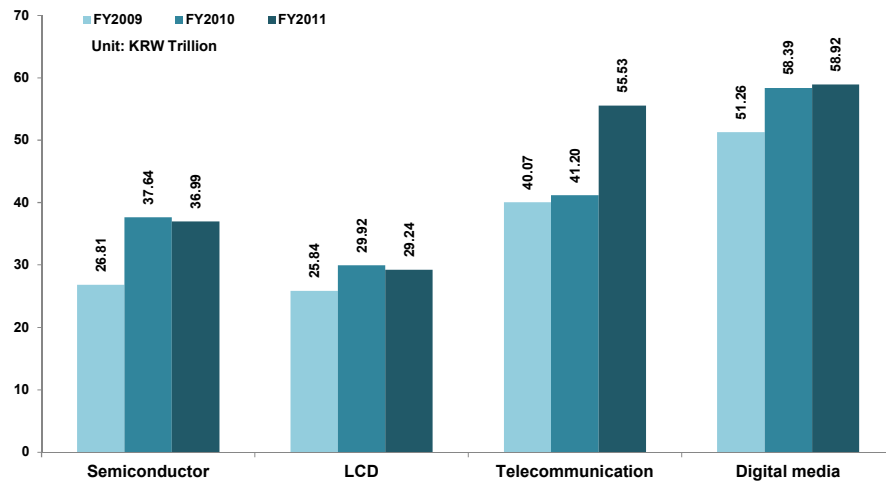


Source: Samsung Electronics Financial Highlights (www.Samsung.com)

Samsung's growth has been rapid. In 2010, the company achieved sales of C\$140 billion (KRW 154 trillion) - a growth of 13.2% in Korean Won (KRW) revenue, and 7% KRW revenue growth in 2011. In terms of net profit, the company achieved its highest ever profit after tax of C\$14.92 billion, (10.4%) of sales in 2010, and C\$12.5 billion (8.3%) in 2011. Samsung has a sizeable cash reserve and intends to use this to acquire companies which take it to its new strategic areas. It claimed to be looking at 20 possible acquisitions in November 2011, and has bought two medical equipment suppliers – one of its new strategic directions noted above – in the second half of 2011.^v

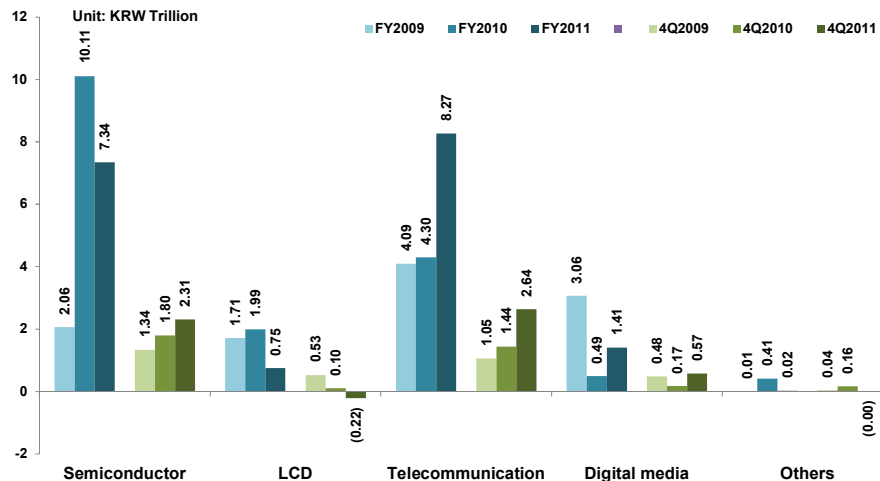
Samsung divides the revenues of its product groups into four categories as shown in figure 3. Device Solutions is divided into semiconductors and LCD which in 2011 represented 22.4% of revenue and 17.7% respectively. Digital Media is divided into telecommunications 33.6% of revenue (subdivided into mobile and others, of which 96% is mobile and 4% is systems) and digital media at 35.7% (divided into visual devices and others). Compared with 2010, this is a striking rise in telecommunications.

Figure 3: Samsung Electronics Sales Performance by Segment



Source: Samsung's Earning Release, 2011Q4

Figure 4: Samsung Electronics Operating Profit Performance



Source: Samsung's Earning Release Q42011 (note set top box transferred from Telecom to DM&A in 2011)

Others include other businesses including some items which might be considered part of a future connected vehicles division, although for practical purposes at present, all connected vehicle activities are contained within the telecom or digital media segments, or handled by the non-consolidated subsidiary, Seoul Commtech. All of Samsung's products use their own semiconductors and LCDs. Figure 4 shows that the semiconductor cycle swung heavily in Samsung's favour in 2010 with a great leap in profit, and digital media saw a drop, while in 2011, the semiconductor cycle swung against Samsung and for the first time telecommunications (led by smart phones) produced more profit than semiconductors. In turn, smart phones are leading to a rise in the development of non-memory semiconductors.

Other affiliates produce other components that go into these devices and from time to time appropriate affiliates are merged with Samsung Electronics. In late 2011, after a group-wide assessment of the structure, SEC is considering absorbing Samsung LED. Possibly Samsung Mobile Display will merge with the LCD division. ^{vi}

3.3. Samsung Electronics' product groups' performance 2011 YOY

Figure 5 shows that telecommunication's share of total sales is rising rapidly from 24.8% in 2010 to 28.8% in Q1 2011 and to 34.7% in Q3 and 37.6% in Q4. In terms of profit, semiconductors and display products were subject to the downswing of the semiconductor price cycle, which is both a function of global demand and supply, and the cycle of innovation and investment.

Figure 5: Samsung Electronics Sales Performance

Percentage contribution of scale	Q1	Q2	Q3	Q4
Semiconductor	24.8%	23.2%	23.0%	19.3%
DP (LCD)	17.6%	18.0%	17.2%	18.0%
Telecommunication	28.8%	30.9%	34.7%	37.6%
Digital Media	36.6%	35.7%	34.7%	135.8%
Others	-7.7%	-7.8%	-11.0%	-11.0%
Total	100.0%	100.0%	100.0%	100.0%

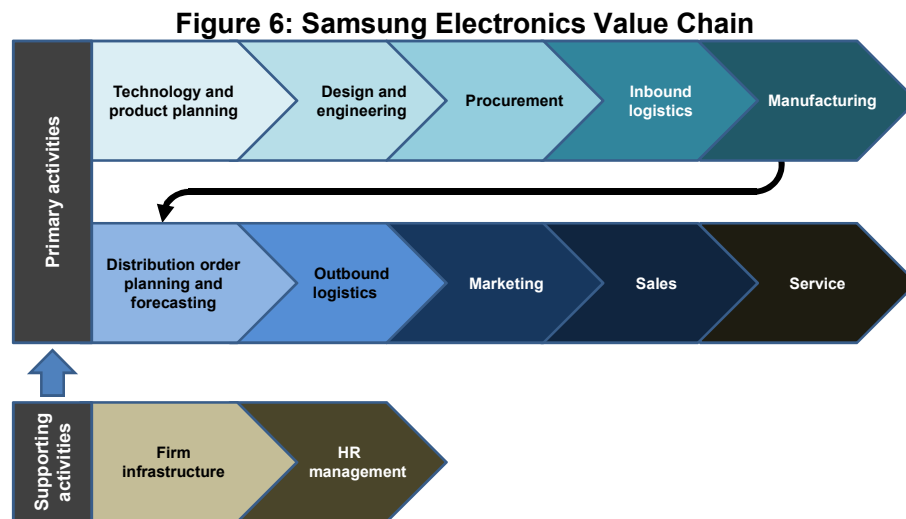
Source: Samsung Electronics' Financial Report, Divisional Performance^{viii}

Telecom is growing dramatically led by the rise of the smart phone. Without mobile telecom, Samsung Electronics' sales revenue would not have been growing in 2011. The wired world (the "ubiquitous world" in Korean parlance) is currently the engine driving Samsung Electronics forward. Despite this, the majority of investment for 2012 will be in semiconductors and display products, notably advanced display (OLEDs) products which will go into smart devices, and non-memory chips. Samsung plans to increase its investment by 18% in 2012 to KRW 43.1 trillion (C\$39.2 billion) of which KRW 12.1 trillion (C\$11 billion) will go into R&D (a 20% increase over 2011).

4. The Basic Global Value Chain of Samsung Electronics

4.1. Basic Value Chain

Figure 6 illustrates that the Samsung value chain is based broadly on the Oracle value chain for hi tech businesses, with the addition of logistics, which play such an important role in a company of the size of Samsung Electronics. In this section the basic framework of the Samsung value chain is presented so that the distinctiveness of the mobile media value chain and the connected vehicle value chain can be readily understood. This closely relates to how Canadian companies might seek to interface with Samsung. There is also the spatial dimension since these activities do not take place in the same space, but across the entire globe, although heavily concentrated in Korea, China and Vietnam.



Source: Profitable Innovation in High Tech, Oracle (KABC analysis)

For Samsung, the activities of basic research, product development and design are a primary activity, unlike Porter's original value chain model that classified these as support activities.

We therefore designate technology development and part of product development to the first step of the value chain, prior to procurement and inbound logistics. This view of the value chain potentially adds more value-added in this stage for connected vehicles, where the business model is not yet established, than for mobile technology where Samsung is already a global leader. As will be shown in the next section, Samsung has developed a complex organization that can both develop new products and improve existing products.

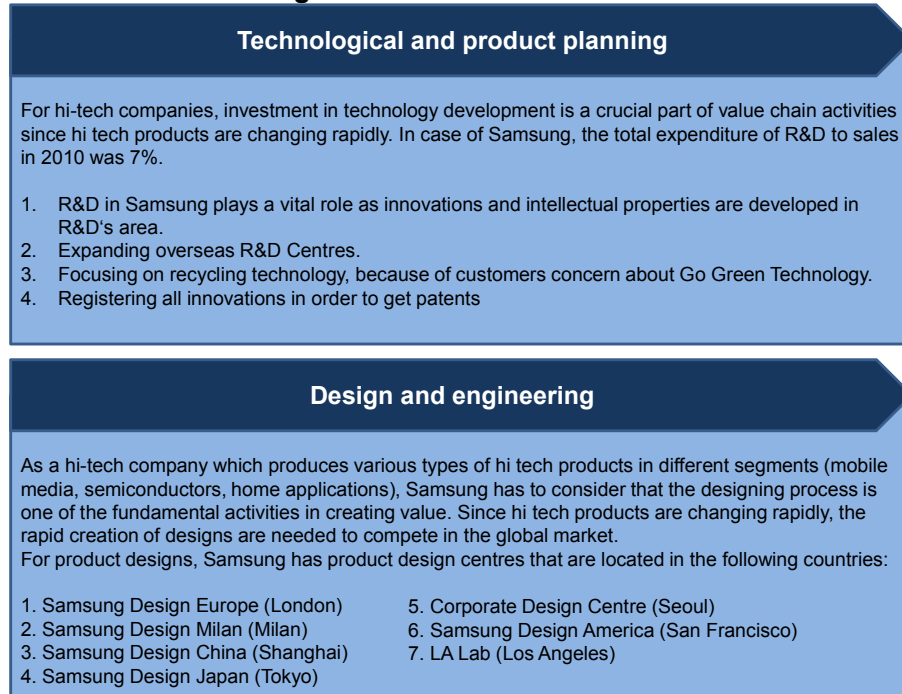
4.2. Structure of the R&D Value Chain

Since the late 1990s, Samsung has progressively taken competitive leadership first in memory chip design, then in LCD technologies and now mobile telephony so that it is breaking new frontiers in product design and integrated technology at each stage. This is recognised even by Apple's I- product family, both in its purchase of components from

Samsung as the best, but not necessarily the cheapest available and its global legal campaign against Samsung.

4.2.1. Samsung's R&D organisation.

Figure 7: Basic Goals of R&D



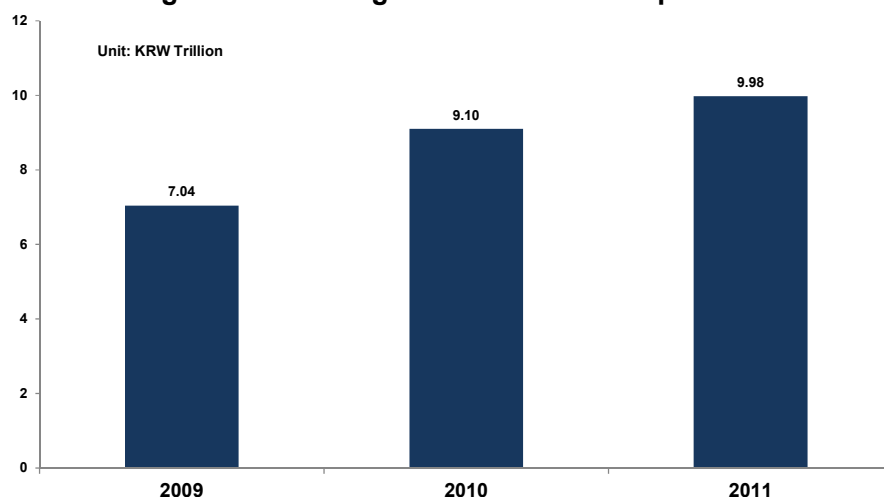
Source: Profitable innovation in High Tech, Consultant's Estimate based on Samsung's Data

Samsung R&D has three layers. The first two layers are core to technology development and product planning;

- The Samsung Advanced Institute of Technology (SAIT) - ensures Samsung's technology competitiveness in core business areas, identifies growth engines for the future, and oversees the securing and management of technology including patents.
- The R&D centers of each business focus on technology that is expected to deliver the most promising long-term results. Each division of SEC has its own research department, but all of these can outsource projects both to SAIT, and to third party institutions.
- Divisional product development teams, working with design centres, are responsible for commercializing products scheduled to hit the market within one or two years.

SEC has spent about US\$7~10 billion per annum on R&D in recent years (about 7% of gross earnings.)

Figure 8: Samsung Electronics R&D Expenses



Source: Samsung's Income Statement 2011

Samsung has 18 R&D Centers in nine countries. Figure 9 shows 12 of these centres by activity.

Figure 9: Details of 12 major R&D Centres outside Korea

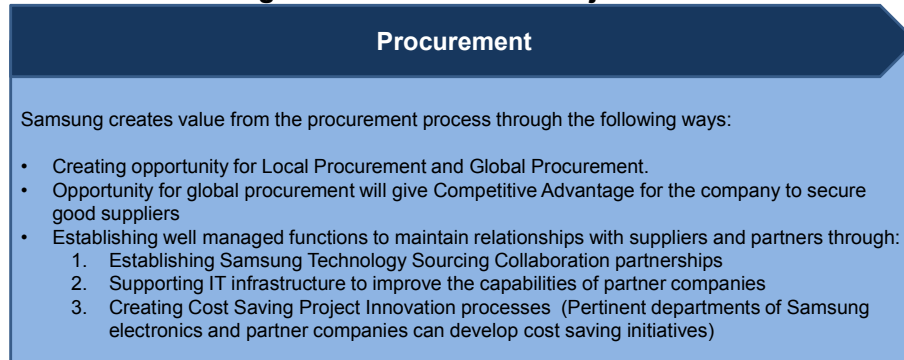
Center Name	R&D Areas	Locations
Samsung Information Systems America, Inc. (SISA)	Strategic parts and components, core technologies	US
Dallas Telecom Laboratory (DTL)	Technologies and products for next-generation telecommunications systems	US
Samsung Electronics Research Institute (SERI)	Mobile phones and digital TV software	Europe
Moscow Samsung Research Center (SRC)	Optics, software algorithms and other new technologies	CIS
Samsung Electronics India Software Operations (SISO)	System software for digital products, protocols for wired/wireless networks and handsets	Asia-Pacific
Samsung Telecom Research Israel (STRI)	Hebrew software for mobile phones	Middle East
Beijing Samsung Telecommunication (BST)	Mobile telecommunications standardization and commercialization for China	Asia-Pacific
Samsung Semiconductor China R&D (SSCR)	Semiconductor packages and solutions	Asia-Pacific
Samsung Electronics (China) R&D Center (SCRC)	Software, digital TVs and MP3 players for China	Asia-Pacific
Samsung Yokohama Research Institute	Core next-generation parts and components, digital technologies	Asia-Pacific
Samsung Poland R&D Center (SPRC)	STB SW Platform Dev., EU STB/DTV commercialisation	Europe
Samsung India Software Center (SISC)	S/W Platform and Application Design, Graphic design	Asia-Pacific

Source: Samsung Electronics' Website, Research and Development

In mobile phones, R&D and design may be taking place in multiple centres, with the Solution divisions in Korea preparing products for external customers - like Apple, and for its internal customers in Samsung. Samsung will open a new software centre in Korea and a new media centre looking for content and apps in Silicon Valley in 2012.

4.3. Procurement

Figure 10: Procurement objectives



Source: Profitable innovation in High Tech, KABC's analysis^{viii}

Procurement within the firm takes on a different function from procurement in companies like Apple or Dell, because of the intra-firm nature of many of the components, which most electronics companies do not produce components themselves. This may cause problems for external suppliers and would-be suppliers because their product may well straddle two or more divisions which share a component (outsourced from another supplier and or internally from Samsung). Because so much of Samsung's activities are intra firm, the procurement process with external suppliers seeks to replicate the intra firm system, rather than the external procurement system, which may be more recognizable to North American suppliers. Samsung seeks to create a family of accredited suppliers and often advertises opportunities only to this family. Once inside the family, new horizons are offered. Outside the family, supplying to Samsung is difficult. Figure 9 shows how Samsung sees the recruitment of external partners.

Figure 11: External Relations Partners and Supplies (Procurement)

Samsung uses a core competency proposal system for those who wish to become a supplier, open to any company, based on the following steps:



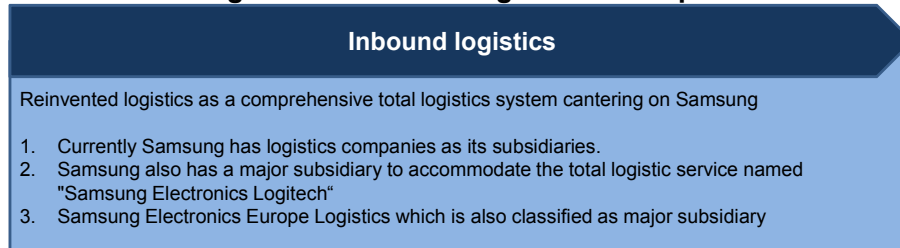
Cooperation Policy

Samsung Electronics promotes a win-win policy based on cooperation for mutual benefit with cooperating companies. Some of the programs provide cooperation by providing equipment funding for plant modernization and localization, promoting productivity enhancement through site improvement, dispatching expert manpower to strengthen efficiency and providing ERP consulting.

Source: Samsung Electronics' Website, Global Procurement

4.4. Logistics

Figure 12: Inbound Logistics Concepts



Source: Samsung's Business Report Q2 2011

Logistics is handled in a unique way in Samsung so that it covers many administrative processes. It is more complex than described in a basic value chain model. Core building blocks for components plus combined internally and externally sourced components are shipped to the assembly factories, either from Korea or directly to the overseas plant by Samsung Electronics Logitech which handles both inbound and outbound logistics and goes further in handling payments and processes with outsourced companies working seamlessly with the global ERP system maintained by Samsung SDS.

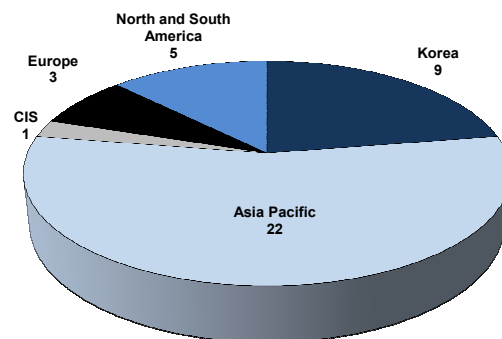
4.5. Assembly

Figure 13: Manufacturing Concepts



Source: Samsung's annual report 2010, page 88 (global network)

Figure 14: Samsung Electronics Production Plants



Source: Samsung's annual report 2010, page 88 (global network)

Each division is responsible for its own factories and assembly plants. No outsourcing of assembly takes place as far as is known. In 2011, the major locations of assembly for mobile phones were Korea, China and Vietnam. Samsung handles its logistics in Asia for components through three key centres, Tianjin, Shanghai and Hong Kong.^{ix}

4.6. Trading support service and outbound logistics

Figure 15: Distribution Order Planning and Forecasting Concepts



Samsung Electronic Logitech is a specialized company which handles a full range of trade support functions as well as logistics. It negotiates payment collection for Samsung Electronics export products and performs insurance claims where appropriate directly liaising with Samsung Insurance company. It helps export product payment collection by issuing the documents specified on the letter of credit and presenting them to the bank after loading the export products.

Figure 16: Outbound Logistics of Samsung Electronics



Source: Consultant's estimate based on Samsung's Annual Report 2010

4.7. Marketing and Sales

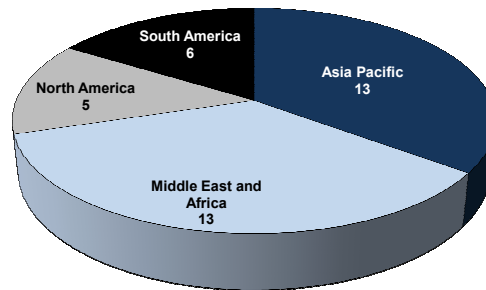
Figure 17: Marketing and Sales Value Chain



Source: Samsung's annual report 2010, page 88 (global networks)

There is a marked difference between the two core divisions of Samsung Electronics in that only the DM&C division has a globally based marketing operation. The device solution business is a B2B business with a quite different structure. Each major market has a DM&C sales and marketing subsidiary, which works with partner sales organizations.

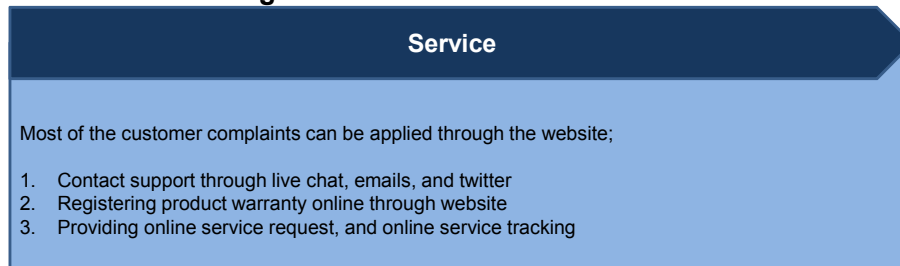
Figure 18: Samsung Electronics Sales & Marketing Network



Source: Samsung's annual report 2010, page 88 (global networks)

4.8. After-sales

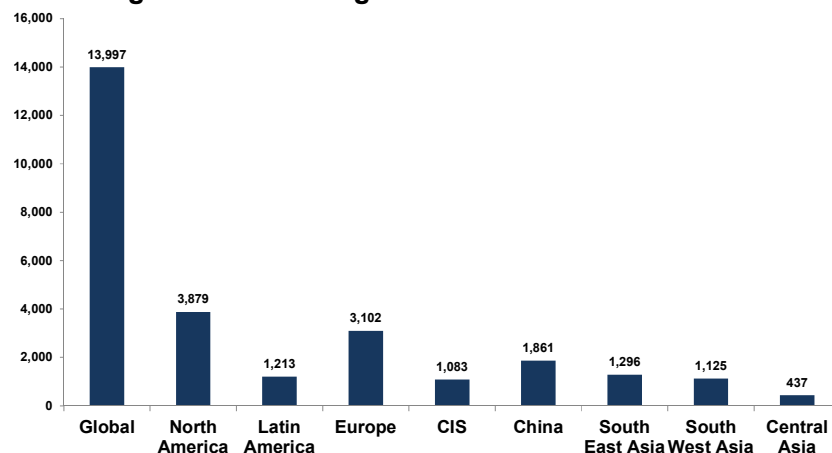
Figure 19: After-sales Value Chain



Source: Samsung Electronics' Website, Consumer's Section

Korean companies excel at after-sales because in general the reliability of the product is so high that returns are rare, and defects normally replaced with new items so that the failed product can be studied. An example can be given for Switzerland. In 2011, Samsung signed an agreement with a Switzerland supply chain company CEVA^x. Under the contract, CEVA will organize pickup of return devices, such as phones, flat screens, printers and refrigerators from Samsung's service partners across Switzerland and bring them to a central laboratory. CEVA employees will carry out quality control activities on behalf of Samsung to establish if the items have an inherent defect or can be repaired. This kind of operation can be found in every market.

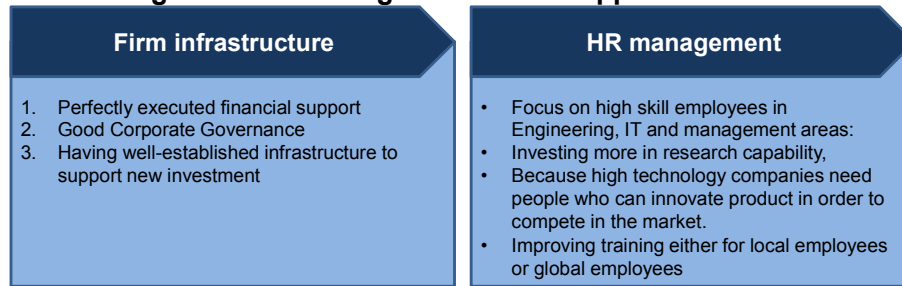
Figure 20: Samsung Electronics Service Centres



Source: Samsung Electronics' Customer Delight Service Report

4.9. Support Activities

Figure 21: Samsung Electronics Support Activities



Source: Consultants estimate based on Samsung Electronics' Reports

Samsung is also supported by what is rated as the most professional infrastructure of any company in Korea. In terms of financial support, investor relations, and the handling of finance and investment funds are all those of a first rate organisation. This goes as far as creating venture funds to foster potential suppliers. Samsung has the Samsung Venture Investment Corporation (SVIC) that has the main role to provide financial resources to start-up companies in the areas of information technology, communications, semiconductors, electronics and biotechnology.^{xi}

Figure 22: Samsung Electronics Lists of Venture Capital Association Cos

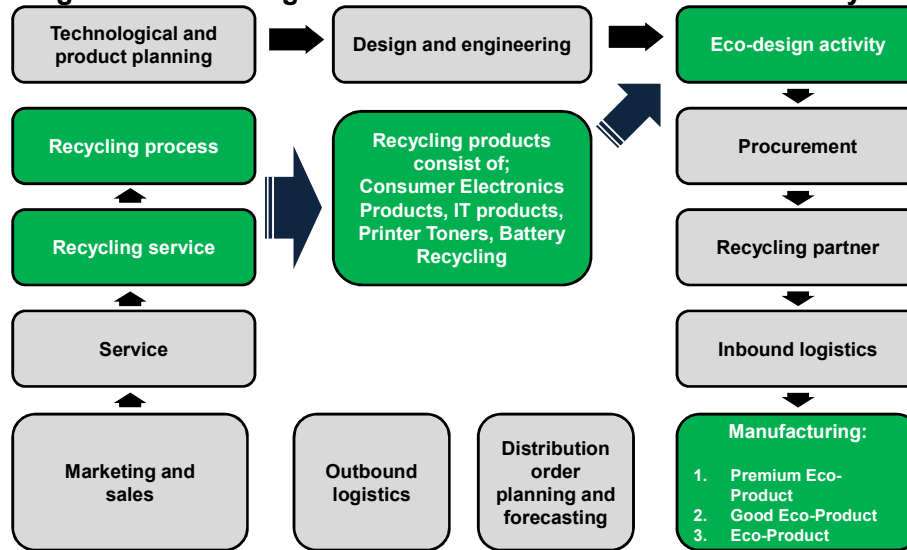
Name of Association	Amount of collection	Date of Establishment
Organized New Technology Investment Association SVIC No.4	150 billion won	1992.12
Organized New Technology Investment Association SVIC No.6	90 billion won	2005.07
Organized New Technology Investment Association SVIC No.7	15 billion won	2005.07
Organized New Technology Investment Association SVIC No.8	10 billion won	2005.12
Organized New Technology Investment Association SVIC No.9	15 billion won	2006.01
Organized New Technology Investment Association SVIC No.10	2 billion won	2007.07
Organized New Technology Investment Association SVIC No.11	50 billion won	2008.01
Organized New Technology Investment Association SVIC No.12	10 billion won	2008.06
Organized New Technology Investment Association SVIC No.13	30 billion won	2009.01

Source: Samsung Electronics' website, affiliated companies

4.10. Samsung Product Lifecycle Management

Samsung has recently set up an Eco-Design Assessment System to further support business divisions. This system ensures that Samsung's products such as LCD, semiconductors and mobile media devices comply with the global environmental regulations. In 2009, Samsung upgraded the system from Eco-Design Assessment System into Eco-Rating system for all its products. The eco-rating consists of a three point scale: Eco-Product, Good Eco-Product, and Premium Eco-Product.^{xii} Samsung expects this to become more important in the future, and seeks assistance from external companies in this area. Figure 19 shows how the eco design concept is built into the value chain, with the green areas representing the new activities Samsung has established.

Figure 23: Samsung Electronics Value Chain of Product Lifecycle



Source: Consultants analysis based on Samsung's Information^{xiii}

Through the recycling process, Samsung seeks to create partnership with recycling companies. So far, Samsung has collaborated partnership in recycling activities with the following US companies:

- Chicago-based SIMS Group Limited, which has operations on the Northeast region, the West Coast, the Midwest, and the South.
- Wisconsin-based CRT Processing LLC, which has operations across the Northeast region, the Midwest, and the Pacific Northwest regions.
- New York-based Eco International LLC, which has operations across the mid-Atlantic, Midwest, and West. Minnesota-based JFRC, LLC, which operates in the northern Midwest.

In addition, Samsung also collaborates with Global Electric Electronic Processing (GEEP), which is located in Barrie, Ontario, and Edmonton, Alberta. The profile of GEEP can be seen through GEEP's website (www.geepinc.com).

In order to find the opportunity in this part of value chain, partnering candidates should follow the Samsung Waste Electrical and Electronic Equipment (WEEE) Management Policy (US and Canada) set out in figure 24:

Figure 24: Samsung WEEE Management Policy



5. Value Chains of Mobile Media and Connected Vehicles

5.1. Overview – the theory of convergence

5.1.1. Overview of R&D and Product Development

This section focuses on the existing mobile media value chain, and suggests a future value chain for connected vehicles. The value chain follows the broad description contained in section 4. The initial description focuses on two areas; technology development; and where Canadian companies might seek to get involved in sourcing.

Samsung Electronics and affiliates are determined to maintain leadership in all areas related to mobile and media technology. The intellectual spearhead of this is Samsung Advanced Institute of Technology (SAIT). The mission of the corporate research organization is to create a technology foundation for the future. “We work with research communities around the world to identify challenges ahead, share our findings, and continually explore possibilities for the future. We push the frontiers of technology every day in a variety of research fields. Today our research focuses primarily on Future IT (ranging from exploratory work in beyond 4G to intelligent web and multi-core); New Materials & Device (including areas as diverse as flexible display, new materials and Nano technology); Energy & Environment (including areas as EV battery, solar cell and water treatment); and Bio & Health.”^{xiv}

SAIT is eager to build a close relationship with global experts to leverage their knowledge, experience, and technology insights to help create new businesses for Samsung. As stated, SAIT’s core areas consist of four areas: Future IT and Convergence, New Materials & Nano Technology, Energy and Environment, and Bio & Health.^{xv}

From a product development point of view, mobile media falls within the scope of work of two business divisions. The first is the mobile division of the telecom business unit, and the second is digital media which including computers as well as TVs. The recent decision to place the Galaxy Tablet in the mobile division of telecom meant a transfer of expertise and closer cooperation from the digital media division. (In 2012, Samsung will announce a restructuring intended to reduce interdivisional issues).

In the future, Samsung expects that digital technology that shapes life style will be more important. The need to create more realistic and interactive personal multimedia services, build topologies that converges private and local networks, and make effective use of IT devices and components into emerging areas will be increased. In order to respond to such demand, SAIT is focusing on real 3D, communication for various topologies, more efficient multi-core, software-based data intelligence, as well as convergence technologies based on IT, BT and NT. It will be noted that connected vehicles are not specifically mentioned within the current vision, but lie within the broader Korean vision of convergence and “ubiquity.”

Every year, SAIT also carries out collaboration in various research areas in order to innovate new ideas and methods from outside that can vitalize its internal organization. This collaboration includes four programs: ^{xvi}

1. GRO (Global Research Outreach): a program for academic collaboration.
2. CORE (Collaboration Open Research Expert): a network for communicating with global technology leaders. In this program, the participants may share their ideas on technology fusion and multidisciplinary collaboration by advising on research strategy and collaborating on development of new business opportunities and research themes.
3. SRP (Strategic Research Partnership): a research partnership for industrial development
4. Strategic Venture Investment

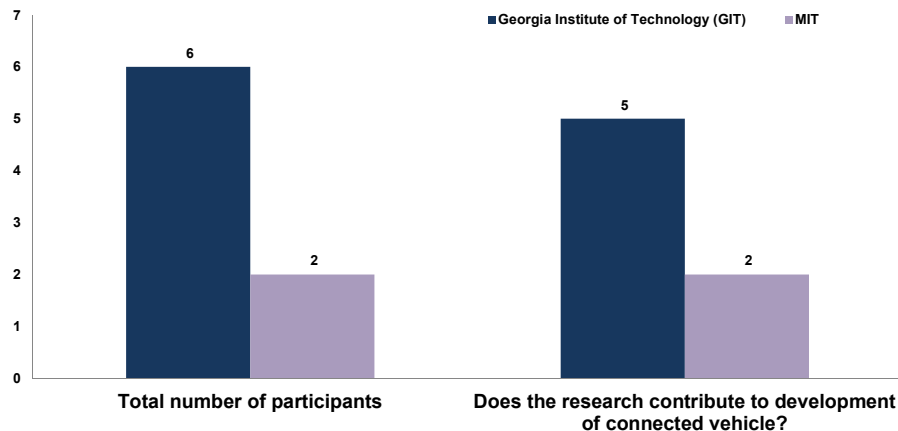
Global Research Outreach Program (GRO), research proposals are accepted annually from various universities from around the world. How might a Canadian organization find a way to be a partner of Samsung in research areas of interest? The answer from figure 26 is to collaborate with Georgia Tech. The following table shows the list of research themes during for the Year 2011.

Figure 25: SAIT Themes of Research for the Year 2011

Theme	Number of Research Proposals	Does the research contribute to development of connected vehicles/mobile media
Advanced Media & computing	4	Yes
Proactive Cloud Computing	3	Yes
Proton coupled electron transfer (PCET)	1	Yes
System Architecture	1	Yes
Integrated Photonic Interconnect	4	Yes
Material & Device	4	Yes
Environment	4	Yes
Medical	4	No
Organic Solar Cell	1	Yes
New Memory	1	Yes
Next UX	3	Yes
Future IT	3	Yes
SOC	2	Yes

Source: SAIT's website, Open Innovation

Figure 26: SAIT's most frequent collaborators



Source: SAIT's website, Open Innovation

A second research institute, Samsung Information Systems America (SISA) based in California is the Samsung Electronics' US R&D Centre. SISA also gives an opportunity for Canadian companies and institutions to collaborate in their respective research areas. The main business of SISA is to research emerging technologies to create new businesses, and to develop core technologies to create new businesses, and developing core technology itself. SISA's core areas consist of: Advanced Printing Solutions, Computer Science, Digital Media Solutions, Standardization, and Storage^{xvii}. Through the Samsung Technology Sourcing Collaboration programme, SISA opens the opportunity to collaborate with third parties in innovation.

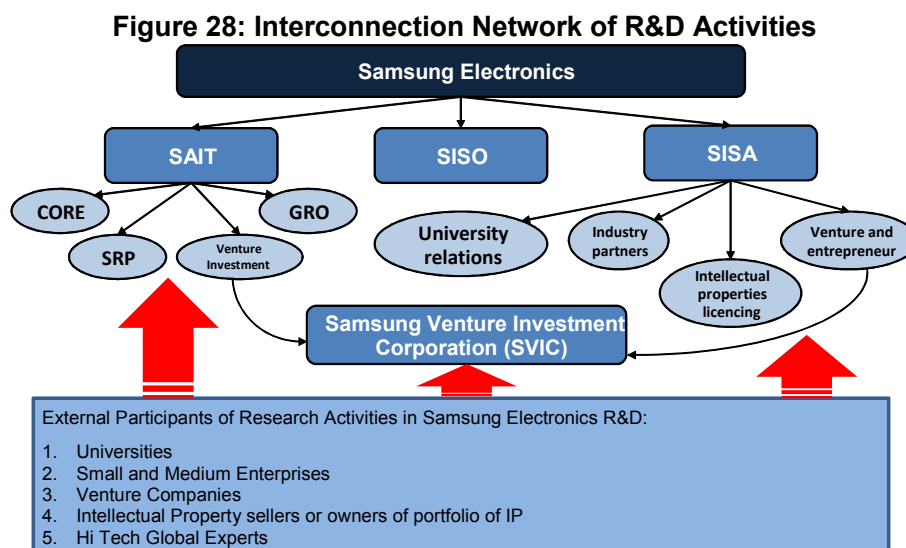
Figure 27: SISA Partnership Collaboration

Type of Collaborations	Description
University Relations	Collaborate with Samsung Advanced Institute of Technology
Venture & Entrepreneur	1. Collaborate in producing healthcare or robotics products. 2. SISA also has Open Innovation Center which focuses on creating new business. It cooperates with Samsung Product divisions and Samsung Venture Investment Corporation to provide funding to help Samsung Electronics to innovate in the respective field of interests.
Intellectual Properties Licensing	Purchasing intellectual property from start-ups, corporations, IP auctions and markets.
Industry Partners	Engaging in corporate relations and partnerships specifically in corporate research collaboration and corporate-level partnership activities.

Source: SISA's website

A third research institute – Samsung India Software Operations (SISO) is located in India and looks at the global development of software. Samsung has not yet announced whether its new applications R&D centre in Silicon Valley to be established in 2012 will be independent or part of the existing system

Figure 28 illustrates how the interconnected network of the three R&D centers: SAIT, SISA and SISO work together.



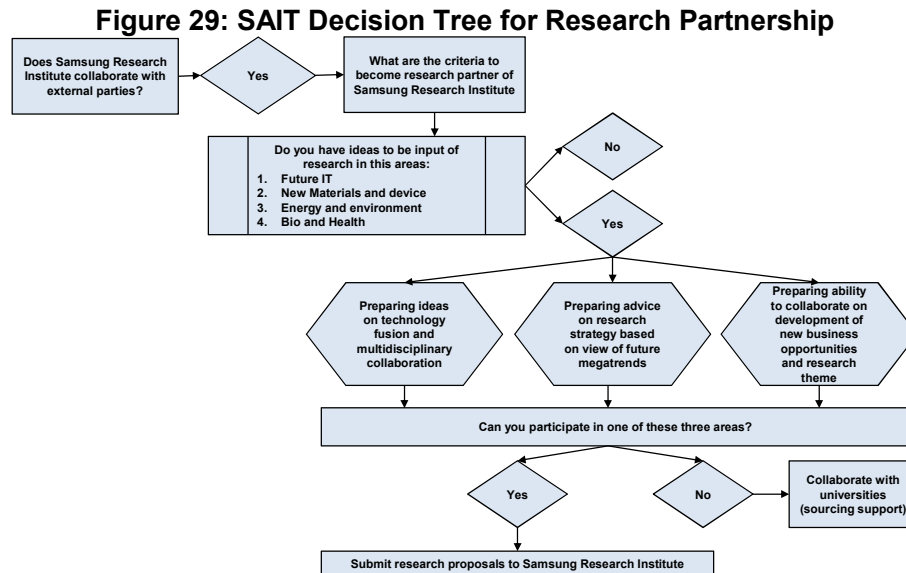
Source: Consultants analysis based on Samsung's information

5.1.2. Patents

In 2010, alone, Samsung was awarded 4,551 patents by the US trademark and patent office, and ranked second on the world's most inventive companies list. These are managed by SAIT.

5.1.3. Decision making criteria and decision trees related to becoming a research partner

Figure 29 summarizes the potential of becoming Samsung Electronics' partner in the research area



Source: Consultants estimate based on information in SAIT's Website and interviews

As noted Samsung Electronics has established the Samsung Technology Sourcing Collaboration organization (STSC) under Samsung Information System America (SISA), which facilitates the collaboration and knowledge sharing among Samsung Electronics' affiliates and subsidiaries with prospective partners. Through this organization, companies may have opportunities to become Samsung Electronics' partners.

5.2. Mobile Technology Value Chain

5.2.1. Overview

"Mobile media is generally defined as the mobility and portability of media. It encompasses how content is developed and how technology is applied to deliver, share, distribute, store and create digital media, innovatively creating new experiences and efficiencies. Mobile media addresses the consumers' need and desire to access and use media devices regardless of where they are in the world." In the convergent world it is not merely people who share content (data) but also devices. This lies at the core of connected vehicle technology and the Korean concept of ubiquity – of intelligent houses, cities, vehicles, display devices and people.

5.2.2. The Mobile Media Value Chain

Mobile media is the fastest growing area of Samsung Electronics' business, led by the Galaxy smart phone. This report assumes that the legal issues between Apple and Samsung which are interrupting the supply chains are settled and do not affect the long-term evolution of the company or its structure.

Overall, Samsung sold 280 million mobile phones in 2010, corresponding to a market share of 20.2%. Shipments of smart phones increased 30% in Q4 2011 over the previous quarter. The total value of the telecom and mobile media business to Samsung Electronics in 2011 was KRW55.53 trillion (C\$50.5 billion), with KRW8.27 trillion in operating profit and an estimated KRW8 trillion in net profit before tax.^{xviii} This is a 38.5% increase in sales and 89.6% increase in operating profit over 2010

Figure 30: The mobile value chain quantified 2010

		Unit: KRW trillion
Total sales		41.2
R&D	(40%)	3.64
Sourcing		
Internal (including affiliates)		20.45
External		10
Assembly		10.45
Labour	(8%)	1.82
Energy		0.50
Sales and marketing	(40%)	10.49
Operating profit		4.3

Source: Samsung Electronics' Q4 2010 Report and consultants estimates

In this estimate, most of the value comes from inside the company (or affiliates) and only about one third of the components come from external sources.

5.2.3. Product and technology development

This process depends on whether the starting point is the business division or the R&D institute. The R&D process has been analysed above, but for many new developments the process is internal to the business unit, and there is little opportunity for external parties, not already part of the Samsung family to participate.

5.2.4. Sourcing decision making criteria

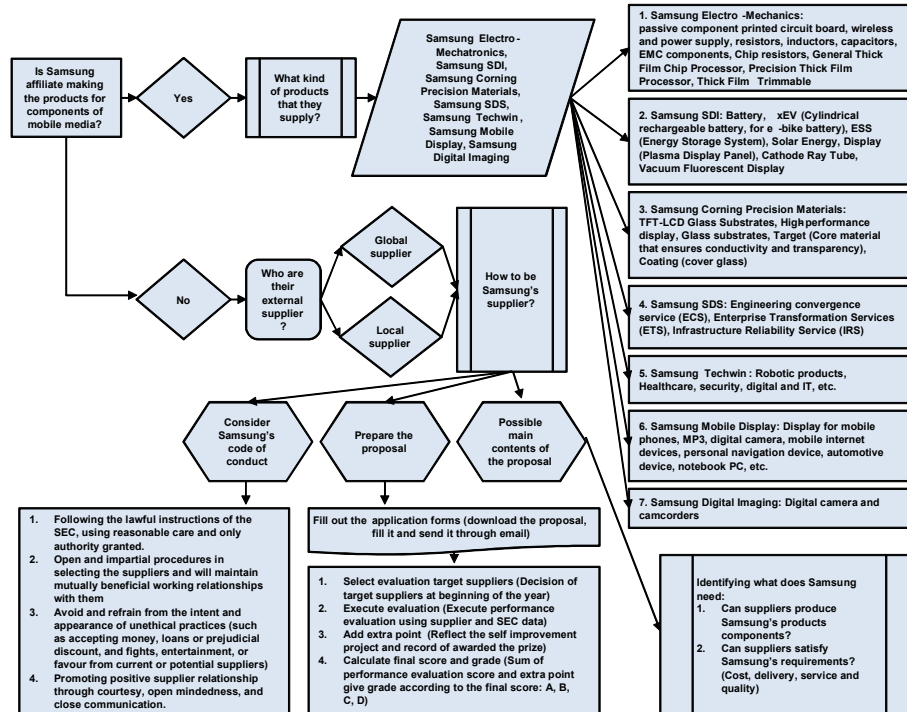
For specific sourcing of mobile products, as opposed to product development, the current preference is for Chinese based companies. Unlike semiconductors, most of Samsung's mobile component affiliates are based in China.

The easy route to becoming a supplier is to work together with Samsung's R&D organization as described above. Becoming a supplier for an existing product is more difficult, and means dealing with the business divisions themselves. The decision-making criteria for mobile and connected vehicle suppliers (as opposed to R&D partners) do not greatly vary from product division to product division at Samsung. Generally, Samsung requires the vendor to guarantee following three conditions:^{xix}

- VE/VA (Value Added Engineering) activities
- Excellent quality and delivery dates,
- Competitive prices.

Figure 31 is both generic to Samsung's whole organisation and specific to mobile decision making:

Figure 31: Decision Flowchart of Samsung Production



Source: Consultant's estimate based on Samsung's annual report 2010 and Samsung's sustainability report

5.2.5. Components

Figure 32: Global Value Chain of Samsung Electronics for Smartphones

Product and Technology Development	<p>For mobile media such as notebook and tablet, the technologies use three main features:</p> <ul style="list-style-type: none"> • Superior Visual Quality • Eco-Friendly and Mobile Design: The designs from the mobile are slim, low power design, featuring with dimming control for outdoor and indoor use. • Touch and 3D Features: Using 3D gaming, movies, and multimedia, Samsung continues to provides the most compelling touch and 3D mass-market technologies
Components	<ul style="list-style-type: none"> • Samsung Product Lines for Mobile Phones Mobile DRAM: Memory • SRAM: Buffer • NAND Flash: memory (external, internal) • NOR Flash: boot-up • MCP: Memory, buffer, removable storage, boot-up • ASIC: controllers • Foundry services: Storage • CMOS image sensor: camera • LCD: mobile displays • Display Driver ICs: display controllers

Source: Samsung Electronics' website, Business OEM Solution^{xx}

Components will be sourced from existing Samsung plants or affiliates and only if not available through this route will be sourced from external partners. These will normally be existing partners with a proven track record. The Chinese and Vietnamese plants are assessing potential local suppliers, but the current trend at the end of 2011 seems to be to bring back sourcing to Korea. This will follow the decision tree given in Figure 31 above

5.2.6. Assembly points

Assembly points are either Gumi in Korea, in various facilities in China or in the new factory in Vietnam. This will continue to be true for consumer products. As mobile phones have a relatively high labour intensive content, Samsung will continue to develop its Vietnamese factory capacity and output as Chinese labour costs rise.

5.2.7. Marketing and sales companies

Each of the 128 markets has a marketing and sales company. For North America, there are several companies. Samsung USA coordinates all sales partners in the USA, as well as marketing arrangements. The major marketing companies also feed back design and product ideas to the product divisions. In the past, major initiatives such as the Matrix phone were driven by Samsung Electronics USA, and there is a continual flow of competitor information and consumer reaction.

5.2.8. After-service

After service is normally subcontracted to logistics partners as described in the previous chapter, but also forms part of the quality and design feedback loop.

5.3. Connected vehicles value chain

5.3.1. Basic Overview – the vision

The potential vision for connected vehicles is huge. For Oliver Wyman the connected vehicle is the smart phone of the automobile world. “The Connected Vehicle will leverage the possibilities of convergent technologies within the vehicle space including: advanced automotive technologies (GPS / fuel efficiency), telecommunications (Bluetooth / connectivity), broadcasting, media and infotainment as well as safety and interconnection of home and vehicle and person.” Enthusiasts believe that “Information and Communication Technologies (ICT) account for 80% of the innovation in vehicles and an estimated \$1 billion in software development for each car model. ICT accounts for 70% of a car’s development costs.

Steven Bayliss in “An evaluation of Long Term Evolution (LTE) and other wireless technologies’ impact on the transportation sector” writes, “With Fourth Generation cellular (4G), we will see the complete extension of the internet suite of protocols to the wireless environment. 4G likely represents the end of the traditional telecommunications silo approach that has been the result of decades of investment in single-application “purpose built” wireless technologies (e.g. radio, TV, land mobile, and cellular) and regulatory practice. Current investment patterns in infrastructure provide a strong indication of what will be available and provided in what quantities, quality, and cost beyond 2015 for both terminal devices and network infrastructure.

Next generation wide-area cellular such as 4G will be able to support vehicular applications, and how transportation infrastructure may mesh with wireless networks. Specifically, it suggests that automotive electronics engineers will need to be cognizant of how application data is treated by 4G LTE networks, and how innovations such as self-organizing femtocell, “traffic shaping” and heterogeneous or “vertical roaming”

across different radio access technologies may improve the performance of off-board or “cloud” -based vehicular applications.

Bayliss’ paper suggests that over the long term, vehicles will serve as wireless gateways that manage and collect data from a number of devices or sensors deployed in vehicles and highway infrastructure, utilizing 4G cellular as the last-mile wide-area connection to the cloud. 4G will likely manage devices and sensors that utilize a variety of short-range radio access technologies such as Wi-Fi that provide the “last yard” connection. Given that developing LTE is one of Samsung’s core mobile drivers, the connected vehicle has a high potential to be a future core area of the company.

Technologies within the CV realm include: antenna and multimedia kits to develop user interfaces; telematics; data technology; software to support, map and provide other user information. With 4G, this range of products goes further into internet radio and other areas. Apple can be assumed to be working on this with US manufacturers and Samsung cannot be left behind. In Korea, the smart phone population had increased to over 50% by the end of September 2011 and is becoming widely used as the navigation device – with the advantage that it is ubiquitous and can be used on foot, in the subway or bus and not confined to the vehicle. Smart phone/intelligent vehicle interfaces are expected to become common in the near future with the next generation of vehicles and may be managed through software “applications” or through designed integrated systems. In Samsung’s case, the conventional navigation devices are produced by a subsidiary, Seoul Commtech, but sometimes branded simply as Samsung overseas.

Within such a vision, the range of products, services and product applications is almost endless. Samsung’s product and technology development is at the inception stage of building up a new separate eco-system. Diagram 33 below envisions how this might look. Equally, product development could be largely collaborative at this stage, driven by enquiries from OEMs and other interested parties, or initiatives like the Hyundai Motors-Samsung cooperation agreement on applying its smartphone technology to Hyundai’s onboard computer systems that apparently does not seem to be making much progress at present.

At the point at which product and technology development reach the design stage, then the smart tablet product is likely to be the basis – based on the galaxy pad or variant of the same. As Samsung has no current plan to create complete connected vehicles, the value chain for connected vehicles will be substantially different for products developed for this purpose. Although the products will draw on the basic mobile interface, they need to interface with the vehicle system as well. The business structure inside Samsung may well be closer to that of the development of components that goes into other companies mobile phones, for example Apple’s I-family series. At present, the development takes the form of navigation devices and ancillaries for connected vehicles such as media player including internet radios and peripherals such as aerials. All these use Samsung Electronics general competence, but does not yet merit a division specifically dedicated to the connected vehicles – or if there is such a division it is the independent affiliate Seoul Commtech. If the proposed Hyundai Motors-Samsung cooperative venture proceeds, then there will be adaptation of the Samsung Tablet family which will certainly call up a specialist group.

Samsung is a secretive organization and it is hard to state with 100% assurance that no future product development is planned. Samsung is conducting research on intelligent vehicles, principally in Daegu, but almost certainly in other locations. There is, as far as can be ascertained no product outcome at the present time except vehicle navigation and Internet radios.

5.3.2. Product and technology development

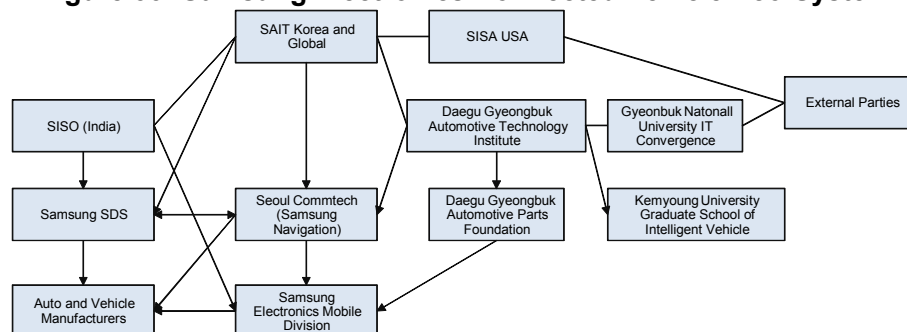
Product development will be driven outside of the normal mobile media structure at the present time. As noted Samsung is pursuing connected vehicle studies in Daegu.

Samsung Navi or Seoul Commtech is also developing a wide range of products and from May 2011 has produced a series of Android based products with certain advantages of using a standalone smart phone unit - a larger screen, offline maps, and battery life.^{xxi} Samsung also introduced the SENS-240 a tablet hybrid which replaces standalone GPS units as well as in-car navigation units, a unit focused on navigation while also capable of pairing with an Android smartphone.^{xxii} The SENS-240 is powered by a 1.43GHz processor capable of rendering high-resolution 3D maps while simultaneously playing both video and audio files on its 7-inch WVGA (800×480 resolution) display. There's also 256MB of RAM, USB 2.0, a SD card slot, DMB-TV and Bluetooth onboard.^{xxiii}

5.3.3. Decision making criteria and networks

The decision making criteria is likely to remain the same as for mobile phones, although the potential for partnership with research based companies and institutions on the right hand side of the diagram and auto-manufacturers and parts manufacturers on the left is much larger.

Figure 33: Samsung Electronics Connected Vehicle Eco-System



Source: Consultants estimate based on Samsung Electronics' data

As can be seen from the connected vehicle eco-system diagram, the scope for general collaborative development is much higher in this area than in mobile media where collaboration would need to be very specific.

Samsung's existing telecom systems business is small, with sales of 2.1 trillion won in 2011, (C\$1.9 billion). But the company expects it to become much larger through the Samsung LTE wireless telecom system which is part of mobile media components in term of wireless communication and the connected vehicle vision. Samsung is making efforts to develop technologies and expand the global market for Mobile Worldwide Interoperability for Microwave Access or popularly known as Mobile WiMax. One of the

efforts is to collaborate with SMEs for the expansion the next generation mobile communication especially with Mobile WiMax Ecosystem. The main technology function of Mobile WiMax especially in its system is providing the Core Service Network Products. In addition, Samsung also offers device management solution by cooperating with device management vendors.

The main role as a partner of Samsung Mobile WiMax is generally to be a value-added reseller (VAR). In this case, Samsung wants the partner not only to be its reseller, but also to add value to the products by complimenting products, services, and other forms of enhancement.

The term and procedure based on Samsung's website is described in the following figure:

Figure 34: Samsung LTE Partnership Procedure

Requirements	Description
Areas of Partnership	<ul style="list-style-type: none"> • R&D Field • Sales & Marketing field • Service field (Installation & Commissioning / maintenance, spare parts management) • Others (OEM/Local Agent)
Capabilities Requirements	<ul style="list-style-type: none"> • Sales • Marketing • Network/RF Design Capabilities • Project Management Capabilities • Established Network of implementation teams • System Integration • Network Service & NOC Capabilities
Company's Infrastructure Requirement	<ul style="list-style-type: none"> • Having over U\$3M paid in capital • Over 30 employees • Business experiences with telecom operators
Administrative Procedure	<ul style="list-style-type: none"> • Apply for partnership • Evaluating candidate • Selecting Candidate • Notice • Agreement of distribution • Training of Samsung Mobile WiMax • Final contract for partner certification

Source: http://www.samsung.com/global/business/telecomm/partner/Partner_Introduction.html

5.3.4. Sourcing decision making criteria

Sourcing decisions will normally follow the sourcing decisions made for the corresponding/related mobile component described in Figure 31. The complications of adding a different external component from the one used would add costs, and likely be rejected in mobile, but in connected vehicles the case might be different. Even if the criteria came from a specification from Samsung SDS – Samsung's systems integration company – for example for intelligent bus, bus stop communications, normally sourcing would be internal to Samsung Electronics or the Samsung Electronics family of partners.

5.3.5. Components

Components would be the ones used in corresponding or related mobile systems or developed through joint researches.

5.3.6. Assembly points

The assembly point would depend on the volume required and the ultimate customer. For products for most of the world, the expected assembly point would be Korea. This might be either Seoul Commtech, or Samsung Mobile Media Division. For a Chinese customer, the assembly point would be China, and for a future Hyundai-Motors/Samsung collaborative product could be Korea, China, India or Vietnam. However logistic considerations and just-in-time factors would make Gumi the logical choice.

5.3.7. Marketing and Sales

These could be handled through the country's marketing system feeding orders to the centre.

5.3.8. After service

This would normally be outsourced to qualified service providers and built into the logistic services as described in previous sections. However where the unit is installed as a tablet in a vehicle, special arrangements would need to be made with vehicle service stations.

5.3.9. Patents

The numbers of patents held in this area are unknown at the present time.

6. Identification of Samsung Electronics' affiliates and spin-offs within mobile media and connected vehicles areas

6.1. Overview

The purpose of this section is to identify affiliates which are important for participation in Samsung's GVC including their business information (partly contained in an appendix).

6.2. Korean based

6.2.1. Product development:

The organisations involved in product development are Samsung Advanced Institute of Technology (SAIT), Seoul Commtech (SCOMMTECH) and various contracted universities. The various design centers also help develop products. The product divisions then develop them to production level, normally in Korea, but increasingly in China.

6.2.2. Production

- **Samsung Electronics Gumi**

Gumi is the heart of Samsung's mobile production. In the year 1996, Samsung Electronics completed a \$370 million multimedia plant in Gumi, which is a part of Gyeongsang Province in South Korea. In this area, Samsung expanded production capacity for multimedia infrastructure and integrated operations. The main purpose of establishing multimedia plan is to specialise the production of telecommunications network hardware such as switching systems and optical fiber cable. ^{xxiv}

- **SCOMMTECH (www.SamsungNavi.co.kr)**

Seoul Commtech is a typical example of Samsung's confusing eco-system. Originally founded for network phones and PABX, and moving into home automation, it began to develop the ubiquitous system in the 2000s. Samsung Electronics owns 45.8% and Lee Jae-Young (son of Samsung Group Chairman) owns 36.5% personally. Consequently, it is not consolidated with Samsung Electronics although he is the President of Samsung Electronics. Sales in 2010 were KRW255 billion (C\$231.8 million)

- **Samsung SDS**

Samsung SDS describes itself as a Smart Infrastructure Engineering (SIE) company whose capacity expands across the Korean goals of a ubiquitous city into buildings as well as its transport systems. Its ITS division applies latest technologies in electronics, information & telecommunication to the existing transportation components such as road and vehicles to operate transportation facilities efficiently and provide useful information to users. It is essentially a digital systems integrator. Sales in 2010 were KRW3.6 trillion (C\$3.3 billion), an increase of 44% over 2009.

6.3. Other countries

6.3.1. Product development

In product development, three institutions stand out, Samsung India Software Operations (SISO) in India for software, Samsung Information Systems America (SISA) in San Jose, California in the USA and the overseas centers of Samsung Advanced Institute of Technology (SAIT). The various design centers also help develop products. The product divisions then develop them to production level, normally in Korea, but in the future increasingly in China.

6.3.2. Production

The following companies are the 37 Samsung affiliates which are involved in production or services which are, or may in the future, related to mobile media and related components and potentially connected vehicles. Given the fact that China is the future of automobile production both as the largest market in the world, and also as the largest producer one day, due attention should be given to the Chinese subsidiaries.

Figure 35: Samsung Electronics - List of Production Factories

	Type of Businesses	Name of Subsidiary	Region/Country
1	Production and sale of electronic goods	Samsung Electronics Mexico	America
2	Production and sale of electronic goods	Samsung Electronica da Amazonia	America
3	Production and sale of electronic goods	Samsung Electronics Hungarian	America
4	Production and sale of electronic goods	Samsung Electronics Display (M) Sdn Bhd	Asia Pacific
5	Production and sale of electronic goods	Samsung Electronics Indonesia	Asia Pacific
6	Production and sale of electronic goods	Thai Samsung Electronics	Asia Pacific
7	Production and sale of electronic goods	Samsung India Electronics	Asia Pacific
8	Production of electronic goods	Samsung Mexicana S.A de C.V	America
9	Production of electronic goods	Samsung Electronics Poland Manufacturing	Europe
10	Production of electronic goods	Samsung Electronics Vietnam	Asia Pacific
11	Production of electronic goods	Samsung Electronics Horizon	Asia Pacific
12	Production of electronic goods	Tianjin Samsung Electronics	Asia Pacific
13	Production and sale of note PC's	Samsung Electronic Suzhou Computer	China
14	TFT-LCD Processing	Samsung Electronics LCD Slovakia	Europe
15	TFT-LCD Processing	Samsung Electronics Suzhou LCD	China
16	TFT-LCD Production	Dongguan Samsung Mobile Display	China
17	TFT-LCD Production	Tianjin Samsung Mobile Display	China
18	Investment in Venture Firms and New Technologies	SVIC #6 Venture Capital Union	
19	Investment in Venture Firms and New Technologies	SVIC #7 Venture Capital Union	
20	Investment in Venture Firms and New Technologies	SVIC #14 Venture Capital Union	
21	Investment in Venture Firms and New Technologies	SVIC #20 Venture Capital Union	
22	R&D (Software Operations)	Samsung India Software Operations	India
23	R&D Telecom	Beijing Samsung Telecom R&D Center	China
24	R&D Semiconductor	Samsung Semiconductor China R&D Center	China
25	R&D	Samsung Guangzhou Mobile R&D Center	China
26	R&D	Samsun Tianjin Mobile Development Center	China
27	R&D	Samsung Information Systems America	America
28	R&D	Samsung Electronics China R&D Center	China
29	ODD Production	Samsung Electronics Philippines Manufacturing	Philippines
30	Production of camera/camcorder	Tianjing Samsung Opto-Electronics Co., Ltd.	China
31	Optic cable, camera module	SEHF Korea	South Korea
32	Manufacturing and Sale of TFT-LCD	S-LCD Corporation	South Korea
33	Handset Production	Tianjin Samsung Telecom Technology	China
34	Handset Production	Shenzen Samsung Kejian Mobile Telecommunication technology	China
35	Logistics	Samsung Electronics Europe Logistics	Europe
36	Total logistic Services	Samsung Electronics Logitech	South Korea
37	Services	Samsung Electronics (Beijing) Service Company	China

Source: Samsung Electronics' Business Report Q2 2011

7. Recommendations to Canadian companies for participation in Samsung's global value chain for mobile media and connected vehicles areas

7.1. Basic principles for participation

The most important thing in many aspects of Korean business is the introduction, and the way that a person or company is introduced. In the preceding sections, the formal application process to become a partner has been described. Many believe that without a personal introduction, or an inside contact, these applications will not succeed, especially if this is related to qualification as suppliers and not as R&D partners. Acceptance is particularly difficult for a foreign SME, as size matters in Korea – and this affects the qualifications to become a partner. Start-ups with no track record will not get far, except through the SAIT system. However, with the exception of brilliant start-ups, it is unlikely to get through the SEC bureaucracy without having a tie up with a larger concern, which ideally would have an established relationship with Samsung, or – and this may be easier for a start-up – with a Canadian university or research institute or a global research institute. Being on the MIT Science Park or Cambridge UK science park would also increase the credentials. Business location on the science park of a Canadian university might also help.

7.2. Formal registration systems

Formal registration procedures exist for each stage of the value chain. The main stages were outlined in section 4.3. Samsung has clear guidelines for registration as a partner and agency/partner selection process/guidelines. Once the partnership agreement is established the Canadian company will be notified of potential cooperation opportunities.

Samsung believes that a company begins to qualify when it has a turnover of US\$3 million, or 20 or more employees. However, possessing patents would also count as a qualification.

Even if qualified, cold calling Samsung to speed the process probably will not help. There should be an introduction or expression of interest from a point in the Samsung eco system - this might be SAIT, a university with a contract with Samsung, an existing supplier or an ex-Samsung employee or a Samsung development executive or another Samsung subsidiary or overseas office. Simple go-between, like an introduction from the Canadian Embassy that is not in a direct commercial or research relationship will probably be of limited use.

7.3. Beyond participation - seeking Samsung's investment

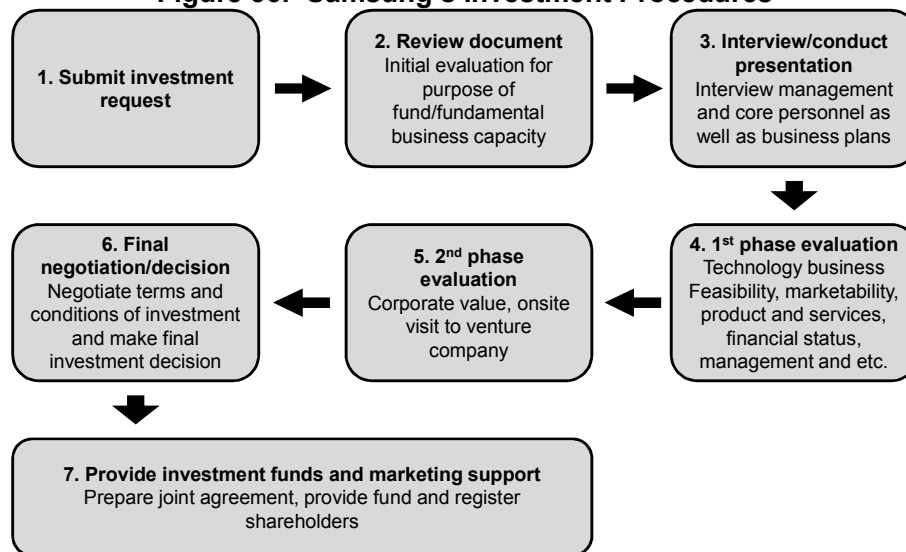
Samsung is now in acquisition mode and will consider acquiring appropriate operations with a proven track record. Alternatively for start-ups, Samsung has a series of venture capital funds described earlier, which may consider applications administered by Samsung Venture Investment Corporation.

Samsung Venture Investment Corporation, introduced in section 4, is the corporate venture capital arm of the Samsung Group. The main role of the company is to provide financial resources to start-up companies in the areas of information technology, communications, semiconductors, electronics and biotechnology. Samsung Venture Investment Corporation collectively manages over US\$452 million for the limited partners and has invested over US\$447 million.^{xxv}

Samsung Venture Investment Corporation focuses on future-oriented businesses based on new and innovative technology. It also focuses in promoting the establishment of small and medium sized companies including semiconductor, telecommunication, software, internet, bioengineering and medical industry, film/video industry while potential investment subjects ranging from start-ups to established companies that are about to be listed in the stock market. It has also approached electric vehicle companies in the last 15 months.

For interested start-ups and suppliers, Samsung Venture Investment Corporation has procedures as described in figure 36

Figure 36: Samsung's Investment Procedures



Source: www.samsungventures.com

Past experiences suggest that conversations with this organization even for entry into other parts of the organization will always be valuable as the executives frequently come from other divisions of Samsung and may provide introductions.

7.4. Joint research or problem solving

7.4.1. SAIT Global Research Outreach Program

The simple way to participate is to join the SAIT Global Research Outreach (GRO) Program, which is SAIT's annual call for proposals, open to world's leading universities. "With this call, SAIT invites your novel research ideas in SAIT's research fields. Your ideas will be reviewed and selected by annually appointed SAIT technology board members for its novelty and alignment with SAIT's research direction." The 2011 call for proposals identified 33 qualified programs from universities around the world.

However, the inside track appears to be held by the Georgia Institute of Technology, which was awarded 6 of the 33.

Note that the university must accept the application first. To be eligible, an authorized legal office of the universities must complete and sign the Acceptance Letter. The Acceptance Letter template is available on the website GRO Research Agreement Acceptance Letter

Selected proposals will be financially supported for one year, contract based, in a range of US\$50,000 to US\$100,000, including any overhead. Based on research outcomes and internal request for research continuance, the contract may be renewed up to three years. Joint research proposals are also accepted.

The SAIT GRO program is expected to become a platform that universities and SAIT build mutually prosperous relationships on research collaboration. SAIT welcomes questions or comments and looks forward to the contributors' participation.

7.4.2. Core Network Program – Global Expert Network at SAIT

More difficult to enter is the Core Network which envisages a global group of 40 experts. However, it is also envisaged that each expert would act as a hub. Core Network members will have opportunities to work closely with Samsung - a company with a diverse and successful portfolio of products suited for the era of digital convergence. Core Network will consist of about 40 experts around the globe per business area, and will be continually expanded. Members will also be connected to each other through Samsung to exchange innovative ideas of mutual interest.

Members of Samsung Core Network can participate in the followings:

- Sharing ideas on technology fusion and multidisciplinary collaboration to overcome significant technical challenges
- Advising on research strategy, based on view of future mega trends
- Collaborating on development of new business opportunities and research themes

7.5. Collaboration with other partners working with Samsung

Especially in the connected vehicle area, collaboration with Korean universities or other non-Samsung entities are possible. In Daegu, Samsung is working with other companies and universities to produce advanced automobile components, and in Ulsan, Samsung SDI – manufacturing displays for mobile phones and TVs - oversees an industrial estate of suppliers of electronic components with a similar purpose.

7.6. Best practises in supplying to Samsung

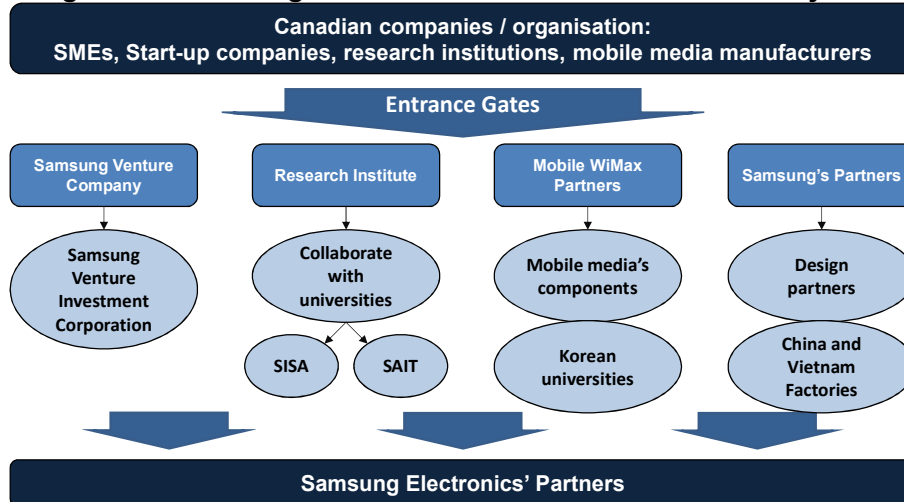
Samsung Corning is a long running joint venture based in Korea, supplying glass for Samsung Electronics devices. Corning basically has a single executive in Korea and leaves the Samsung's Korean employees to manage everything. Total Petrochemicals acquired 50% of the equity of Samsung Petrochemicals which supplies resins and other petrochemicals for the cases of Samsung devices. Total Petrochemicals leaves managing sales to Samsung to the Samsung executives. The lesson seems to be to let Samsung employees manage the relationship. Smaller Chinese and Vietnamese companies report

the same experience – it is the Samsung way or no way. All suppliers say that core to success is constant quality, willingness to meet new demands and keeping delivery dates. Employing Samsung staff to manage the relationship normally smooth procedural difficulties but is not essential.

7.7. Overview of entrance gates to Samsung's Partnership

The following figure shows the summary of mechanisms by which Canadian companies could become partners of Samsung Electronics:

Figure 37: Samsung Electronics Connected Vehicle Eco-System



Source: Consultants Estimate Based on Samsung's Data

8. Tips for Canadian Companies approaching Samsung

8.1. Overview

Past experiences suggest that approaching Samsung is not going to be easy. Careful preparation is required. This should include PowerPoint or word documentation (Korean is not essential) of no more than 10 pages in both hard and soft copy. It is likely that you will go through a referral process and that the referrer will need to forward some material to get the interest of the next person in the chain.

8.2. Hiring ex-Samsung employee

Samsung is an organization that encourages its managers who will be passed over for promotion to quit about the age of 40-45 and start a business as a supplier to Samsung. Some entrepreneurial managers also take advantage of this process. Any Korean hired can normally be expected to use his social and business network on behalf of his employer. In hiring a former Samsung executive the following points should be born in mind.

- 1) The executive left Samsung for a reason
- 2) The contractual arrangements must be clear
- 3) The prospective employee should have worked in a relevant area at Samsung

Samsung Electronics has also hired thousands of foreign engineers and others who retain contacts within the company. The level at which these engineers worked and their on-going contacts should be gauged.

8.3. 10 best entry points for Canadian companies

The following points are written with SMEs in mind. Larger companies may be able to develop direct contacts through existing channels.

- 1) Contact SAIT, SISA or SISO for advice on whether the idea, concept or product is of interest to Samsung
- 2) Form an alliance with a Canadian or other academic institution which acts as a form of pre-qualification and apply through the GROW system of SAIT (see section 8 and appendix)
- 3) Retain an expert consulting company with experience of dealing with Samsung Electronics. There are ex-Samsung employees who act as agents for would-be partners who can be contacted through this channel
- 4) Use the value chain analysis in this report to pin point the appropriate division or entity within the Samsung universe and try to contact it directly through phone and email. It will be advisable to have a Korean speaking associate in this process
- 5) Approach through subsidiaries like SCOMMTECH, Samsung SDS or Samsung Electronics Logitech, etc.
- 6) Make face to face contact with Samsung Electronics USA to ask their guidance on who to contact
- 7) Contact research institutes working with Samsung

- 8) Contact Intelligent Transportation Society (ITS) either directly or through the corresponding Canadian entity for introduction on connected vehicles
- 9) Exploit a Chinese connection. Since Samsung is focussed on sourcing from China, using an approach through China may be appropriate. In the future Vietnam may also be an entry point.
- 10) Apply to Samsung Venture Capital for funding

The commercial section of the Embassy may also be able to advice and can try to find appropriate contacts that can be used to connect to the correct division of Samsung.

9. Appendix with further details and contacts

Here are basic contact points, website, email address and phone numbers.

9.1. Research Proposal to GROW outreach contact e-mails:

Proposals are recommended to be less than 10 pages, single space. Additional pages, however, may be added for supporting figures, images, data or other documentations, which will not count against the 10 pages limit. Please see this link for more detail on 2011 GRO Proposal Guide.

- North America : gro.usa@samsung.com
- Europe : gro.europe@samsung.com
- India : gro.india@samsung.com
- Japan : gro.japan@samsung.com
- China : gro.china@samsung.com
- Russia : gro.russia@samsung.com

9.2. Samsung Technology Sourcing Collaboration (STSC)

To introduce the company's profile, Samsung requires filling the information of the company and the proposed form of relationship (Partnership, Venture Investment, IP Acquisition/M&A, feedback on business plan) in the application.

9.3. Samsung LTE, Mobile WiMAX Partnership

To be a partner of Samsung on LTE and Mobile WiMAX, candidates should download the application form from following website and send the completed application to

9.4. Samsung Venture Investment Corporation

Address: Samsung Electronics Seocho Tower 29F, 1320-10 Seocho 2-Dong, Seocho-Gu, Seoul, Korea
Tel: +82-2-2255-0299

9.5. Seoul Commtech

Address: 448-11 Sungnae 3-dong, Gangdong-gu, Seoul, Korea

Tel: +82-2-2225-6000

9.6. Samsung SDS
