

Development of the Vietnamese Automotive Industry and EDI Infrastructure

ICHIDA, Yozi
College of Commerce, Nihon University
ichida.yozi@nihon-u.ac.jp

Abstract

Production and sales of automobiles in Asian nations have expanded recently. However, car sales in Vietnam were just 7% of those of Thailand, and Vietnam's production volume was just 3.7% of Thailand's in 2013. Cars made in Indonesia and Thailand will begin to be imported into Vietnam when import tariffs within the ASEAN region go to zero in 2018. In order to promote the automotive industry, the Vietnamese government has taken various policy measures. However, these policy measures do not go far enough, and inconsistent sales and production of cars is expected. Recently, the government has promoted policies to attract and cultivate support industries for the automobile industry. Development of a supply chain in the country is essential to the development of the automotive industry. However, the antiquated method of using e-mail with an attached PDF document is now the popular means of exchanging information in the automotive industry in Vietnam. To form a smooth supply chain, the author discusses the importance of EDI infrastructure as a platform for better communication of digital data.

Key words: automotive EDI, communication infrastructure, supply chain in automotive industry, automotive parts trade, EDI in SME

1. Introduction

The author has focused on the role of EDI in the development of the automotive industry for many years, focusing on Japan, the United States, and Europe. Sales and production of cars in emerging countries in Asia have been increasing in recent years, but there has been little research related to EDI in this area. The author would like to shed light on the role of EDI in this area.

Manufacturing industries create jobs. In particular, the automotive industry comprises many other supporting industries; it creates employment for many. If the domestic automotive industry declines, not only is GDP reduced, but also many jobs are lost. For example, Mitsubishi Motors in Australia withdrew from the market in 2008, Ford is to withdraw by 2016, and Holden GM affiliated will cease production of automobiles by 2017. In February of 2014, Toyota Motor Corporation Australia announced that it will discontinue production of vehicle engines in Australia by the end of 2017. Thus, by the end of 2017, cars will no longer be produced in Australia. In Australia, there are about 150 automobile related companies, including machinery, equipment, and parts employing 45,000 people or more. Those jobs will gradually be lost in the near future.

There is a possibility that automobile Original Equipment Manufacturers (henceforth OEM) will withdraw from Vietnam as well. Import tariffs within the ASEAN region are scheduled for elimination in 2018, and car imports from Indonesia and Thailand production will increase in Vietnam. The effects of these changes on the automotive industry in Vietnam are unpredictable. In fact, its very survival is in question. Over the years, the Vietnamese government has taken steps to develop and promote the automotive industry and supporting industries. However, in 2012, automobile production, which exceeded 100,000 units from 2008 through 2012, fell below 100,000 units in 2013. Looking at this fact, it is hard to say that the steps taken by the Vietnamese government have been successful. In countries where the automotive industry is developing, transactions between suppliers, OEM, and among suppliers are active. From OEM up to the supplier at the end of the supply chain, it is possible to provide end customers with a satisfying car by providing quality products, delivered in a timely manner and at a reasonable price. In other words, a smooth supply chain is essential.

The purpose of this paper is to consider what is needed in order for the Vietnamese automotive industry to develop in a sustainable manner, with particular emphasis on the support industries necessary for efficient production. By delineating the role of EDI infrastructure as one of the core features of the supply chain this paper will make recommendations for its construction. The next section looks back on academic research on the Vietnamese automotive industry conducted to date as a means of understanding the current situation. In Section 3, the problems facing the Vietnamese automotive industry are defined, and possible solutions explored. In Section 4, the method of data exchange that is currently employed in the Vietnamese automotive industry is surveyed. In Section 5, the development of infrastructure necessary for future EDI for Vietnam is proposed. The proposal will be discussed in comparison to EDI in Japan, Europe, the United States, and in neighboring Thailand in Section 6. In the concluding section, the conditions necessary to develop sustainable supporting industries in the Vietnamese automotive industry are explored.

2. The Vietnamese Automotive Industry

(1) Previous Study

Research on EDI in the Vietnamese automotive industry investigating the current state of the telecommunications company as a preliminary investigation of EDI infrastructure is limited to a single study (ICHIDA, 2012)¹. A review of this study is necessary to understand the current problems in the Vietnamese automotive industry.

In the ASEAN countries, the promotion of the automotive industry for economic development has been encouraged. Japanese OEM and suppliers have made a significant contribution in this regard. For the region, complement concentration and production of auto parts in Thailand, Malaysia, the Philippines, and Indonesia, Shimizu analyzed in a time series up to the AFTA from the BBC schema in 1988 and the AICO schema of 1995 (SHIMIZU, 2011)². When production volume is small, this framework works well. Each country has increased production volume steadily. However, since Vietnam joined the ASEAN in 1995, not a single member of these BBC and AICO schema has developed significantly. On the

other hand, in Vietnam, the spread of motor bikes is high, and has continued to increase in both sales and production.

Regarding the motorcycle industry in Vietnam, MISHIMA found that it has evolved into a stage of import substitution, as the local content ratio of assembly companies has reached 80 percent, and foreign manufacturers are performing research and development in Vietnam. He also found that the background of the automotive industry has been swayed by policy. For example, taxation is linked to local content, requirements regarding production of parts by foreign manufacturers, and a ban on completed vehicles (MISHIMA, 1997)³.

For the development of the Vietnamese automotive industry, the development of supporting industries is essential. IDE and MORIHARA are proposing a management strategy that can contribute to supporting industries in Vietnam used by small and medium-sized Japanese enterprises. That is, they pointed out the following key points. Training staff in a short period of time for local suppliers to meet the required level of foreign OEM is very difficult, so many suppliers of various types actively accept small and medium-sized enterprises as incentives for sustainable growth, and government policy can do much to facilitate this (IDE and MORIHARA, 2012)⁴.

It can be seen from the discussion of previous studies that effective policies to facilitate training to attract supporting industries is a significant challenge for the promotion of the automotive industry.

(2) Current status

For production volume and vehicle unit sales in Vietnam, a comparison with members of the ASEAN Automotive Federation (AAF) is useful (Table 1 and Table 2).

Table1: Sales of members of AAF
SALES: 2006-2013

	2006	2007	2008	2009	2010	2011	2012	2013
Brunei	12,522	14,220	14,680	12,365	13,589	14,555	18,634	18,642
Indonesia	318,904	433,341	603,774	483,550	764,710	894,164	1,116,212	1,229,901
Malaysia	490,768	487,176	548,115	536,905	605,156	600,123	627,753	655,793
Philippines	99,541	117,903	124,449	132,444	168,490	141,616	156,654	181,738
Singapore	137,564	122,254	110,574	79,503	51,891	39,570	37,247	34,111
Thailand	682,161	631,251	615,270	548,871	800,357	794,081	1,436,335	1,330,672
Vietnam	40,897	80,392	110,186	119,460	111,737	109,660	80,453	98,649
TOTAL	1,782,357	1,886,537	2,127,048	1,913,098	2,515,930	2,593,769	3,473,288	3,549,506

Source: The author creates the table from AAF yearly data⁵.

Table2: Production of members of AAF

	2006	2007	2008	2009	2010	2011	2012	2013
Indonesia	296,008	411,638	600,844	464,816	702,508	837,948	1,065,557	1,208,211

Malaysia	503,048	441,678	530,810	489,269	567,715	533,515	569,620	601,407
Philippines	41,603*	49,492*	54,434*	62,523	80,477	64,906	75,413	79,169
Thailand	1,188,044	1,287,379	1,394,029	999,378	1,645,304	1,457,795	2,453,717	2,457,057
Vietnam	35,087	75,249	107,918	107,760	106,166	100,465	73,673	93,630
TOTAL	1,987,100	2,215,944	2,633,601	2,123,746	3,102,170	2,994,629	4,237,980	4,439,474

Source: The author creates the table from AAF yearly data⁶.

*Data from MarkLines⁷, because AAF has provided no data on the Philippines from 2006 to 2009.

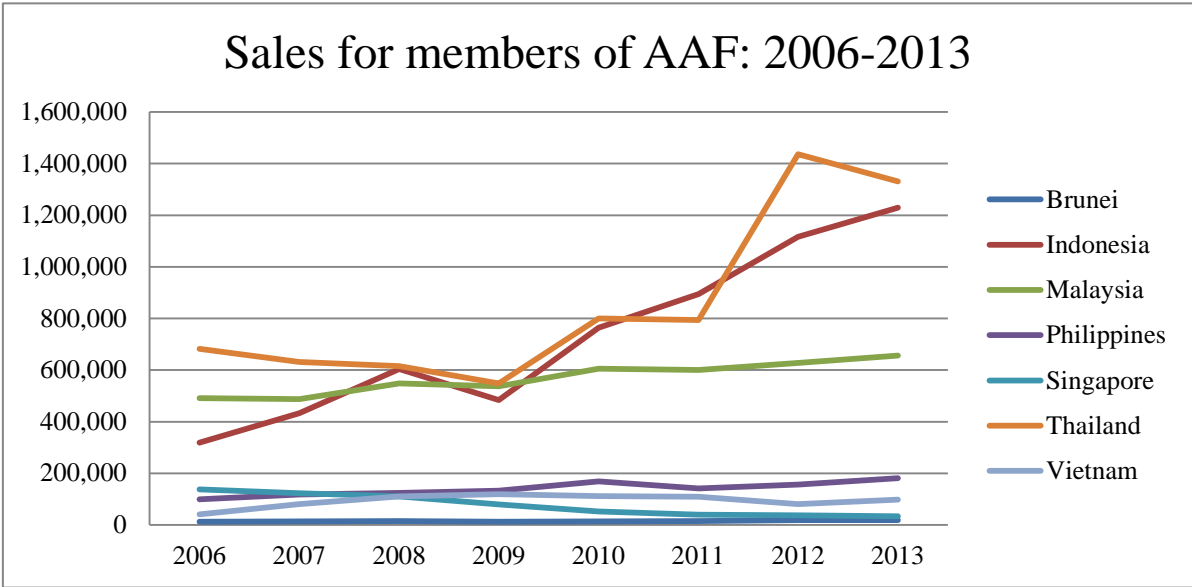


Figure1: Sales for members of AAF: 2006-2013

Source: The author creates from Table1.

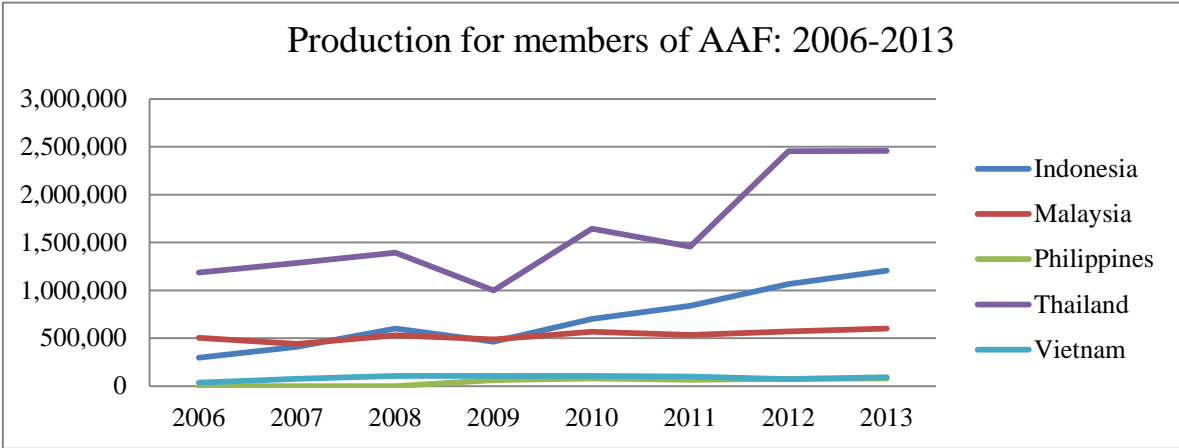


Figure2: Production for members of AAF: 2006-2013

Source: The author creates from Table2.

Car sales in the AAF Member States increased two-fold in seven years, to about 3.55 million units in 2013, from about 1.78 million units in 2006. It can be seen from this data that

ASEAN is responsible for one side of the boom in car sales in Asian emerging countries. However, most recently, 2013 year-on-year sales in Singapore and Thailand have decreased. The reason for the decrease in Thailand is that demand expanded from 2011 to 2012 due to the impact of car purchase incentives provided by the government, but sales decreased when the incentives came to an end in 2013. In addition, it is believed that anti-government demonstrations in November, and tightened lending by financial institutions contributed to the decrease. Despite the decline, sales in Thailand were at a record high, and production exceeded the previous year because each manufacturer exported units unsold in the domestic market.

Table 3: Production of members of VAMA in Vietnam

	2013	2012	Y-o-Y
SUV/MPV/Crossover	23,791	17,141	38.80%
Passenger Cars	34,349	26,691	28.70%
Commercial Vehicles	36,827	35,615	3.40%
Others*	1,725	1,205	43.20%
Total	96,692	80,652	19.9%

*Including Mercedes-Benz

Source: VAMA (Vietnam Automobile Manufacturers' Association) ⁸

Table 4: Sales in Vietnam

Make	2013	2012.	Y-o-Y	Make	2013	2012.	Y-o-Y
Toyota	33,288	24,927	33.50%	Vinamotor*	1,726	2,555	-32.40%
Truong Hai	24,214	24,001	0.90%	Mercedes-Benz	1,725	1,200	43.80%
Ford	8,166	4,790	70.50%	Hino*	1,409	632	122.90%
GM Vietnam	5,178	5,613	-7.70%	SAMCO	506	341	48.40%
Honda	4,593	1,804	154.60%	Mekong	311	464	-33.00%
VinaMazda	4,089	900	354.30%	SYM	289	344	-16.00%
Suzuki	3,765	3,409	10.40%	Vinacomin*	36	62	-41.90%
Isuzu*	2,039	1,217	67.50%	VMC	63	470	-86.60%
VEAM	1,909	1,881	1.50%	Vinaxuki	1,200	4,453	-73.10%
VinaStar	2,186	1,589	37.60%	VAMA Total	96,692	80,652	19.90%
Total**	110,519	92,584	19.40%				

* excluding bus chassis

** Total (including imports/VAMA non-members)

Source: VAMA ⁹

Compared to Thailand, Vietnam has only 7.4% of its car sales and 3.7% of its production volume. One of the factors that that caused unit sales in Vietnam to increase in 2013 is that vehicle registration fees for new passenger cars with a seating capacity of 9 or less were decreased. License plate registration fees were 10-fold higher, and vehicle registration fees were raised to 20% from 12% in Hanoi and to 15% from 10% in Ho Chi Minh City in 2012.

As a result, new car sales for that year fell below 100,000 units. As a countermeasure, in 2013, vehicle registration fees were reduced to 12% from 20% in Hanoi, and to 10% from 15% in Da Nang. In addition, the original level in Ho Chi Minh City was reduced to 10% from 15% at the beginning of 2014. For this reason, it is expected that sales in 2014 will exceed the 11 million units sold in 2011 before the rising of registration fees¹⁰.

According to VAMA, domestic automotive production in 2013 was 96,692 units (a 19.9% increase from the previous year). On the other hand, 13,827 units of OEM production volume of VAMA non-members and imported cars represent a 19.4% increase. Production volume of OEM of VAMA non-members is very small, so many such cars are imported. According to the ASEAN Trade in Goods Agreement (ATIGA)¹¹, the import duty on vehicles of 1000cc or more was reduced in stages, from 70% in 2012, to 60% in 2013, and to 50% in 2014. It will be reduced to 0% in 2018. If the Vietnamese automotive industry does not improve its competitiveness, the expansion of imports from Thailand and Indonesia is an automotive production base in Southeast Asia is its corollary.

3. The Issue of the Vietnamese Automotive Industry

So why has Vietnam failed to realize auto sales and production growth? Let's analyze the issue from the perspectives of consumers, producers, and policymakers.

(1) From the perspective of the consumer

GDP per capita of Vietnam is \$1,755¹². It has not yet reached a level that is generally considered to be high enough to make private ownership of cars economically feasible for the average person. Only when GDP per capita reaches more than \$3,000 will that be the case. In the Philippines, GDP per capita is \$2,587, with a population of around 94 million (as of 2010). The population of Vietnam is approximately the same (91.7 million as of 2013), but the difference in GDP per capita is reflected in the difference of sales (1.8 times greater in the Philippines).

License plate registration fees and high vehicle registration fees are reflected in maintenance costs and the high purchase price. It is a considerable burden on the consumer. Registrations of Motorbikes are one person per 2.4 out of 37 million, based on the author's experience in Hanoi and Ho Chi Minh City, where one has the impression that there is one Motorbike per adult. The author surmises that because a motorbike is sufficient for most people's needs, there may be little incentive to switch to a four-wheel vehicle. Traffic congestion and lack of parking space suggest that the use of four-wheel vehicles will not increase in urban areas.

(2) From the perspective of the producers

Vietnamese OEM comprises 19 companies registered with VAMA. However, according to the suppliers in Vietnam interviewed by the author, nearly 50 companies delivered parts to OEM, and these small companies assemble parts imported from China. The actual number of such companies may be closer to 70.

In Vietnam, the local production rate of auto parts is very low. Except for the labor-intensive parts, such as sheet metal and wire harnesses (three major Japanese plants

have been constructed), the situation demands the import of many parts. It is believed that local content components account for 20% to 30% of all component parts. A huge tax on imported parts for OEM was a political issue in 2011. For example, Ford paid \$1.5 million, and Honda Vietnam was ordered to pay \$160 million. Assembled vehicles with relatively expensive parts will be more expensive of course.

The absolute number of suppliers is small in Vietnam, and unorganized (there is no Parts Industries Association). In contrast, 2,350 supply companies belong to the Thailand Auto Parts Industries Association (TAPMA) in Thailand. In Malaysia, 690 supply companies are participating in the MPCPMA; there are three Parts Industries Associations in Indonesia comprising 144 companies and all suppliers are enrolled¹³. Development of suppliers of a wide range of automotive parts in Vietnam is an important issue.

(3) From the perspective of policymakers

In the case of Honda Vietnam described above, Mr. Hiroshi Kitamura stated, “It’s the day after it was reported that the Japanese Charge in Vietnam has sent a letter to the competent department. There is no talk of back taxes for Honda Vietnam.” Phó Thủ tướng Hoàng Tuan, Deputy Treasury phase. That was the end of the matter¹⁴.

Seeking preferential foreign policy and expansion of demand, the Vietnamese government has been swinging between domestic and international industrial development policy for both the two-wheelers and four-wheelers. Although the sales and production volume of the motorcycle have increased, the impact of a contradiction of policy did not garner attention, but the sales and production volume of automobiles is lower, and the effect of changes in registration fees have already been realized. The Vietnamese government has attempted to support industrial development of automobiles, but it has yet to realize significant growth.

Once, for the injection molding industry, the Thai government gave preferential treatment by exempting companies from corporate income tax for eight years. This had the effect of developing this industry. Drastic policies like this will be required if the Vietnamese government is to attain similar results in its automotive industry. Policy that is consistent is required at the same time. Unfortunately, at present, while the Vietnamese government wants to develop the automotive industry, specific policies have led to suppressed demand.

4. Data Exchange in the Vietnamese Automotive Industry

The following data was compiled by the author during a visit to Vietnam in March of 2014, when he interviewed Japanese OEM, Japanese suppliers, Vietnamese OEM, and actual Vietnamese suppliers.

(1) Japanese OEM

Number of suppliers by region	Japan 11, Vietnam 2, ASEAN 1, the other 1
Types of data interchange	Region
Traditional EDI ¹⁵	Japan, ASEAN

Web-EDI	Japan, ASEAN
e-Mail	Japan, Vietnam, ASEAN, others
e-Mail (attached file)	Japan, Vietnam, ASEAN, others
Types of data interchange	Content of data interchange
Traditional EDI	Order, Shipping
Web-EDI	Forecast order, Order
E-Mail	Forecast order, Order, Shipping instruction, Shipping, Acceptance, Payment
E-Mail (attached file)	Forecast order, Order, Shipping instruction, Shipping, Acceptance, Payment
Data interchange frequency	Content of data interchange
Every day	Shipping, Acceptance, Payment
Once a month	Forecast order, Order
Anytime	Shipping instruction
Network	X.25 WAN (ISDN), TCP/IP (The Internet), dedicated line between suppliers
Protocol	FTP
Data format	Proprietary format based on ANSI/X12

Source: author

This company is a global business, and there are many overseas plants. An affiliated company in the group has a global network, so it uses this network between the suppliers.

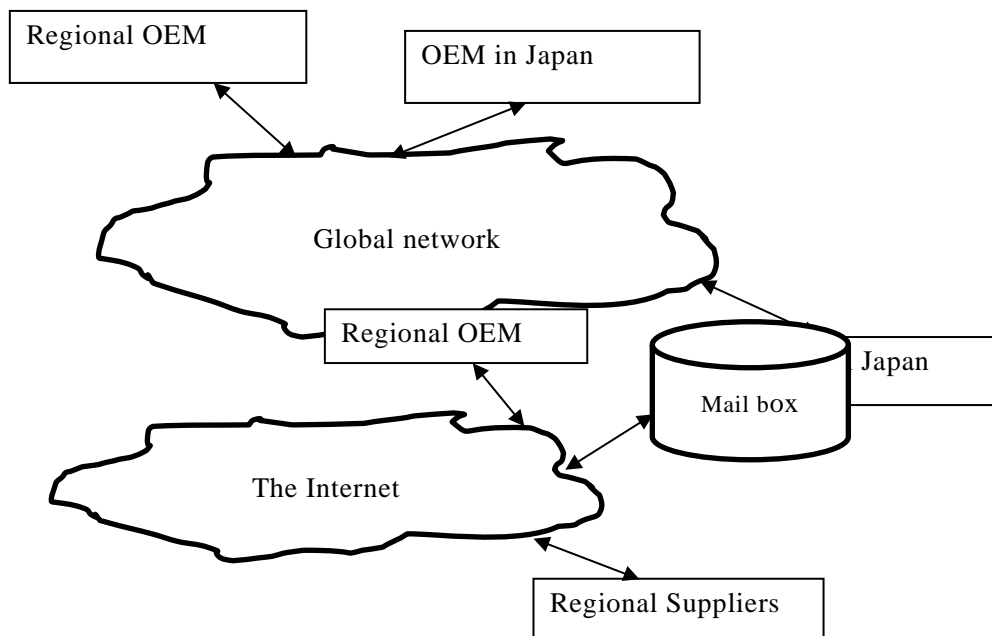


Figure 4: Using the Internet

Source: Created by the author.

(2) Vietnamese OEM

Number of suppliers by region	Japan 4, China 30, South Korea 2
Types of data interchange	Region
E-Mail	Japan, Vietnam, China, ASEAN, South Korea
Postal (document)	Japan, ASEAN
Types of data interchange	Content of data interchange
E-Mail	Forecast order, Order, Shipping instruction, Shipping, Acceptance, Payment
Postal (document)	Forecast order, Order, Shipping instruction, Shipping, Acceptance, Payment
Data interchange frequency	Content of data interchange
Every day	Order, Acceptance, Payment
2-3 times a week	Forecast order, Order, Shipping instruction, Shipping, Acceptance, Payment
Data format	No answer

Source: author

(3) Japanese suppliers (Customers include OEM and tier-one suppliers as follows)

Number of Customers by region	Japan 8, Vietnam 3, China 5, ASEAN 6, the other 9 ¹⁶
Number of suppliers by region	Japan 10, Vietnam 40, China 3, ASEAN 20, South Korea 2
Types of data interchange between customers	Region
Traditional EDI	Japan 1, China 2, ASEAN 3, the other 5
Types of data interchange between suppliers	Region
Traditional EDI	Japan 1, China 2, ASEAN 5, South Korea 1
E-Mail (attached file)	Japan 9, Vietnam 40, China 1, ASEAN 15, the other 1
Types of data interchange	Content of data interchange between customers
Traditional EDI	Forecast order 11, Order 11, Shipping instruction 11, Shipping 11, Acceptance 11, Payment 11
Web-EDI	Forecast order 1, Order 1, Shipping instruction 1, Shipping 1, Acceptance 1
E-Mail (attached file)	Forecast order 2, Order 2, Shipping instruction 2, Shipping 2, Acceptance 2, Payment 2
Types of data interchange	Content of data interchange between suppliers
Traditional EDI	Forecast order, Order 9, Shipping instruction 9, Shipping, Acceptance 9, Payment 9
E-Mail(attached file)	Forecast order 66, Order 66, Shipping instruction 66,

	Shipping 66, Acceptance 66, Payment 66
Data interchange frequency	Content of data interchange between customers
Once a week	Order 11
2-3 times a week	Shipping instruction 3, Shipping 3, Acceptance 3
Once a month	Forecast order 14, Order 3, Payment 14
Anytime	Shipping instruction, Shipping, Acceptance, Payment (66 enterprises includes all of them)
Data interchange frequency	Content of data interchange between suppliers
Once a month	Forecast order 75, Order 75, Payment 75
Anytime	Shipping instruction 75, Shipping 75, Acceptance 75

Source: author

(4) Vietnamese suppliers

Number of OEM by region	Vietnam 50, ASEAN 9, South Korea 1, the other 6 ¹⁷
Types of data interchange	Region
E-mail	Japan, Vietnam, ASEAN, South Korea, the other
E-Mail (attached file)	Vietnam
Fax	Vietnam
Postal (document)	Vietnam
Telephone	Vietnam
Types of data interchange	Content of data interchange
E-Mail	Forecast order, Order, Shipping instruction, Shipping, Acceptance, Payment
Fax	Forecast order, Order, Shipping instruction, Shipping, Acceptance, Payment
Postal (document)	Order
Data interchange frequency	Content of data interchange
Once a week	Forecast order, Order, Shipping instruction, Shipping, Acceptance, Payment

Source: author

By using the global network of its own and group companies, Japanese OEM and suppliers are using traditional EDI to exchange data with trading partners outside the country. However, data exchange in Vietnam conducted using e-mail with a PDF file attached, with both companies using the Internet. Content of the data exchange is usually Forecast order, Order, Shipping instruction, Shipping, and Acceptance of Payment. Data in Vietnamese OEM are changed daily: Order, Acceptance, the Payment data including Shipping, Acceptance, and Payment of the Japanese OEM. Two suppliers which the author visited exchange no data daily, and the most frequent exchange of data is once a week.

Data exchange in the automotive industry in Vietnam is "Pre-EDI," which is a state that predates the general form of EDI used in Japan, the United States, and Europe. Already,

procedures such as business Forecast order, Order, Shipping instruction, Shipping, Acceptance, and Payment have been computerized. However, at the time of payment, tax bills are filled out on red paper commonly referred to as a red invoice, which must be submitted. In addition, at the time of delivery, in some cases, a copy of the purchase order is required, and it must be filled out and bear the corporate seal. It is so at present, and the exchange of PDF attachments is insufficient to transmit and process these necessary documents digitally by both computers.

5. Infrastructure development of EDI

One of the conditions for supporting the automotive industry in Vietnam is the development of a supply chain in the country. One of the means to this important end is the implementation of EDI infrastructure.

One of the crucial elements of infrastructures is power. A stable supply of power is essential to the smooth operation of a factory and office. However, in Vietnam, the power supply was unstable until 2010. Rolling blackouts were conducted twice a week, from 9:00 to 22:00. When the Son La hydroelectric power plant began operation in 2010, the amount of power generation, combined with coal power generated by CamPha1 and Hai Phong 1, increased and stabilized the supply of power in the country¹⁸.

(1) Communication network infrastructure

Vietnam Post Telecommunications Group (VNPT) is the largest fixed communication network in Vietnam. On April 29, 1995, the Prime Minister issued Decision 294/TTg to establish the Vietnam Posts and Telecommunications Corporation¹⁹.

Vietnam Army Electrics and Telecommunications (VIETTEL) was founded in 1989 and launched in 2000. It is 100% owned by the Ministry of Defense. The Power Corporation also established EVN Telecom in 2001, but because of a lack of subscribers, it was absorbed into VIETTEL in 2012. NTT Communications Vietnam of Japan was established in 2012, and has since launched a data network²⁰.

Even at present, the user can select from among various telecommunication carriers, but the communication infrastructure of the Vietnamese automotive industry demands safety measures, such as ANX, JNX, and ENX. The network can control the communications of the entire VPN, so having an administrator is desirable. Furthermore, in this case, the network should contract with two or more communication carriers so that the user could select the carrier.

(2) Data format

When the hardware system, including the communication network, infrastructure power, and computers to exchange data are integrated, it is necessary to establish a standard data format or data format in common. Historically, how suppliers respond to the proprietary data formats of the OEM continued, but the adverse effects became so numerous and so much data had been captured that the UN/EDIFACT was established by the United Nations. The American National Standards Institute (ANSI) X12 format has now become the standard. Still, there was a difference between order, order confirmation, and shipping information at the claims processing level of each OEM. However, mutual conversion software is now available in the United States and Europe. A survey by the author has found that suppliers do not have any particular problem with this software.

For the future promotion of the interchange (EDI) of the Vietnamese automotive industry, it is meaningful to discuss the standardization of data format at this time. Since there is no examined standardized EDI in Thailand, a Web-EDI for different OEM has been introduced. When one end is introduced, it is possible to change it with difficulty. Because it must correspond to the Web-EDI data format, screens and different primary suppliers of OEM businesses with more than one exchange partner, it can be a heavy burden. In addition, the end of the supply chain of the automotive industry is a supplier of small and medium scale. For suppliers that cannot afford the cost in personnel to accommodate a different Web-EDI for each transaction, it becomes a burden. It is predicted that it would also affect the core business.

The problem is similar to slip-document centered trade. EDI reduction does not precede a trade between suppliers of small and medium scale in Japan. The type of item in the document, and a large number of small items may make matters difficult. Therefore, an attempt to standardize messages with tags in order to facilitate the interchange (EDI) and to exchange XML is continuing. It has already been proposed at the United Nations, as CEFAC Cross-Industry EDI Specification V2.0. About 10,000 items are currently registered. It is updated twice a year, and a common dictionary of business messages is being established. Japan has such proposals before the United Nations CEFAC. Currently, the work of building such systems may be used to download and build a repository message dictionary by selecting messages necessary for the company²¹.

Developing EDI for the automotive industry in Vietnam could help avoid problems if it uses a standardized format for data that will work smoothly with the EDI format of individual OEMs in Thailand.

6. Discussion

(1) Comparison with EDI in Thailand

A comparison of Vietnam with the spread of EDI currently in progress in the automotive industry in Thailand is instructive. A questionnaire was administered for EDI between the local suppliers by JAMA on the Japanese OEM in 2013. The Web-EDI data exchange method is used with 9 companies, with 5 companies using email with PDF attachments, one company exchanging data by FAX, one company using the postal system, and 6 companies using other methods. The results suggest that Web-EDI is taking hold in Thailand for the exchange of digital data²².

On the other hand, the method of e-mail with attached PDF is the primary means of data exchange in Vietnam. In the automotive industry in ASEAN, the author was able to find a process that will develop data exchange from the outmoded e-mail with attached PDF method to Web-EDI. This is in contrast to the United States, Europe and Japan, where EDI between tier-one suppliers and OEM grew out of traditional EDI, with Web-EDI becoming popular as an alternative to FAX for small and medium suppliers.

(2) Vietnam-specific property

At the time of transaction, the "PURCHASE CONTRACT" document requires the handwritten signature of the seller and buyer in addition to other requirements in Vietnam. Similar documents are also required at the time of delivery²³. These are commonly called

"Red Invoices" because the forms are printed in red. This and the accompanying paperwork cannot be migrated to EDI to exchange communication by digitizing data.

However, Viet Nam Automated Cargo Clearance System (VNACCS), a new customs clearance system established in April of 2014 is promising. This is a system that has been developed with funding from Japan's ODA, based on Nippon Automated Cargo and Port Consolidated System (NACCS), which is the customs clearance system in Japan. By operation of VNACCS, the effects of using electronic signatures and paperless documents, and concentrated processing are expected. The Vietnamese government has recommended that companies migrate to the new customs clearance system to increase the speed of the customs clearance system²⁴. The new customs clearance system has become popular, and the author anticipates the day when electronic signatures and paperless documents also become common, and when handwritten signatures and "Red Invoices" become obsolete. At that time, the Vietnamese automotive industry will have developed into a stage of Web-EDI from the stage of e-mail with attached PDF.

(3) Facilitators of EDI infrastructure

In order for the automotive industry of Vietnam to develop, a smooth supply chain in the country is necessary. EDI infrastructure is a basic framework to support the supply chain. For the development of EDI infrastructure, cooperation between OEM and suppliers is essential. Among other things, OEM is in a position to understand both sides of tier-one supplier trades with tier-two suppliers. It can contribute to the solution of the supply chain problem facing the entire automotive industry.

The author interviewed one person involved in the establishment of SupplyOn in the summer of 2010. SupplyOn was founded as a company that provides a platform of Web-EDI for tier-one suppliers such as Robert Bosch, a maker of power trains and electrical equipment; Continental Automotive Systems, a tire maker; INA, which makes bearings; ZF, a transmission manufacturer; and SAP, a leading software vendor. At that time, many tier-one suppliers interchanged data with about half of the tier-two suppliers by FAX. Tier-one suppliers had to enter data into a computer, but this was recognized as a waste of time and cost. So, tier-one suppliers advised tier-two suppliers to migrate to Web-EDI, and supported the cost of the migration. Through such efforts by tier-one suppliers, SupplyOn has grown into a company that provides a platform and portal site of Web-EDI to more than 11,000 companies all over the world.

(4) Attracting and Nurturing Suppliers

Simply developing an EDI infrastructure is no guarantee that EDI will become popular. There are 19 OEMs that have registered on VAMA in Vietnam, but the number of suppliers is small, and the Suppliers Association is not well-organized. The Vietnamese government recognizes the training of suppliers in the automotive industry as a key issue, and it has developed an action plan and policy to attract foreign suppliers. The government enacted an industry master plan in 2007 (ministerial ordinance 34/2007/QD-BCN) aimed at the development of suppliers to perform the production of versatile parts, but it was ineffective. The action plan of the fourth phase of the Japan-Viet Nam joint initiative, which was announced in 2010 as a specific practice to attract supporting industries, should be encouraged. The injected molding industry has signed on. The six target areas, including auto parts assembly, were elected to support industries in Decree 12 (12/2011/QD-TTQ) on

February 24, 2011, and Decree 1483 (1483/2011QD-TTG) on August 26, 2011. Within that six months, producers of auto parts, including field assembly, engine parts, lubrication systems, cooling systems, fuel supply system, chassis, body and door by specifying the important functional components of many related parts, including suspension, wheel relationship, transmissions, drive systems, brake systems, electrical equipment, power supply, ignition, relays, lighting systems, emission, plastic parts such as rubber products, supporting industries can be seen to be cultivating a positive attitude. It was decided that in response to these policies, Japan increased both the number of investments and the amount invested overseas in 2012. Singapore and Taiwan greatly reduced investments in 2012; Japan stood out in particular²⁵. If these policies are steadfastly continued, it is expected that investment in the auto parts industry abroad will continue to increase.

Support is necessary in order to develop the suppliers until a Parts Industry Association such as those in Thailand, Indonesia, and Malaysia can be firmly established in Vietnam. If suppliers can establish an association, it can influence the opinions of their own government and VAMA.

7. Conclusion

The introduction of new models, the development of eco-friendly cars as a world strategic model will encourage competition and undoubtedly promote the development of the Vietnamese automotive industry. To this end, an efficient supply chain is essential. OEMs want to build an optimal supply chain, but since there is no direct connection between tier-two and tier-three suppliers, their influence is limited. For the automotive industry as a whole, the contribution of tier-one suppliers is expected. In Vietnam, OEMs are sufficient, but suppliers are insufficient. Greater supplier sufficiency is needed for sustainable growth for foreign small and medium-sized enterprises (EMSs) to advance in Vietnam. They supporting industries are needed for EMSs.

In order to develop the supporting industries in the automotive industry, information exchange, information sharing, promotion of standardization is required, and the development of EDI infrastructure is essential in these regards. Now is the best chance of EDI infrastructure development in order to give Vietnam a competitive edge in the automotive industry, and survival upon the elimination of tariffs within the region in 2018.

A research issue which remains to be verified is the effect of supporting industrial development of the Vietnamese government. The Vietnamese government is called upon broadly to support the development of EDI infrastructure.

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Note

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⁵ Statistics of AAF. (<http://www.asean-autofed.com/statistics.html>)

⁶ Statistics of AAF. (<http://www.asean-autofed.com/statistics.html>)

⁷ MarkLines. (<http://www.marklines.com/>)

⁸ Nonmember of VAMA (Vietnam Automobile Manufacturers' Association) could not access the original statistics. We can see the following MarkLines Portal site.

'Vietnam - Flash report, Sales volume, 2013 - MarkLines Automotive Industry Portal' (http://www.marklines.com/en/statistics/flash_sales/salesfig_vietnam_2013)

⁹ Nonmember of VAMA (Vietnam Automobile Manufacturers' Association) could not see the original statistics. We can see the following MarkLines Portal site.

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¹¹ ASEAN TRADE IN GOODS AGREEMENT (<http://www.thaifta.com/thaifta/Portals/0/atiga.pdf>)

¹² GDP per capita (current US\$) (<http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>)

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¹⁵ 'Traditional EDI' is the exchange of data between computer-connected communication lines. Application program works automatically, without human operation.

¹⁶ The other countries include USA, Brazil, Australia, Indonesia, India, UK, France etc.

¹⁷ The other countries include France, Germany, Hungary, Poland, Russia, and Ukraine.

¹⁸ JETRO Hanoi office, Vietnam power survey 2013, in Japanese.

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- ¹⁹ VNPT; Historic Milestones.
(<http://www.vnpt.vn/Default.aspx?tabid=212&IntroId=269&temidclicked=269>)
- ²⁰ VIETTEL; Who are you. (http://www.viettel.com.vn/Who_we_are.html)
- ²¹ Study paper of UN/CEFACT Japan Committee Forum, Feb. 2014. Also see 'PART 5. UNITED NATIONS DIRECTORIES FOR ELECTRONIC DATA INTERCHANGE FOR ADMINISTRATION, COMMERCE AND TRANSPORT'.
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