

# The International Deployment of R&D Organization and the Collaborative Knowledge Creation: Case Studies of Nissan in China and Brazil

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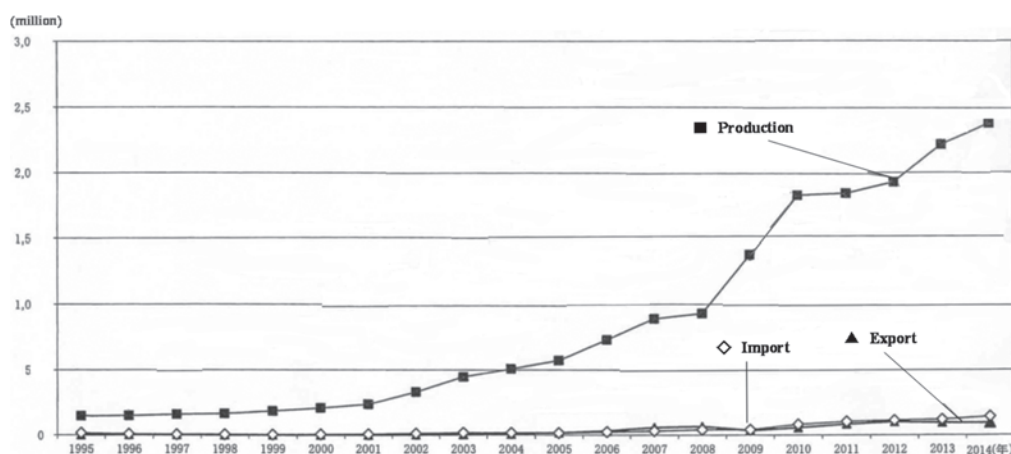
**Key words:** R&D Organization, Knowledge Transfer, Collaborative Knowledge Creation, Dynamic Capability

## 1. The core topic and question being examined

Regarding the state of automotive market in China and Brazil, Chinese 2014 year car sales number (Export is included by a factory shipment base.) shows gentle growth up to 23,492,000 with 6.9% more by year-to-year comparisons and last year's 2 digit growth. Public investment of an infrastructure building is increased, and a car market in 2015 has the perspective that a commercial vehicle market makes a recovery. Although the passenger car market depends on registration regulation in the large city of a coastal region, the strong demand of local market triggers the new demand<sup>1)</sup>.

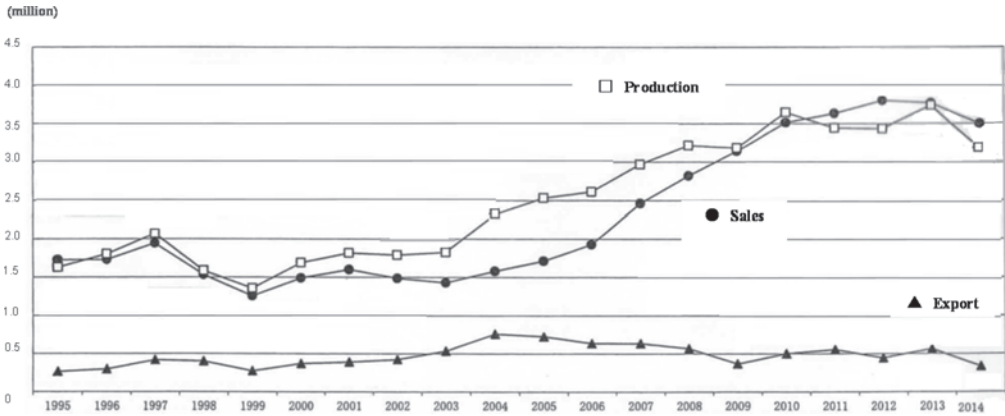
On the other hand, sales number in the Brazilian car market in 2014 is reducing production number from 3,498,000 to 3,173,000. The factor is pointed out with business stag-

Figure 1. Automobile Production, Export, and Import in China



Source: FOURIN *World Automotive Industry Yearbook 2015*, p. 288.

Figure 2. Automobile Production, Export, and Import in Brazil



Source: FOURIN *World Automotive Industry Yearbook 2015*, p. 126.

nation, a rise of interest rates and a price increase for cars due to the tightening of safety regulation by ABS as well as an end of IPI tax reduction. Besides, the squeezed market of Chile and Argentina which are the main places of export destination countries has been also large affected factor<sup>2)</sup>.

Thus, there are differences in the general market condition and environmental factors respectively in China and Brazil. However, organizational management enhancing the capability of R&D of the firm and the knowledge transfer of intra-organizations become more important from the standpoints of the long-term strategy of the both countries.

Automotive industry is vital for the industrial development of emerging country. That is why, in this study the technology transfer of Japanese automotive firms and the R&D organizational capabilities in the host country are examined from the case studies of Nissan in China and Brazil. In accordance with the stages of localization in production and engineering of automobiles, it is vital to foster the autonomous development of capabilities in the design and engineering of automobiles. This study focuses the collaborative co-creation of automotive development and engineering with local partners and alliance.

## 2. The theoretical background

The R&D of Japanese automotive firms has been recently collaborated with home R&D center and local R&D center to cope with the localization of car designs for the local users' desires in the intensive environment of competitive new car development. Therefore, it is very important to promote the knowledge transfer of R&D and deploy the col-

laborative co-creation of automotive design and engineering with local partners and alliance.

### 3. The research methodology employed

This study investigates the fact finding and problems of knowledge creation, organizational learning, and HRD at the development function of Nissan automobile affiliates in China and Brazil. In this study, the cases of Dongfeng Nissan JVC in China and Nissan do Brazil alliance with Renault have been examined, which are constructed on the framework of knowledge creation, and interview investigations, referring literatures of knowledge based theoretical view (Grant, 1996; Kogut and Zander, 1992; Nonaka, et all 2008) and dynamic capability theory (Helfat, 2007; Teece, 2009; Zollo and Winter, 2002).

#### 3-1. Knowledge-based theory

It is possible to place knowledge-based theory (KBT) by a flow of theory evolution of the resources-based theory (RBT). For example it is the individual property including each skill and know-how that you aim as the inner factor which brings advantage by RBT. However, strengthening them is not always related to the creation of the end product, thereby a possibility exists that advantage of an enterprise is not led as a result<sup>3)</sup>.

The study of Grant (1996)<sup>4)</sup>, Kogut and Zander (1992)<sup>5)</sup> is emphasizing knowledge in particular apart from core competence theory of the Prahalad and Hamel (1990), which is stating that creating capability as the organizational routine to utilize individual resources brings advantage to a firm. In other words, advantage can be raised by the firm's creating capability of the organization.

#### 3-2. Dynamic capability theory

The creation of Chi (Knowledge) in joint business organization is an important factor in the long-term growth of a firm. The dynamic capability is a useful theoretical framework, because it searches and utilizes a resource of new Chi from intra-corporate organization (Teece, 2009).

DC indicates the ability to sense and then seize new opportunities, and to reconfigure and protect knowledge assets, competencies and complementary assets so as to achieve sustained competitive advantage (Teece, 2009)<sup>6)</sup>. According to Teece (2009), Critical dynamic managerial capabilities include asset orchestration, frequently involving in special-

The International Deployment of R&D Organization and the Collaborative Knowledge Creation: ized and complementary assets within the resource base of an organization. Not only managers must assemble these bundles of resources, but also they must design appropriate governance and incentive structures<sup>7)</sup>. Thus, it is suggested that the role of management and the entrepreneurship are largely related to this DC.

The DC theory of Teece is different from the view of Zoro and Winter (2002) and Helfat (2007) who have showed an integrated capability and DC by the capability of organizational routine. Teece includes in the conceptual elements of DC not only knowledge as organizational capability, but also personal knowledge as entrepreneur's spirit by management (Nagano, 2015)<sup>8)</sup>.

#### 4. The key findings

##### 4-1. Dongfeng Nissan: new original brand development "Venucia"

Dongfeng Nissan, Chinese joint venture of Nissan Motor and Dongfeng (Guangdong-province) has developed "Venucia e30" based on technology of the EV Nissan sold by Japan and U.S. in 2010 as "leaf". Venucia e30 has been sold at the price of 267,800 Yuan in China. Dongfeng Nissan has just started to sell the new style of SUV "Venucia T70" in January 2016, and "Infiniti" within a year.

The mileage is increased by the most suitable control according to the Chinese road environments and use situation, which produces at a main factory of Dongfeng Hanato factory (Guangdong-province). Dongfeng Nissan has a plan to sales 50,000 cars in 2018, and aimed at the share of 20% at a Chinese EV market.

Thus, it is the brand image which makes the quality and the reliability in a background as expected to become a turning point of sales' good or bad condition. For the brand making of each company as well as the numbers and the design of the investment of goods, a steady and strategic match seems to be asked from now on.

In the case of Dongfeng Nissan Technical Center, 1,000 Chinese engineers with support of Japanese experts have developed new original brand car "Venucia" in 2012, and deployed second model of new models in 2013. Besides, the second generation of Tiida hatchback cars has been developed as a global model car, so that product design function has also been transferred to Dongfeng Nissan from the development center of Japan in order to meet with the Chinese specific needs and apply them in the global market in April 2013.

How about an electric car (EV) and ecology car strategy? Chinese government puts

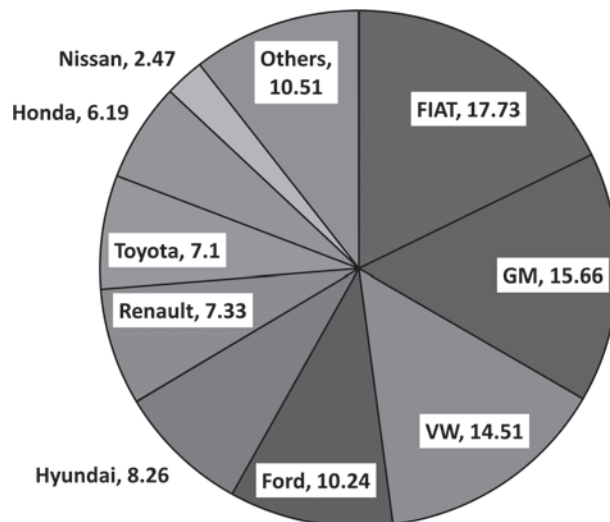
the emphasis, however, sales do not develop comparatively. There are details of the subsidy frame by which a government will pay for each car type of the EV actually. Therefore, the person considering purchase will waver. When it is filled with details of the subsidy, sale should also increase in sequence. Nissan will aim at the top of share 20% at the Chinese market in 2020.

#### 4-2. Nissan do Brasil

In the case of Nissan do Brasil, it has been operated since 2012 to collaborate with globally allied Renault. Besides, it has been collaborating not only with global head office in Japan, but Nissan Mexicana S.A, which has been operated in Mexico since 1960. That is why, many core engineers have been sent to Mexican plant for the training and acquiring technical knowledge. Thus, the plant of Nissan Mexicana plays the actual role of “mother plant” in the car production engineering.

From this study, the importance of fostering the knowledge creative personnel from Know-how to Know-why type has been suggested. Furthermore, it is suggested to localize the function of R&D and delegation of authority from the head office to the affiliate of a local country.

Figure 3. Automotive Market Share (%) in Brazil (2014)



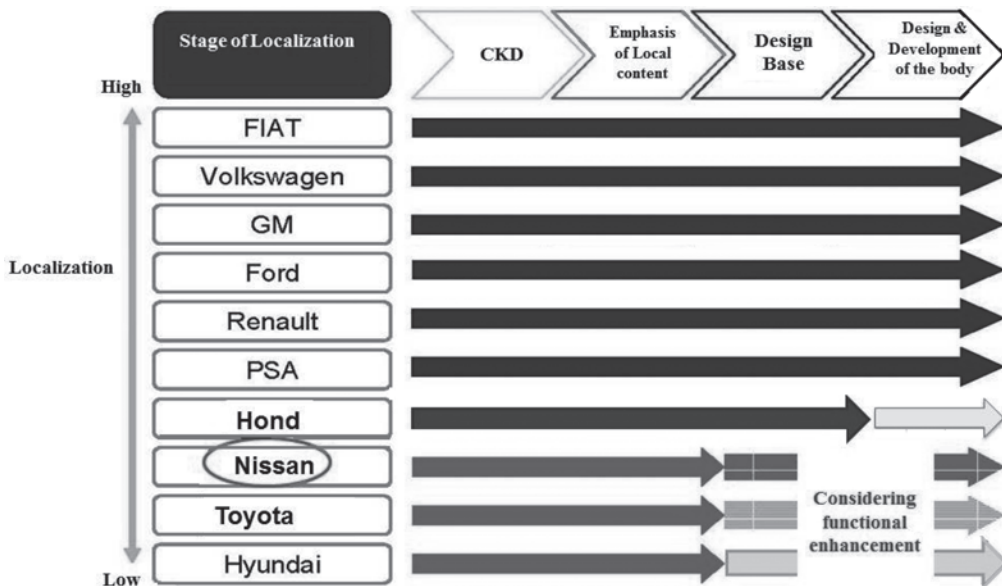
Source: Made by author from *Nihon Keizai Shinbun*, January, 20th, 2016.

**Company Profile of Nissan do Brazil in the last fiscal year 2014**

The firm’s outline of Nissan do Brazil is summarized as follows.

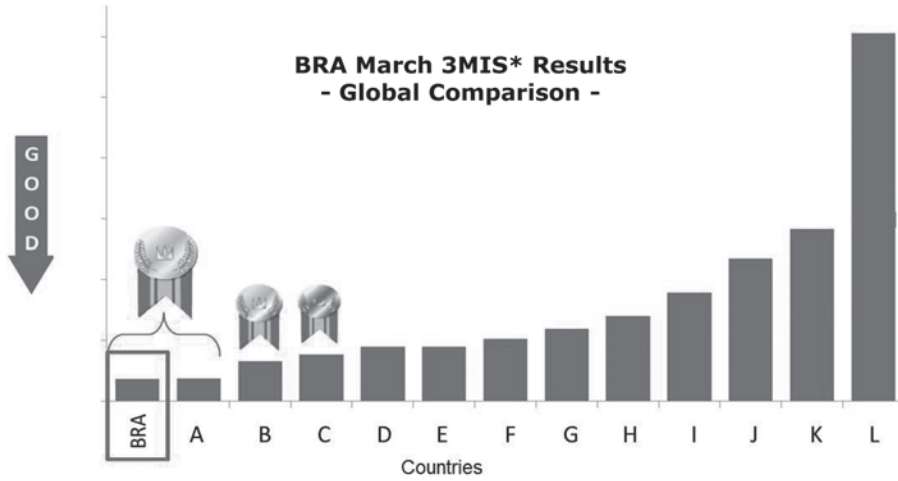
- Nissan do Brazil started operations in 2,000, in São José dos Pinhais (PR) plant, on the assembly shared with Renault.
- Long-term commitment with the country.
- Investment of BR\$ 2.6 billion in the Resende (RJ) plant, the first 100% Nissan in Brazil.
- The Rio 2016 Olympics and Paralympics Sponsorship and the Time Nissan.
- The Nissan Institute, first social responsibility institute among Nissan, and the project of the Early Childhood Educational Center, in Resende.
- Launch of NBA Plant in Resende.
- Annual capacity of 200,000 vehicles/200,000 engine/year.
- 1,400 direct jobs (1,800 total NBA).
- Launch of two new engines: 1.0 12V 3 cycle and 1.6 16V flex fuel.
- First Japanese Company to have a 3 cyl in Brazil.
- Launch of two new cars: Nissan New March and Nissan Novo Versa.
- Great Quality Rates.

Figure 4. Localization of R&D



Source: Mizuho Bank (2014) *Mizuho Industry Focus*, Vol 149, p. 16.

Figure 5. Quality rates resend plant



Source: Nissan Motor Corporation.

Table 1. Nissan Way: The power comes inside.

Mind Set	Actions
1. Cross-functional, Cross-cultural	1. Motivate
2. Transparent	2. Commit and Target
3. Learner	3. Problem
4. Frugal	4. Measure
5. Competitive	5. Challenge

\* The index of focus is a customer, and by which motive power is value creation and success is the profit.

**Quality is an obsessive commitment for Nissan:**

BRA March Resende K13 has best 3MIS result globally (6 months weighted average) by launching period.

BRA Versa 1st Results: 1MIS current results for Versa is same level as March. Same level of results is expected.

The Mind Set and Action in the following table also permeates widely in a foreign subsidiary as a Nissan Way. A focus says that a customer and motivated power are value creation, and that an index of success is the profit based on the viewpoint which is “Everything starts from the will of the individual.”

**4-3. The results from interview research at Nissan do Brazil<sup>10)</sup>**

**(1) Relationship between management vision, strategy and knowledge creation**

For Nissan do Brazil, knowledge means business innovation and horizontal development of Kaizen and the best practice. A management strategy chooses monthly progress as a cascade kit, and is for all the members. A style of leadership is based on Nissan Way: everything starts from the will of the individual, and transparency is important. Management of overall opinion by market intelligence, and total customer satisfaction are important for promoting knowledge creation.

**(2) Relationship between information tools and knowledge creation**

Each function constricts connected knowledge bank on the alliance networking for sharing success/failure cases and best practices. Bidirectional information sharing is accomplished, and creation of chi (knowledge) is being promoted. The standardization of operational processes globally implemented in Brazilian offices as well. Information system tools such as operational standardization are effective for innovative knowledge creation. Three actual principles (“go and see,” and actual understanding) are emphasized. Knowledge is created by a fact base, and real understanding is important.

**(3) Relationship between corporate culture/learning and knowledge creation**

Corporate culture is based on the matrix organization of the region and the function spindle, the cross function/culture and diversity. In accordance with the achievement of the commitment, a bonus is decided to the commitment for the employees. For exchanging the knowledge, community of practice is important such as Cross-functional Value-up matching. (Something likes six sigma)

As to the cross-functional and cross-organizational group training and e-learning community of practices, they are different depending on departments, but a benchmarking with a company in the same line of business such as Mazda has been implemented as well as technology exchange meeting, Value-Up projects, and expert leaders as CKM (Chief Knowledge Manager) or knowledge facilitator.

**(4) Relationship between human resources development for employees and knowledge creation**

Competency management is important for the qualifications and requirements of personnel in your company who are capable of implementing knowledge creation. A person-



nel ratings and evaluations based on a clear standard (such as competency) are followed up. Follow-up meeting of twice a year is put into effect (Face to face with a boss), and it is effective for the career formation and support of employees. There are facilities and programs in every central and region for the purpose of organizational learning. Recognition such as overseas training program and daily throughput prize is effective to the incentive systems such as Nissan prize for the employees or a group leader, contributing to the knowledge creation. Cross functional and cross organizational group training and cyber learning community for operation and training are not so important. They are put into effect partially, but they are limited with a personal education and training base.

#### (5) Knowledge creation and innovation in design and development organization

The mind set which is not seized with a standard and benchmark in the region is effective to the outcome of design and development of Knowledge. The most important requirements for the automotive design and development in Brazil are the capability of grasping of needs and the reflection in a market and utilized local parts. Deployment of the experience and practical knowledge acquired from the automotive design and development in Brazilian market into other emergent market is emphasized. In the procurements and development of local parts, the decision making of authority certification could be delegated to local side.

### 5. Conclusion and Implication

From the development stages of the knowledge (management & technology) transfer from home to host country, the maturity of organizational learning shall take the process of creative innovation from imitative learning to adaptive learning stage, then after innovative development stage. Thus, the organizational management of R&D has been evolved from centralized control type, and coordinated federation type into transnational type.

From the field study observation, Nissan has been shifted the stages of the first and the second stage. Thus, it will be vital for them to foster R&D for the globally collaborative innovation stage. Recently, it has been evolved into the transnational type, which emphasize the dynamic co-creation process not only by relying on the own home based R&D center, but by the role of alliances with Renault including outside firms and research organizations positively.

**Table 6.** The Development Stages of Knowledge Transfer, R&D Organization, and Organizational Learning

Development Stage of Knowledge Transfer	Evolution of R&D Organizational Management	Maturity of Organizational Learning
1 Imitative Learning	Centralized Hub Type	守 (Shu) Basic Learning
2 Localized Improvement	Centralized Federation Type ↓ Coordinated Federation Type	破 (Ha) Adaptive Learning
3 Collaborative Knowledge Co-creation	Transnational Type ↓ Globally Collaborative Network Type	離 (Ri) Co-Creative Learning

Sources: Authors made from the references of Hideo Ueki (1982, 2013), Bartlett, C. & Ghoshal, S. (1989), Hideo Ueki & Mariko Ueki (2008).

In the case of Nissan do Brazil, under the global matrix organization, the axis of functional divisions supports globalized organizational business, whereas the axis of regional headquarter (Nissan do Brazil in South America region) operates local production, marketing and product design & engineering, etc. Besides, Nissan plants of Mexico operating since 1960's have played the role of "mother factory" for engineering and human resources development as Latin American regional operation of Global Nissan, which has been observed in the HRD at Nissan do Brazil.

As D. Teece suggested in his DC theory, the entrepreneur's leadership of Carlos Ghosn, using managerial resources through the strategic alliance of Nissan and Renault would be implied in the dynamically changing environments in the world competitive market and technological advances of automotive industry. On the other hand, automotive industrial policy by government shifts the advancement of the R&D technology towards sustainable growth by environmental regulations and equilibrium of employment and upgrading of skills in emergent countries.

Thereby, it will foster the globally collaborative networking of R&D management by fostering developing dynamic organizational capabilities through intra-corporate technology and knowledge transfer at the transnational firms like Nissan in order to meet with the public needs of emerging countries.

That is why, the international deployment of R&D organization and the collaborative knowledge creation is vitally important.

Notes —————

1) FOURIN (2015) *The world car statistical yearbook 2015*, p. 288.

- 2) FOURIN (2015) *The world car statistical yearbook 2015*, p. 126.
- 3) Nagano (2015) pp. 106-111.
- 4) Grant (1996) p. 109.
- 5) Kogut and Zander (1992) pp. 83-385.
- 6) Teece (2009) p. 206.
- 7) Teece (2009) p. 80.
- 8) Nagano (2015) pp. 114-115.
- 9) *Nikkei Sangyo Shinbun*, November, 28<sup>th</sup>, 2014.
- 10) Interviews with VP and managers of Production and Engineering Division were held on September 14<sup>th</sup>, 2015.

#### References

- Grant, R.M. (1996) "Toward a knowledge-Based Theory of the Firm," *Management Journal*, Vol. 17 (Winter), pp. 109-122.
- Helfat, C.E., Finkelstein, S., Mitchell, W. Peteraf, M.A., Singh, H. Teece, D.J., and Winter, S.G. (2007) *Dynamic Capabilities: Understanding Strategic Change in Organizations*, Blackwell.
- Kogut, B. and Zander, U. (1992) "Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology," *Organization Science*, 3 (3), pp. 383-397.
- Nagano, H. (2015) *Shigenbeisuron no Rironshinka*, Tokyo; Chuokeizai Co.
- Nonaka, I and Toyama, R., and Hirata, T. (2008) *Managing Flow: A Process Theory of the Knowledge Based Firm*, New York: Palgrave Macmillan.
- Teece, D.J. (2009) *Dynamic capabilities and Strategic management: Organizing for Innovation and Growth*. NY: Oxford University Press.
- Ueki, H. and Ueki, M. (2010) "Enabling Knowledge Creation and International Deployment of Best Practices in Large Japanese Firms," *The Journal of Tokyo Keizai University*, No. 266, pp. 3-35.
- Ueki, H. et al. (2011) "A Comparative study of enablers of knowledge creation in Japan and US-based firms," *Asian Business & Management*, Palgrave Macmillan Publishers, Vol. 10, No. 1, pp. 113-132.
- Ueki H. et al. (2011) *Chi wo Souzousuru Keiei (Knowledge Creating Management)*, Tokyo; Bunshindou Co.
- Ueki H. (2016) "Knowledge Transfer and the Sharing of R&D Capabilities at the Japanese Automotive Firms in Asia," *IFEAMA SPSC*, Vol. 4, pp. 1-13.
- Zollo, M. and Winter, S.G. (2002) "Deliberate learning and the evolution of dynamic capabilities," *Organizational Science*, 13 (3), pp. 339-351.

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