Analysis of Automotive Telematics Industry in Japan

by

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Submitted to the Alfred P. Sloan School of Management
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Master of Science in the Management of Technology

at the

Massachusetts Institute of Technology

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Abstract

A major element of mobile multimedia, telematics is the convergence of telecommunication and information technology which provides various services to and from the vehicle or mobile communication devices. Telematics is also a new technology which accelerates the rate of technological evolution in the automotive electronics industry. Similar to the United States and Europe, Japan is one of the nations which have advanced automotive technologies. Japanese telematics, however, doesn’t have a long history. On the other hand, Japan has unique business circumstances such as highly developed mobile communication technology and contents business. The purpose of this study is to unlock the industrial structure and dynamics of the telematics industry in Japan. In addition, providing indications for building business strategies for telematics players such as automakers, auto suppliers and other industries is another objective.

According to the “clockspeed” analysis, telematics clockspeed is much faster than that of automobiles. This situation creates a boundary called clockspeed collision between these two industries. Clockspeed collision will increase market pressure on automakers to provide updated electronic features and to reduce exposure of obsolescence. Clockspeed collision will also significantly affect the business strategies that each player involved in the telematics industry must consider.

Value chain analysis illustrates that the telematics industry has a horizontally disintegrated structure. Also the fact that automakers have advantages in the industry is presented. In such situation, the “business double helix” explains that automakers’ advantages will be unstable in the future. Namely, the supplier sector in the industry will have significant incentives to move from a horizontal structure to a vertical structure due to its huge market power. My research shows that telematics industry has already started to move toward a much more vertically integrated structure.

These analyses lead to conclusions that each player in the telematics industry must recognize a principle of temporary advantage and that the automotive industry is moving from automobile production to maximizing customer’s LTV (Life Time Value).

Thesis Supervisor: Charles H. Fine
Title: Chrysler LFM Professor of Management, MIT Sloan School of Management
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I owe a debt of gratitude to my colleagues at Yazaki Corporation, including Mr. Takashi Iwamura, Mr. Tsuyoshi Hoshino, Mr. Keiji Nakamura, Mr. Hiromi Nagasawa, Mr. Toshiaki Ozaki, and Mr. Takao Ohta for their support and encouragement throughout my study at the Management of Technology Program at MIT.

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Chapter 1

Introduction

1.1 Motivation

Maturity of the automotive industry in Japan started in the 1970s. Automobiles reached every part of the country and were purchased by most of people who need it. Besides enhanced fundamental performances such as “running”, “turning”, and “stopping”, automobiles were also required to be a comfortable mobile space in the 1980s. New automotive electronics technologies such as automatic transmission, power steering system, and air conditioner became popular in this era. And since the 1990s, automotive electronics has been evolving toward mobile multimedia [1]. Rapid diffusion of the car navigation system is an example.

A major element of mobile multimedia, telematics is the convergence of telecommunication and information technology which provides various services to and from the vehicle or mobile communication devices. Also telematics business is expected to be a new business opportunity in the automotive industry, and market of telematics hardware and subscription services is estimated to grow to $27 billion by 2005 [2].

Although current Japanese telematics systems are developed under major automakers’ initiatives, there are lots of players in telematics business, and their roles in the industry are becoming increasingly important all the time. The purpose of my study is to unlock the industrial structure and dynamics of the telematics industry in Japan. In addition,
providing indications for building business strategies for telematics players such as automakers, auto suppliers and other industries is another objective.

1.2 Focus and Scope

Similar to the United States and Europe, Japan is one of the nations which have advanced automotive technologies. Japanese telematics, however, doesn’t have long history. On the other hand, Japan has unique business circumstances such as highly developed mobile communication technology and contents business.

Considering these situation, I decided to focus on business, industry, and players of telematics in Japan. I believe that this study will reveal the distinctive Japanese industrial structure and its dynamics, and that it will be a meaningful study for research of the future telematics world.

1.3 Research Approach

In order to pursue this study’s purpose, appropriate management tools like the concepts of Clockspeed and Business Double Helix brought about by Fine [3], and value chain analysis are used in this thesis. In addition to a literature search focusing on technology, business and industry structure, the data needed for this thesis was collected by interviews with telematics players.

Chapter 2 provides an overview of Japanese telematics. Chapter 3 examines the collision between the rates of evolution of automobiles and telematics. Chapter 4 reviews the telematics value chain and compares it with the conventional automotive value chain. Chapter 5 discusses the industrial structure and its dynamics, and focuses on the great
transition which players are facing. Chapter 6 provides the conclusion. A content of interviews with telematics players is shown in the Appendix.
Chapter 2

Telematics Overview in Japan

2.1 Introduction

This chapter focuses on background of telematics industry and its current situation in Japan. Similar to the United States and Europe, Japan is one of the nations which have advanced automotive technologies. Thus, telematics services in Japan attract our interests naturally. On the other hand, Japan has unique business circumstances such as highly developed mobile communication technology and contents business, and it can be considered that they affect Japanese telematics industry significantly. Therefore, in order to recognize the unique social circumstances and industrial history, a telematics overview is presented in this chapter.

2.2 ITS (Intelligent Transport Systems)

2.2.1 ITS in Japan

Before describing telematics business in Japan, the cutting-edge automotive technology called ITS (Intelligent Transport Systems) must be reconsidered because the ITS is closely related with telematics in terms of its emergence and technologies.

Becoming popular through broadcasted news or published articles, the ITS is one of the important national level projects for advanced transport systems (as well as in the United
States and Europe). Actually, this project is a large portion of the e-Japan priority policy program, with which Japan aims to become the world’s most advanced IT nation by 2005 [13]. The reason why development of the ITS is placed as a national project is that its market is expected to expand rapidly over the next few decades. In fact, ITS Japan, established as a parent body to promote the ITS development in Japan, estimated that the potential market will reach to about 50 trillion yen.

The ITS is defined as the system which gives a fundamental solution to various issues concerning transportation which include traffic accidents, congestion and environmental pollution through the most advanced communications and control technologies, and it receives and transmits information on humans, roads, and automobiles. Figure 1 is the concept of the ITS [18], and its objectives summarized by ITS Japan is shown in Figure 2 [14].

At the present time, the ITS project in Japan is focusing on nine development areas (see Table 1. Description of each area is extracted from ITS Japan Website). Core technologies in telematics have also been developed in these areas.

In next two sections, situations of the ITS in Europe and the United States are introduced.

---

1 ITS Japan Website. [http://www.iijnet.or.jp/vertis/e-frame.html](http://www.iijnet.or.jp/vertis/e-frame.html)
Figure 1: Concept of the ITS

Figure 2: Objectives of the ITS
Table 1: Nine Development Areas of the ITS

<table>
<thead>
<tr>
<th>Research and Development Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advances in Navigation Systems</td>
<td>To improve driver convenience, traffic information is distributed to the driver via the navigation system that is compatible with the on-demand function and information supply units so that optimum behavior concerning the route and travel time can be selected, best distributing the traffic flow.</td>
</tr>
<tr>
<td>Electronic Toll Collection Systems</td>
<td>Electronic toll collection is enabled without stopping at the tollgate to eliminate traffic congestion, improve driver convenience by cashless payment, and reduce administrative costs.</td>
</tr>
<tr>
<td>Assistance for Safe Driving</td>
<td>To prevent traffic accidents, various types of sensors are used on the road and in the vehicles to collect driving conditions data including the ambient road and vehicle situation.</td>
</tr>
<tr>
<td>Optimization of Traffic Management</td>
<td>To improve traffic safety, driving amenities, and the road environment, optimum signal control is implemented for the entire road network as well as for areas with exceptional traffic congestion and damaged roadside environments.</td>
</tr>
<tr>
<td>Increasing Efficiency in Road Management</td>
<td>Determination of the optimum work period, planning of the working arrangement, and provision of directions to the vehicles are performed by accurately identifying road surface conditions and work vehicle positions to maintain a safe, smooth and pleasant driving environment in accordance with the social condition and nature of each region.</td>
</tr>
<tr>
<td>Support for Pedestrians</td>
<td>Support is given to choose flexible transport measures, transfer and departure time zones suitable for the needs of the public transport users to improve convenience for the users.</td>
</tr>
<tr>
<td>Support for Emergency Vehicle Operation</td>
<td>To greatly improve transport efficiency, reduce commercial traffic and improve transport safety, operation administration is supported by real-time collection of operation status of trucks and tourist buses and distributed as basic data to the transport operators.</td>
</tr>
</tbody>
</table>
2.2.2 ITS in Europe

The organization promoting the ITS in Europe is called ERTICO (European Road Transport Telematics Information Coordination Organization) which was established in 1991 [15]. At ERTICO, over 80 companies such as Bosch, Siemens, BMW, Motorola, Nokia, Sony, Volvo, government offices, and organizations are in active.

ERTICO’s mission is to build several standards regarding core ITS technologies widely. Examples of their achievements are WAP (Wireless Application Protocol), in-vehicle multi-bus architecture, and digital maps.

Because each country borders on in Europe, not only automobiles but also railroads, ships, and aircrafts are considered as important transportations, and ERTICO has been developing with wide perspectives including these transportations.

Rapid growth of car navigation market is another characteristic in Europe, with 200,000 units, 400,000 units, and 900,000 units shipped in 1998, 1999, and 2000 respectively [12].

2.2.3 ITS in the United States

In the United States, ITS America has the initiative for domestic development of the ITS [16]. Internal and external administrative organs, universities, research institutes, and various companies are listed as leading members, and the number of the members exceeds 630.

Similar to ERTICO, their activities are basically standardization, research and development, and popularization of the ITS. They also provide on-line access services on the Internet.
Additionally, the action called TEA21 (Transportation Equity Act for the 21st Century) was started by federal government in 1998. In this act, an approved 51.3 billion US dollar budget will be used for the ITS related activities.

Regarding the characteristics of the ITS in the United States, Fujita mentioned that the emphasis is on making the ITS fit for practical use rather than on basic research, and that the telematics market has already taken root with the advent of the GM’s Onstar [12].

2.3 Telematics and ITS

Under international cooperation with organizations mentioned above, the ITS development in Japan has been progressed actively (see Figure 3 [14]).

![Diagram of international cooperation on ITS]

Figure 3: International Cooperation on ITS

However, for a business perspective, penetration of the ITS is unfavorable. ETC (Electric Toll Correction, see Table 1) is an example. Although ETC was started in 2001 with backing from the administration, the number of subscribers is 10-20% of estimated
value even though several support policies have been enforced. Because of this fact, the growth of the ITS business is regarded as questionable recently.

The main reason for this situation is regarded as failure to capture consumer’s actual needs. As mentioned above, the ITS project has been supported by the government and R&D divisions in the ITS related firms. As a result of this, the ITS in Japan has become a extremely technology-oriented project. Specifically, developers aim at highly complicated technologies such as automated vehicles, and not what consumers in the market really want. Naturally consumers don’t accept such unrealistic products. Because of that, the ITS related firms which had been expending huge R&D costs hesitate to expand its business area to the ITS field rapidly.

Technologies used for telematics, such as mobile communication, in-vehicle devices, and satellite technology, have been developed within the ITS project. However, there is a significant difference between telematics and ITS. While the ITS has been led by the government and R&D divisions, telematics was introduced by automakers which are familiar with the automotive market and consumers’ needs. Also, not only automakers but also auto suppliers, telecommunication companies, consumer electronics companies, and solution vendors have been entering this business field with various ideas and technologies. Therefore, the telematics business shows a totally different aspect compared with the ITS, and is expected to create new business opportunities.
2.4 Telematics Business in Japan

2.4.1 Potential of Telematics Business in Japan

Fujita mentioned that because it is a private demand-centered business compared with the ITS, telematics can be considered as a key driver of breaking through for the spiritless ITS business. And it is important that leading organizations of telematics are major automakers because many automakers have superior marketing management, and that capability can be applied to the telematics business [12].

Also Matsumoto pointed out that Japan has three important industrial circumstances for telematics business. Firstly, in addition to existing world-wide automakers, there are automotive electronics suppliers which have outstanding technologies. Rapid growth and high performance of car navigation systems are examples. Secondly, network infrastructure, communication technology, and know-how of contents business centered on the mobile phone service are well established. For example, success of the mobile phone-based Internet service, called i-mode, provides NTT Docomo with a powerful base of telematics. Thirdly, Japanese people are sensitive to new technologies and are tolerant for investments towards cutting edge technologies. Therefore, telematics can be expected to be accepted by a lot of consumers in the early stage [10].

It can be said that these characteristics will be significant drivers for success of the telematics business in Japan.
2.4.2 Pioneers of Japanese Telematics

Before the recent reinvigoration of the telematics business, each automaker had previously attempted to enter the businesses, e.g., Toyota’s MONET (MOBILE NETwork), Nissan’s CompassLink and Honda’s InterNavi. They were launched in 1998 simultaneously and can be called the first telematics businesses in Japan. For example, MONET provided e-mailing service, information regarding weather, traffic, events, routing to police stations and hospitals, and also emergency call service called HELPNET system was available.

However, because of expensive communication fees, low transmission speeds, and lack of attractive contents, the number of subscribers was not as many as telematics service providers expected. It must be said that their trials failed.

In order to improve this situation, in 2002, Toyota, Nissan, and Honda re-launched new telematics services which were fully prepared for the problems the former telematics services had. (Currently, Mazda and Subaru decided to receive Toyota’s telematics service)

Toyota’s G-BOOK has adopted a fixed amount charge. Since it has a built-in wireless communication device, users don’t need to use their mobile phone for communication on telematics. Toyota has learnt from its troubles with fee collection on MONET. For Nissan, its telematics called Carwings has an advantage in that the quality of operators in its telematics portal is high (see Appendix). Since operators play important roles for users who are unfamiliar to machines, this advantage is powerful. Honda’s Intenavi Premium Club has superior capability in the dynamic routing application.
2.4.3 Telematics Applications

Telematics applications carried out now are roughly divided into two categories; general applications and vehicle related applications. General applications are applications which are available on the Internet using personal computers or mobile phones. On the other hand, vehicle related applications are applications peculiar to cars. Fujita classified them into four categories further, respectively. Table 2 shows Fujita’s classification and the applications considered.
Table 2: Telematics Applications

<table>
<thead>
<tr>
<th>1st Category</th>
<th>2nd Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Applications</td>
<td>Information</td>
<td>News, Weather, Traffic Status, Shopping, Events</td>
</tr>
<tr>
<td></td>
<td>Entertainment</td>
<td>Games, Video, Music, Karaoke</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>E-mailing, Reservation, Hand-free phone</td>
</tr>
<tr>
<td></td>
<td>Commerce</td>
<td>Internet shopping, Banking, Coupon</td>
</tr>
<tr>
<td>Vehicle Related</td>
<td>Navigation</td>
<td>Routing, Dynamic traffic information (VICS: Vehicle Information and</td>
</tr>
<tr>
<td>Applications</td>
<td></td>
<td>Communication System [19]), Digital map downloading, Reservation of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>parking lots</td>
</tr>
<tr>
<td></td>
<td>Emergence</td>
<td>Automatic/hand-operated emergency call, Tracking of stolen vehicles</td>
</tr>
<tr>
<td></td>
<td>Net-Care</td>
<td>Remote vehicle diagnosis, Software download/update</td>
</tr>
<tr>
<td></td>
<td>Intelligent Car</td>
<td>Automated speed/steering wheel/brake control</td>
</tr>
</tbody>
</table>

2.4.4 Structure of Telematics System

In general, the telematics system consists of in-vehicle/out-vehicle communication terminals, network infrastructure, and telematics portals which have operators and various servers. According to Nissan, Carwings is structured as shown in Figure 5.

In terms of its applications and system, the telematics industry is more complicated than the conventional automotive industry. In order to analyze the telematics industry, the clockspeed concept and value chain will be used.
Figure 5: Structure of Telematics System (Nissan)
Chapter 3

Clockspeed Analysis of Telematics Industry

3.1 Introduction

Since the introduction of electronics for automobiles, the evolution of automotive electronics has advanced rapidly. And now that mobile communication such as telematics is introduced for vehicles, the interface between automotive electronics and vehicles grows in significance. Managing these two aspects will be an important challenge for the automotive industry due to difference between product life cycles and its acceleration.

In order to consider these factors, the concept developed by Fine [3] is applied to telematics and automotive electronics in this chapter. The concept is a complex and relatively new management tool.

3.2 The Clockspeed Concept

3.2.1 Origin of the Concept

The concept of “Clockspeed” was brought by Fine [3]. After reading the Nobel work that three researchers studied in medicine based on mutations in generations of fruit flies, he found that industries that evolved at faster rates than others can be studied in order to more quickly test his hypothesis. Clockspeed, i.e., the rate of evolution, is an important
concept to understand industrial structure dynamics. Fine also mentioned that not only dose each industry have product clockspeed but its processes and organizations also have unique clockspeeds. Actually, he and his staff investigated product clockspeeds, process clockspeeds, and organization clockspeeds for various industries. The results are shown in Table 3 [3].

Clockspeed analysis is a method of understanding product lifecycle acceleration, modular architecture, and supply chain design to create or maintain a competitive advantage. Thus, measuring clockspeeds is strategically important for every industry.
<table>
<thead>
<tr>
<th>Industry</th>
<th>Product Tech Clockspeed</th>
<th>Process Tech Clockspeed</th>
<th>Organizational Clockspeed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FAST CLOCKSPED INDUSTRIES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Computers</td>
<td>&lt; 6 months</td>
<td>2-4 years</td>
<td>2-4 years</td>
</tr>
<tr>
<td>Computer-aided software engineering</td>
<td>6 months</td>
<td>2-4 years</td>
<td>2-4 years</td>
</tr>
<tr>
<td>Toys and games</td>
<td>&lt; one year</td>
<td>5-15 years</td>
<td>5-15 years</td>
</tr>
<tr>
<td>Athletic Footwear</td>
<td>&lt; one year</td>
<td>5-15 years</td>
<td>5-15 years</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>1-2 years</td>
<td>2-3 years</td>
<td>3-10 years</td>
</tr>
<tr>
<td>Cosmetics</td>
<td>2-3 years</td>
<td>5-10 years</td>
<td>10-20 years</td>
</tr>
<tr>
<td><strong>MEDIUM CLOCKSPED INDUSTRIES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycles</td>
<td>4-6 years</td>
<td>10-15 years</td>
<td>20-25 years</td>
</tr>
<tr>
<td>Automobiles</td>
<td>4-6 years</td>
<td>4-6 years</td>
<td>10-15 years</td>
</tr>
<tr>
<td>Computer operating systems</td>
<td>5-10 years</td>
<td>5-10 years</td>
<td>5-10 years</td>
</tr>
<tr>
<td>Agriculture</td>
<td>3-8 years</td>
<td>5-10 years</td>
<td>8-10 years</td>
</tr>
<tr>
<td>Fast food</td>
<td>3-8 years</td>
<td>25-50 years</td>
<td>5-25 years</td>
</tr>
<tr>
<td>Beer brewing</td>
<td>4-6 years</td>
<td>400 years</td>
<td>2-3 years</td>
</tr>
<tr>
<td>Airlines</td>
<td>5-7 years</td>
<td>25 years (Hardware)</td>
<td>&lt; 5 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-3 years (Software)</td>
<td></td>
</tr>
<tr>
<td>Machine tools</td>
<td>6-10 years</td>
<td>6-10 years</td>
<td>10-15 years</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>7-15 years</td>
<td>10-20 years</td>
<td>5-10 years</td>
</tr>
<tr>
<td><strong>SLOW CLOCKSPED INDUSTRIES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aircraft (commercial)</td>
<td>10-20 years</td>
<td>5-30 years</td>
<td>20-30 years</td>
</tr>
<tr>
<td>Tobacco</td>
<td>1-2 years</td>
<td>20-30 years</td>
<td>20-30 years</td>
</tr>
<tr>
<td>Steel</td>
<td>20-40 years</td>
<td>10-20 years</td>
<td>50-100 years</td>
</tr>
<tr>
<td>Aircraft (military)</td>
<td>20-30 years</td>
<td>5-30 years</td>
<td>2-3 years</td>
</tr>
<tr>
<td>Shipbuilding</td>
<td>25-35 years</td>
<td>5-30 years</td>
<td>10-30 years</td>
</tr>
<tr>
<td>Petrochemicals</td>
<td>10-20 years</td>
<td>20-40 years</td>
<td>20-40 years</td>
</tr>
<tr>
<td>Paper</td>
<td>10-20 years</td>
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<td>20-40 years</td>
</tr>
<tr>
<td>Electricity</td>
<td>100 years</td>
<td>25-50 years</td>
<td>50-75 years</td>
</tr>
<tr>
<td>Diamond mining</td>
<td>Centuries</td>
<td>20-30 years</td>
<td>50-100 years</td>
</tr>
</tbody>
</table>
3.2.2 Clockspeed Collision

Many automakers have been operating at engine or body clockspeed which is relatively slow. According to Fine, however, automakers will need to run at electronics clockspeed in the future. As shown in Table 3, clockspeed of electronics such as personal computers is much faster than automobile clockspeed. Namely, it can be said that automotive clockspeed will be accelerated by electronics clockspeed hereafter.

In its process, however, there is a difficulty that automakers face. In other words, "when two industries that evolve at different clockspeeds come together, it creates a boundary"\(^2\). In the case of telematics, the technologies that make up telematics hardware and software evolve at a high rate. Providing not only vehicles but also telematics products and services, automakers need to manage this clockspeed collision between automobile and telematics in order to respond to market pressure.

The following sections focus on measuring the latest automotive and telematics clockspeed based on my research. Also, influences caused by the difference in clockspeeds and measures automakers are taking for the collisions are discussed.

3.3 Automotive Clockspeed

3.3.1 Vehicle Development Cycle

Since the middle of the 1990s, Japanese automakers have tried to reduce the development cycle of the products in order to cope with diverse consumer's needs. According to the interview with an auto supplier, while the vehicle development cycle of

basic models, which are the representative type of the platform, is still 2 - 3 years, automakers spend only 1 – 2 years for derived models. On the other hand, based on the results from the development cycle reduction activity, automakers have been shrinking its target development cycle year by year. Figure 6 shows the transition of automakers’ target development periods [17].

![Diagram showing vehicle development period]

Figure 6: Vehicle Development Period

It is said that the dramatic changes in the vehicle development cycle were brought about by platform sharing, modularization of car components, and benefits from CAD/CAM systems.
3.3.2 Product Lifecycle

In Japan, the conventional product lifecycle of vehicle was about 4 years. That is, automakers released a new type of the vehicle each 4 years. However this “4 years rule” has been changing recently. Actually, in contrast to the development cycle, the product lifecycle has been extended to 5 - 6 years although there are some variations, and design update and incremental improvement are enforced one or two times within its product lifecycle. Through this expansion of the product lifecycle, each automaker aims to reduce cost through economies of scale and the cutting down of research and development expenses.

As a background to this situation, the number of new cars sold has been decreasing since the 1990s because the automotive industry has matured. In fact, this situation in automotive industry affected introduction of telematics significantly. I will focus on this topic in Chapter 4 and Chapter 5.

3.4 Telematics Clockspeed

3.4.1 Measuring Telematics Clockspeed

The speed of changes in consumer, communication electronics is breathtaking. And even automotive electronics has a fast rate of evolution. For the Japanese automotive industry, the car navigation system is one of the automotive electronics which has the fastest clockspeed.

Japan is a huge market for the car navigation system – the system is expected to be one of the most important communication devices for telematics. According to my research,
Nissan, one of the major telematics service providers, regards telematics as one of information providing services derived from the conventional car navigation system (see Appendix). Therefore, I regard the clockspeed of the car navigation system as equivalent with telematics clockspeed.

### 3.4.2 Penetration of Car Navigation System

The car navigation system is an application of automotive electronics to let the driver identify the car location in relationship to the electrically generated map and to indicate route directions at various road intersections. Figure 7 is a block diagram showing the major components of a generic automatic navigation system [5]. Although the most popular type of the car navigation system is on-board electronic navigation, real-time off-board navigation systems are expected for future passenger car use. Such kinds of car navigation systems are potential devices for telematics [5].

![Diagram showing the components of a generic automatic navigation system](image)

*Figure 7: Genetic Automatic Navigation System*
Diffusion of the car navigation system is progressing dramatically. Figure 8 shows the accumulated number of shipped car navigation systems [18] and the estimated diffusion rate [20]. Fujita pointed out that there are three reasons for this high diffusion rate, which are road circumstances, characteristics of Japanese automakers, and provided contents [12]. Needless to say, roads in Japan are narrow, complicated, and congested. In addition there are lots of signals and crossings. Indicating precise directions to the driver, the car navigation system must be a helpful device to drive on such roads. Secondly, because of distinctive Japanese automaker-supplier relationships, in-vehicle device suppliers had made great efforts to respond to automakers’ request that they add value to the cars. It can be said that the rapid improvement of performance in the car navigation system has been caused by this automaker-supplier relationship. Thirdly, there are abundant contents for car navigation. High-quality digital residential maps are an example. These digital maps contribute to the performance of the car navigation systems – the visual effects affect consumers’ interest significantly.
3.4.3 Car Navigation System/Telematics Clockspeed

Car navigation systems, which can already be said to be household electronic appliances in Japan, have extremely fast clockspeed. According to the interview with a car navigation system provider, its average product lifecycle is 2 years though incremental improvements are enforced every 6 months. Also its development cycle is 12 – 18 months.

Compared with the automotive product lifecycle of 4 – 5 years, there is a clear difference of clockspeeds as shown in Figure 9.
Figure 9: Clockspeed Difference between Vehicle and Telematics

In addition, the mobile phone which is expected to be a mobile communication device in telematics has a faster clockspeed than that of the car navigation system. According to NTT Docomo, the product lifecycle of mobile phones is about half a year, and mobile phone users change their models every 1.5 – 2 year. Thus, it can be recognized that the telematics industry has a much faster clockspeed than the automotive industry.
3.5 Management of Clockspeed Collision

3.5.1 Marker Installation and After Market Installation

Everett terms a boundary which is created when two industries that evolve at different clockspeeds come together a “clockspeed collision boundary” [9]. Obviously, a clockspeed collision exists due to the difference between automotive and telematics clockspeeds as shown in Figure 9.

By the way, the car navigation market has two aspects; maker installation and after market installation. Maker installation means that the car navigation system is offered by automakers and is installed into user’s car by automakers or auto dealers. On the other hand, users can purchase the car navigation system provided by non-automakers such as in-vehicle device providers or consumer electronics providers at an auto parts shop. This is called after market installation. Characteristics of both installations are concluded in Table 4.

<table>
<thead>
<tr>
<th></th>
<th>Advantages</th>
<th>Disadvantages</th>
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</thead>
<tbody>
<tr>
<td><strong>Maker Installation</strong></td>
<td>✔ Fits interior design</td>
<td>✔ Few choices</td>
</tr>
<tr>
<td></td>
<td>✔ Has specialized functions for the car</td>
<td>✔ Users can’t change the device until repurchase his/her car</td>
</tr>
<tr>
<td><strong>After Market Installation</strong></td>
<td>✔ Users can change as users like</td>
<td>✔ Doesn’t fit interior design</td>
</tr>
<tr>
<td></td>
<td>✔ Users can choose the device from a lot of types and device suppliers</td>
<td>✔ Has no specialized functions for the car</td>
</tr>
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</table>
At this moment, telematics in-vehicle system is provided as maker installation. This is a key issue mentioned in next section.

3.5.2 Response for Clockspeed Collision

Clockspeed collision will increase market pressure on automakers to provide updated electronic features and to reduce exposure of obsolescence. Mentioning about different speeds of evolution between the car navigation system and automobile, Fujita gives a warning that automakers will have the risk if they focus on maker installation business because the evolution speed of car navigation systems is much faster than that of automobiles [12].

Interestingly, however, maker installation is becoming more popular than after market installation recently. Additionally, maker installation rate for new cars is increasing gradually. The transition of car navigation market in terms of both installations is shown in Figure 10.
Figure 10: Market Transition of Maker Installation and After Market Installation

Regarding the main reason behind the recent popularity of maker installation, Nissan mentioned the superior design and specialized function of the maker installed car navigation system. They are underlined characteristics in Table 4.

Figure 11 is an example of the communication terminal in the latest car from Nissan [21]. Considered for effective HMI (Human-Machine Interface), the recent communication terminal developed by automakers is designed as a part of the interior, and it fits the total design of the car rather much better than after market installed devices. Nissan also mentioned that design regarding driving interface is one important factor for the recent consumer’s decision to purchase.
Figure 11: Example of Communication Terminal (Nissan)

Similar to Fujita, automakers recognize that car navigation clockspeed is much faster than automobile clockspeed. However, if maker installation is done once, it is hard to replace it with other car navigation systems provided by non-automakers because it is costly for the consumers. Also hardware design of car navigation system provided by automakers is rarely changed. Therefore, it can be said that the lifecycle of maker installation is almost the same as the product lifecycle of vehicles.

However, in order to improve functions on the car navigation system, automakers are trying to establish the way that they can update the software by downloading using wireless communication in telematics (I couldn’t acquire detailed information about this in the interview because of confidentiality concerns). Therefore, clockspeed of software in the telematics system may have faster speed than that of hardware.
Chapter 4

Value Chain Analysis

4.1 Introduction

The profitability of the automobile manufacturing industry is decreasing year to year. While average profit margin of the automobile manufacturing industry was 16% in the 1980s, in the first half of the 1990s it decreased to 12%. For consumer electronics industry, it also decreased from 20.9% in the 1980s to 17.7% in the 1990s [11]. In such situation, how does telematics affect the profitability of the automotive industry?

The purpose of this chapter is to assess the value chain of the automotive industry affected by telematics. Through this analysis, I expect to structure a possible value chain of the telematics industry in Japan.

4.2 Conventional Value Chain in the Automotive industry

4.2.1 Conventional Automotive Value Chain

In general, automotive industry refers to companies which are related to vehicle production. And its value chain is organized as a complex chain centering on automakers (see Figure 12 [22]). Toyota is one of the successful automakers which structured a superior value chain in terms of manufacturing. They built up a closer connection with its
suppliers and distributors, and a powerful consistent chain called “Keiretsu” was established from upstream to downstream. In this chain, time, quantity and quality are optimized to maximum levels when suppliers and distributors coordinate each activity.

![Diagram of Conventional Automotive Value Chain in Japan](image)

**Figure 12: Conventional Automotive Value Chain in Japan**

### 4.2.2 Transition which automakers face

However, now that penetration of automobile possession has reached a high degree, it can be said that the automotive industry has matured. When demand for car purchase is satisfied, the era of profitable automotive manufacturing will be finished. Furthermore, when quality and performance of automobile increase, demand for repurchase of cars will
Figure 13: The Number of Registered New Cars

In fact, production is no longer a profit center within the automotive value chain. Sato and Yusa pointed out the fact that American automobile manufacturing business has only 15% among the profits of the whole automotive value chain [11]. In the interview, Nissan also mentioned that the profit of vehicle selling business occupies only a few percent among 90 trillion yen per year markets. Most of the profits from the automotive business are generated after vehicles are sold. According to the data from Nissan, loan and insurance - 15%, automobile inspections - 6%, maintenances - 6%, tires and equipments - 2.1%, batteries - 2.1%, oil and fuel - 0.4%, fees for highway and parking - 10%, and travels and entertainments - 9% are profitability rates in the whole market.

Since automotive industry had been focusing on developmental and manufacturing technologies, the automotive value chain is relatively short, and the industry was organized
as an optimal system for only automobile manufacturing in terms of supply chain, human resources management, and so on. Now, the automotive industry needs a business model based on the condition of possession, and not consumption, of vehicles. Telematics is expected as one of such business models.

### 4.3 Telematics Value Chain

#### 4.3.1 Key players in Telematics

There are various key players having important roles in the telematics industry. They are basically classified into three categories; software related, hardware related, and network related [12].

Among software-related players, there is a player called the “service provider” which provides the subscribers with the Internet or telematics services such as web surfing, car location, e-mailing, coupons and advertisements from stores or restaurants. Another player is called the “contents provider” which provides the service providers with modified contents and data. Basically, software-related providers are operated by automakers, auto dealers, internet service providers, advertisement firms, digital map distribution firms, or several other facilities.

Hardware-related players are automakers, consumer electronics firms, communication equipment firms, and in-vehicle device suppliers which provide the car navigation system that is expected to be a communication device for telematics. In addition, vendors of mobile phones and PDAs (Personal Digital Assistant) will have the potential to be hardware-related players.
Network-related players provide network infrastructure such as mobile communication infrastructure, wireless LAN, and ground station digital TV broadcasting, which are essential technologies for telematics. Telecommunication companies, broadcasting companies, and IT solution vendors which connect telematics to other businesses can be listed as network-related players.

Basically, the telematics value chain consists of these players.

4.3.2 Possible Telematics Value Chain

In order to add value to its business, the automotive industry needs to extend its value chain which was relatively short, and telematics business is expected to achieve this purpose. Namely, the new value chain generated by the advent of telematics can be added to the conventional automotive value chain (Figure 12), and value to the customers will be increased. Figure 14 is an example of a telematics value chain proposed by Nissan. In Toyota’s telematics, they are adopting a fixed amount charge for this service and mobile communication function is loaded within the telematics communication module. Therefore the mobile phone charge shown in Figure 14 is included in the telematics service charge. However, it can be said that Figure 14 is a fundamental and typical value chain of telematics industry in Japan.
4.3.3 Automakers’ Dominance in the Value Chain

Figure 14 illustrates two characteristics in the telematics industry. First, automakers substantially control its telematics business by playing a role of the telematics service provider. The consumer touch-points for the telematics services are basically managed by automakers, and telematics services are provided under automakers’ governance. Although there are a lot of players in the industry, and they are originally different firms from organizations involved in the conventional automotive value chain, it can be said that automakers are trying to build a value chain in which automakers dominate.
Second, they are outsourcing technological fields in which they are not holding a dominant position. Obviously network or software related businesses were not their business field though they already have superior capabilities in terms of automobile production. This outsourcing situation will probably continue for a while. For instance, Nissan said in an interview that it doesn’t have the intension to play other roles such as mobile communication providers at this moment.

In the next chapter, analysis of changeable automakers’ advantage in the telematics industry using double helix concept and issues that all players in the industry must consider are discussed.
Chapter 5

Analysis of Telematics Business in Japan

5.1 Introduction

This chapter discusses Japanese telematics business using analyzed results from Chapter 3 and Chapter 4. Needing various advanced technologies, telematics has a horizontally disintegrated structure. And automakers have initiatives for the development of telematics system in the current situation. However, "the faster an industry evolves – that is, the faster its clockspeed – the more temporary a company's advantage". Namely, acceleration of telematics clockspeed can affect automakers' advantage in the industry significantly. In this chapter, possible changes of the industrial structure and dynamics, which telematics players must understand, are presented.

5.2 Automakers' Temporary Advantage

5.2.1 Business Double Helix Concept

Regarding industrial dynamics as genetics in business, Fine proposed the concept of the business double helix [3]. He says that "By examining the "molecular" structure of

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companies - their capability chains - business genetics helps us to understand their mutation, evolution, and eventual survival or demise\textsuperscript{4}.

The business double helix illustrates infinite double loop that cycles between vertically integrated industries inhabited by huge companies and horizontally disintegrated industries populated by myriad innovators. Fine explains dynamics of industrial structure on the business double helix as follows: “internal and external forces - niche competitors, the strain of maintaining technological parity across many products, and the organizational arteriosclerosis that so often afflicts market leaders – drive vertically integrated companies toward disintegration and a horizontal industry structure. On the other hand, when an industry has horizontal structure, the forces exerted by powerful component suppliers and by individual firms’ incentives to promote their own proprietary technologies created strong pressures toward reintegration”\textsuperscript{5}.

Figure 15 is the dynamic cycle with the business double helix [3]. This shows that when the industry structure is vertical and the product architecture is integral, the forces of disintegration push toward a horizontal and modular configuration. On the other hand, when the industry has a horizontal structure, another set of forces push toward more vertical integration and integral product architectures.

In the following sections, this concept is adapted for analysis of the automotive industry.

5.2.2 Automotive Industry in the Business Double Helix

A vehicle is assembled from an enormous number of pieces. When Henry Ford entered the automotive industry, the standard technology for assembling vehicles was for the assembler to purchase or fabricate most of the parts and pieces and assemble them. However when he pioneered his machine-paced production line, he integrated into his firm, the Ford Motor Company, the manufacture of many of the parts and pieces [4]. Henry Ford at Ford Motor and Alfred P. Sloan at General Motors (GM) are well known as contemporaneous pioneers of vertically integrated automotive firms.

Toyota, on the other hand, can be considered as an innovator for horizontally disintegrated automotive firms. Toyota exists with a level of vertical integration very
much lower than that of Ford or GM. They have a much smaller, tighter concept of what goes into Toyota and what is kept outside instead they are very broad and large such as Ford and GM in terms of the process of manufacturing vehicles. While quality control and timely deliveries were main reasons why Ford and GM integrated vertically, Toyota pioneered unique production systems such as inventory management colloquially called “Kanban” system in the 1960s and 1970s in order to maintain those two issues.

Fine emphasized that the automotive industry has started to take on a much more distinctly horizontal/modular structure according to the business double helix [3]. In fact, the Ford Motor Company today has moved dramatically toward the Toyota level of horizontal disintegration, although not as far as Toyota or the other major Japanese automakers [4].

On the other hand, the supplier sector in the industry will have significant incentives to move from a horizontal structure to a vertical structure according to dynamics of the business double helix, and they will be able to threaten automakers with their huge market power. Actually auto suppliers are consolidating across auto subsystems and are taking vertical integration strategies recently.

Understanding dynamics of the business double helix and acceleration of automotive clockspeed, major automakers are adjusting its supply chain design ingeniously to maintain their advantages in the industry. For instance, Toyota has developed hybrid gasoline-electric engine technology in-house in spite of the fact that it has massive automotive electronics suppliers such as Denso. This is because they believe that the hybrid technology will be a core competence for Toyota. Unless extremely powerful auto suppliers or retailers emerge, such automakers will keep their advantages in the industry.
5.2.3 Telematics Industry in the Business Double Helix

In Chapter 4, I mentioned the possible value chain of today’s telematics industry (see Figure 14). In that value chain, with automakers at the head of telematics business, software-related providers (application service providers and contents providers), network-related providers, and hardware-related providers exist, and each of them plays clearly distinguished roles. Namely, it can be said that the telematics industry has a horizontally disintegrated structure at present.

In order to maintain their advantages in telematics industry, automakers have taken the strategy that they themselves play a role of the telematics service provider despite the huge costs of developing the telematics system, infrastructure, and human resources management. By this strategy, they are substantially controlling today’s telematics businesses in Japan. Also, as mentioned in Chapter 3, they have controlled the clockspeed of telematics hardware such as the car navigation system by encouraging maker installation of telematics communication terminals and harmonized the design of the communication terminals for the vehicle interior. This can be regarded as another strategy to avoid emergence of powerful suppliers having potential threats in terms of telematics hardware.

However, issues considered in Chapter 3 and Chapter 4 illustrate that there is a possibility that automakers’ advantage in the telematics industry will be temporary. Each player in the telematics industry must recognize dynamics of the business double helix, and they must adjust their strategies to position themselves for the coming changes. The next section focuses on a potential force to move telematics industry from a horizontal structure to a vertical structure.
5.2.4 Double Helix Strategies for Telematics Business

In my opinion, one of the factors which threaten automakers’ advantage in the industry is emergence of software-related players.

Software industry has much faster clockspeed than that of the automotive industry (see Table 3), and firms in the industry are in fierce competition at all times. Thus, the time window of the firms’ decision making is extremely short, and they have excellent capabilities to respond to changeable business circumstances and various technological innovations.

On the other hand, high profitability in software industries can not be ignored. Because it is basically a cluster of intelligence and has no substitutes, software can be considered as high value products for the consumers. In fact, compared with the automotive production, software industry (and service industry too) has relatively high profitability. With the fact that the precision machine and chemical industries (which are highly depending on the software business) have high profitability, Sato and Yusa predicted that main streams of business after 2010 will be software and services such as information, communication, finance, insurance, and medical businesses [11].

In addition, Fujita and Matsumoto emphasized the advantages and importance of the contents provider, one of the software-related players, in telematics value chain. Fujita forecasted that the company which can provide “killer contents” will be a leader in the telematics industry even though major companies such as automakers, consumer electronics companies, and telecommunication infrastructure providers are main key players [12]. Matsumoto also emphasized that entering the telematics business as a contents provider has several advantages. Compared with service providers which need
huge costs for development and maintenance of telematics systems, contents providers can
enter the industry with relatively low capital and can easily build a profitable business
model. These forecasts are based on the success of “i-mode” by NTT Docomo.

According to the concept of business double helix, it can be considered that software-
related players which have several advantages mentioned above will have huge market
power in the industry. And then, once they have built significant market power in the now
horizontally structured industry, they will move vertically to exploit their newfound market
power. Although software-related players are distinguished from the service provider and
the contents provider now, the contents provider might extend its business territory to the
service provider, or a certain service provider might control some contents providers. And
finally, they might take the position of the telematics service provider which is owned by
automakers at present. Namely, software-related players have the possibility to be a
Microsoft or Intel in the telematics industry.

In addition, the network-related player is in an important position in the industry.
Providing only mobile phones, built-in communication modules, and related services
currently, NTT Docomo mentioned that they are aiming at the configuration of telematics
network platform in an interview (see Appendix). This platform covers fee charging and
subscriber certification system which are fundamental functions in telematics. Obviously
controlling of network platform is crucial, and the network-related player has an
opportunity to be in a dominant position in the telematics mobile communication area.

In order to avoid such a situation and maintain its advantage in the industry,
automakers must adjust this newly created supply chain effectively. Telematics industry
has already started to move toward a much more vertically integrated structure.
In next section, automotive/telematics business as a kind of service providing business is discussed.

5.3 Capturing LTV

5.3.1 CRM (Customer Relationship Management)

Recently, CRM (Customer Relationship Management) is becoming a popular term in marketing management. CRM regards the retention of existing customers as more important than acquisition of new customers.

Generally, average acquisition costs for new customers are on average 5 times the retention costs for existing customers [12]. Now that the automotive industry has matured, acquisition costs for new customers have risen gradually, and automakers have problems trying to expand market shares.

The economic theory that 20% of the customers earn 80% of the income called Pareto’s Law must also be considered for CRM. In the automotive industry, 20% of the customers who use the product continuously or repurchase the product from the same automaker are regarded as excellent customers, and it is important that automakers attract such excellent customers to keep income stable.

Thus, cost reduction by retention of existing customers and acquisition of excellent customers will be important indicators for automakers’ marketing.

5.3.2 LTV (Life Time Value)

LTV (Life Time Value) is a crucial concept underlying CRM. LTV means the benefit which is given by the customers within its life time.
As mentioned in Chapter 4, automobile manufacturing has extremely low profitability. And surprisingly, most of profits are generated after vehicles are sold. In other words, maintenance, insurance, selling consumable products such as tires, fuel, and oil, etc deliver huge LTV.

Basically, a powerful relationship between automakers and their customers leads to the capturing of higher LTV. Telematics is expected to be a method to build such a relationship. In fact, Nissan emphasized in an interview that one purpose of its telematics business is to create a relationship of mutual trust with customers. By placing vehicles as “distribution channels of after-services” using telematics, Nissan is trying to touch its customers after the vehicles are sold and thus encourage the purchase or use of its products and services in order to maximize LTV.

On the other hand, information which is collected through access to telematics services is used for the database of CRM. The data includes not only geographical attributes which has been used for conventional marketing methods but also various tastes, lifestyles and senses of values. Using this database and CRM, automakers are trying to promote products to appropriate customers, and they also use the data as feedback for research and development activities.

5.3.3 Automotive Industry as a Service Industry

Through concepts of CRM and LTV, an important aspect that the players in the automotive industry need to manage is the transition from being a manufacturing business centering on hardware, to a services providing business which includes hardware.
Sato and Yusa suggested a possible business process in the automotive industry including telematics, which is shown in Figure 16. Because various services and information will be prepared in the future, the telematics player needs to let consumers know its philosophy and product concepts at first. The products and services will be ordered through the Internet or PDA. Financial services play a role of charging fees for several services. Networking business connects vehicles to firms by telematics [11].

Similar to software industry, service industry is highly profitable. For telematics players including not only automakers but also firms in other industries, it is important that they recognize that the future automotive business will be a kind of service providing business to improve LTV.
Chapter 6

Conclusion

6.1 Conclusions

Telematics is a new technology which accelerates the rate of technological evolution or clockspeed in the automotive electronics industry. Especially in Japan where the car navigation system is highly developed, it can be said that telematics clockspeed is following the evolution of the car navigation system at present. Also telematics clockspeed is much faster than that of automobiles. This situation creates a boundary called clockspeed collision between these two industries. Clockspeed collision will increase market pressure on automakers to provide updated electronic features and to reduce exposure to obsolescence. Clockspeed collision will also significantly affect the business strategies each player involved in the telematics industry must consider. Indeed, some players including automakers are facing the demands of technology innovation such as the development of wireless-downloadable software for risk hedging.

Having initiatives of telematics business in Japan, automakers are heavily dependent on technology outsourcing. Due to this, the industry has a horizontally disintegrated structure. Historically, Japanese automotive industry has a force to move to a horizontal/modular structure, and the industry is extremely optimized for automobile production. In the telematics industry, however, main players excluding automotive related firms are network related firms and software related firms which have much faster clockspeed. While
automakers have leadership positions in the telematics industry at present, their advantages will be unstable in the future.

This transition can be explained clearly by the business double helix concept. Namely, the supplier sector in the industry will have significant incentives to move from a horizontal structure to a vertical structure due to its huge market power. Interviews and various articles illustrate this movement in its true colors. Each player in the telematics industry must recognize the dynamics of the business double helix, and they must adjust their strategies to position themselves for the coming changes. The telematics industry has already started to move toward a much more vertically integrated structure.

Regarding telematics business as a kind of service providing business is also crucial. The automotive industry is moving from automobile production to maximizing customer’s LTV (Life Time Value). For telematics players, I believe that building business models to capture LTV will be a key means to establish core competencies in the future.

6.2 Suggestions for Future Study

While this study focused on telematics product clockspeed for clockspeed analysis, a study regarding process clockspeed and organization clockspeed in the telematics industry will be another research area. Comparison of the different clockspeed attributes may yield some insights for evolution of the industry.

The firm’s three-dimensional concurrent engineering (3-DCE) setup is also an interesting study [3]. Analysis of the 3-DCE, the simultaneous design of products, processes, and the supply chain, gives us fruitful ideas for setting a workable strategy. Similar to the conventional automotive industry, the telematics industry is one of the
industries in which strategic supply chain design is a large part of the firm’s core competency. How the telematics players cope with 3-DCE in order to establish and enhance their competitive advantage will be a useful study for the prediction of “who will be a winner?”

From another viewpoint, considering marketing strategy for world-wide penetration of telematics can be another research theme. Being in “Innovators” phase or “Early Adopters” phase [6] now, telematics needs effective methods for wide diffusion. For all telematics players, creating marketing strategy in order to “Cross the Chasm” [6] will be an extremely significant work.
Appendix – Interview with Nissan and NTT Docomo

Date:

Nissan --- March 16, 2004 at Nissan Headquarter (Tokyo, Japan)
NTT Docomo --- March 19, 2004 at NTT Docomo Headquarter (Tokyo, Japan)

Interviewed person(s):

Nissan --- The person in charge of Carwings, Program Director Office
NTT Docomo --- The persons in charge of Car Multimedia System, ITS Business Promotion Office, Ubiquitous Business Department

Business Profile

1. How do you define “Telematics”?

(Nissan)

We define “Telematics” as a method for providing services to the customers and as a window from the customers. Also it can be regarded as a way to improve brand image. We are basically aiming at increase of contact points with customers rather than huge profits.

(NTT Docomo)

As shown in Figure 17, we define telematics under two major categories which are B to B and B to C services.
2. Compared to competitors, what is your strength and weakness?

(Nissan)

Quality of operators in telematics portals (see Figure 5), well-designed HMI (Human Machine Interface) hardware and software based on historical user access are our strengths. On the other hand, compared with a certain automaker which provides free telematics services, we charges service fees even though it is small amount. Our weaknesses are the number of car sold and quality and quantity of telematics contents compared with competitors.

(NTT Docomo)

As strength for NTT Docomo, I would say that we are providing the mobile phone adopting W-CDMA which arrows high-speed and high-capacity data communication called FOMA (Freedom of Mobile Multimedia Access). FOMA can be expected as an important communication device for telematics. However, a competitor which has
powerful appliance with Toyota has advantage for built-in communication module technology.

3. What are your opportunities and threats in the telematics markets?

(Nissan)

Opportunities are that high-speed and high-capacity telecommunication such as wireless LAN and Digital Broadcasting can be provided at inexpensive fees and that there are several chances to create businesses with other industries such as insurance companies. We are afraid that telematics market itself will be shrunk.

(NTT Docomo)

We regard the automotive industry as the second largest market next to consumer electronics market. On the other hand, differed from our conventional business, our business partners are basically automakers in the telematics industry. We sometimes meet difficulties to have good partnership with automakers.

**Service/Products Profile**

4. What services/products are you providing in the telematics industry?

(Nissan)

We are providing comprehensive telematics services/products. They are regarded as support tools for customers’ transportation. We also place them as an extended function of the car navigation system.

(NTT Docomo)

We are mainly providing devices and services regarding telecommunication such as mobile phones. In addition, platform service in telecommunication can be expected as our secondary business in telematics.
5. How do you distinguish your services/products from others?

(Nissan)

It is hard to say that there are obvious differences compared with other telematics services. However, we consider that user-friendliness is crucial. For instance, our telematics provides subscribers with high-speed telecommunication or the routing service on the website.

(NTT Docomo)

While competitors are releasing mobile phones which have high-speed high-capacity data communication function time to time, it can be said that TV mobile phone is our advantage. Using line-up of TV mobile phone, we want to offer new usage of mobile phone such as a security device.

6. What is the most important technology for your services/products? What do you think about technology innovation in the future?

(Nissan)

At present, we think that telecommunication is the most important technology. In addition, capturing customers’ needs and implementation of it in telematics services, namely a sort of solution business will be a significant part in automakers’ business. Also IVR (Intelligent Voice Recognition) technology will be crucial in the future. This technology can be used as a part of operators’ work.

(NTT Docomo)

As next generation of FOMA, we think that HSDPA (High Speed Downlink Packet Access) is an important technology. We believe that HDSPA will provide telematics users with useful communication environment.

**Business Structure**

7. Automobiles’ product life cycle is about 4 years. What do you think about lifecycle, i.e.,
rate of evolution, of your services/products?

(Nissan)
Obviously hardware such as communication device has shorter lifecycle than that of automobiles. And we recognize that there is difference between telematics and automobile lifecycle. At this moment, I can’t talk about our strategy for this issue because it is a confidential matter. However, we are considering several methods to response this conflict. For example, we think that downloadable software using telematics can be one solution for this issue.

(NTT Docomo)
Recently, product lifecycle of mobile phone is half year, and mobile phone users change his model each 1.5 – 2 years. We also recognize that there is huge difference between communication device and automobile lifecycle.

8. Does difference between automobile lifecycle and your services/products lifecycle affect your business? What is the influence?

(Nissan)
Historically, using same car navigation system within automobile product lifecycle has been considered as usual thing. However, we recognize that this situation will not continue for long time (but I can’t talk the details). One of our concerns is that service area sales persons at car dealers need to deal with is extended because telematics is a totally different product from vehicles. Therefore, sales persons need to be trained in order to response subscribers’ requests.

(NTT Docomo)
As mentioned in question 3, a certain competitor has already adopted built-in communication module in the telematics device, and it has basically same lifecycle as automobile. On the other hand, when mobile phone is used as communication device in telematics, we are not affected by automobile’s long lifecycle because users can purchase the latest mobile phone as they like. And if mobile phone is used as
communication device, wireless technology such as Bluetooth will be main stream of connection between telematics devices and mobile phones. It can be said that the difference between communication device and automobile product lifecycle affect our strategy that we should go with whether built-in module or mobile phone involving wireless technology.

9. How do you think about expansion of your business area? Are there any barriers for entering new business areas?

(Nissan)

Business creation by alliance with leasing companies or insurance companies can be expected. Also providing position related information such as information from museums, restaurants, and tourist resorts is useful services for entering new business area.

(NTT Docomo)

Design and implementation of communication platform in telematics is our expected new business area. Observation of competitor’s actions is a key issue to do this.

10. How do you think the supply chain in this industry will be?

(Nissan)

(See Figure 14)

(NTT Docomo)

It can be considered that there are not only mobile phone users but also automakers, auto suppliers, and car navigation makers in downstream of our supply chain.
11. What telematics capabilities or technologies do you expect to make and which do you expect to outsource from others? Why?

(Nissan)

Although I can’t talk the details, we basically want to focus on capturing conditions for safety driving such as quality of HMI (Human Machine Interface). We don’t have the intention to play as contents providers. Also a part of telematics services is outsourced now.

(NTT Docomo)

Needless to say, mobile communication is our core technology, and we will continue to develop it in-house. But we regard alliances or building efficient relationship with automakers as an important issue to know automotive related technologies.

**Perspectives for Telematics in Japan**

12. What is the attractiveness of this business for your company?

(Nissan)

We think that telematics business is an appropriate field to appeal our technology because of its innovative characteristics. Telematics is indispensable business for our branding strategies.

(NTT Docomo)

The automotive industry is a totally new market for us, and size of the market attracts us.

13. How do you think about political and environmental conditions for development of telematics in this country?

(Nissan)

Providing enrich traffic infrastructure must be considered so that people can drive
light-heartedly. This is because traffic congestion and complicated roads are main reasons for unwillingness to drive.

(NTT Docomo)

The regulation regarding use of mobile phones in vehicles is a key issue. Because the regulation became very strict recently, demand for headset increased. In telematics, hands-free products will be important devices, and it is closely related to regulations.

14. Compared to that in the U.S and Europe, what are the characteristics of Japanese telematics industry?

(Nissan)

For the U.S. and Europe, our impression is that security related service is an important business. On the other hand, routing is the most desired service in Japan because of complicated roads. In addition, it can be said that existing required infrastructure such as mobile network and plentiful contents on the Internet are remarkable characteristics in this country.

(NTT Docomo)

We don’t know much about telematics in the U.S. and Europe. But our impression in Japan is that maker installed communication device is main stream in Japanese telematics hardware.
References


