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Moroccan Automotive Industry : Opportunities and Perspectives

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ABTRACT:*Firstly, our paper is interested by the global automotive industry context, the problem of under-exploitation of logistics function among automotive suppliers and the difficulty of their integration and collaboration in global supply chain. Then, we present an overview of Moroccan automotive industry summarizing different characteristics of this latter and particularly that of economic side. Then we preside developments which Moroccan automotive industry has experienced during the last years. Finally, we propose an exostive presentation of production technologies and management techniques used in Marocian automotive industry with proposals to improve maturity and collaboration of OEMs and to better meet expectations of the global automotive manufacturers.*

Keywords :*Automotive industrie,exports,vehicles, Automotive sector, Management, Technologie, Morocco, TFZ.*

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I. INTRODUCTION

The Moroccan automotive sector takes a strategic importance in national industrial policy. It has been identified among the growth engines given the major development which has experienced in recent years for equipment manufacturers and builders. It presents even greater opportunities for the next decade.

Morocco has more than 50 years of Industrial experience. The Kingdom was one of the predecessor African countries to set up an industrial policy for the automotive sector following its independence by the creation in 1959 of the assembly line SOMACA in Casablanca.Moreover, Morocco has managed to consolidate assembly industry with Renault redeployment in country and implementation of international equipment suppliers in its wake. In addition, local market is promising: equipment rate of Moroccan households by car is important, hence a high potential of market growth for the coming years given the growth in the purchasing power of population (especially middle class).Moroccan automotive sector already has some structural advantages. This sector is also considered by government as a threefold strategic sector in terms of wealth and job creation and foreign exchange generation. Therefore, Moroccan government does not hesitate to get involved in its development. It shows willingness to carry the sector, to structure it and create right conditions for its development.

In addition, studies conducted in Emergence Plan framework (new Moroccan strategy of development and economic and industrial modernization) Have shown that Morocco has to complement and make more attractive its offer in order to become a production and export platform. Moroccan government offers for investors infrastructure, quality services, incentive framework and human resource training solutions they need.Although Moroccan automotive industry has many advantages and it is strongly supported by industry ministry, trade and new technologies, it must also face difficulties both structural and cyclical.

II. OVERVIEW ON AUTOMOTIVE WORLD MARKET

Global automotive industry has been marked in recent years by changes in world demand addressed to shipbuilding countries and amplification of outsourcing phenomenon which has allowed to many developing countries to develop an automotive industry contributing to generate an additional export flows very importants.

The year 2009 was however characterized by a significant deterioration in production of vehicles and automotive products mainly due to the decline in global demand, as well as financing difficulties faced by some companies in automotive industry [1].In 2013, global production of vehicles increased by 4% to 87.3 million vehicles, is the fourth record level after 2009 fall. This increase in volume accounted for 3.1 million vehicles.

The global vehicles production was approximately 50 million units in 1990 and to nearly 60 million in 2000. It has exceeded the threshold of 70 million vehicles before the crisis of 2009. Since then, it has increased by more than 20%. In developed areas, changes in production level compared with 2007 is mixed; it is declining in Western Europe (-18%) and Japan (-17%), but was up 7% in NAFTA (Canada, USA, Mexico) and 11% in South Korea. In emerging areas or countries which are the expansion pole automotive, production is much higher than that of before crisis. In 2013, it increased compared to 2007 by almost 50% in Asia-Oceania (it has more than doubled in China), 26% in Latin America and 13% in the new Member States of European Union . Between 2000 and 2013, global vehicles production (87.3 million) increased by almost 50%, but the results were contrasted between areas. In developed areas or countries, production fell by nearly 5 million vehicles reaching a level of 43 million units (- 10%). They accounted for just under half of world production, whether more than 30 points less than in 2000. Within these areas, production in North America fell by 1.2 million vehicles (- 7%) and in Western Europe by over 4 million (- 25%). Japanese production fell to about 500 000 units in 2013 (- 5% compared to 2000). In contrast, the one in South Korea, including countries benefiting from more favorable exchange rate developments, Increasedby 1.4 million units (+ 45%). In emerging areas or countries, production has increased by more than 33 million vehicles, based on the following five areas: China, which accounted for 25% of world production in 2013; Central and Eastern Europe and Turkey; Indonesia, Iran, Malaysia and Thailand; South America and India. In total, these emerging areas or countries have seen their share of world production of vehicles from 16% to 49% over the period.

Tab. 1 : Global automotive production (In thousands of units) [2]

	2012	2013
Africa	586	637
Europe	19857	19726
America	20086	21136
Asia-Oceania	43709	45801
Total	84239	87300

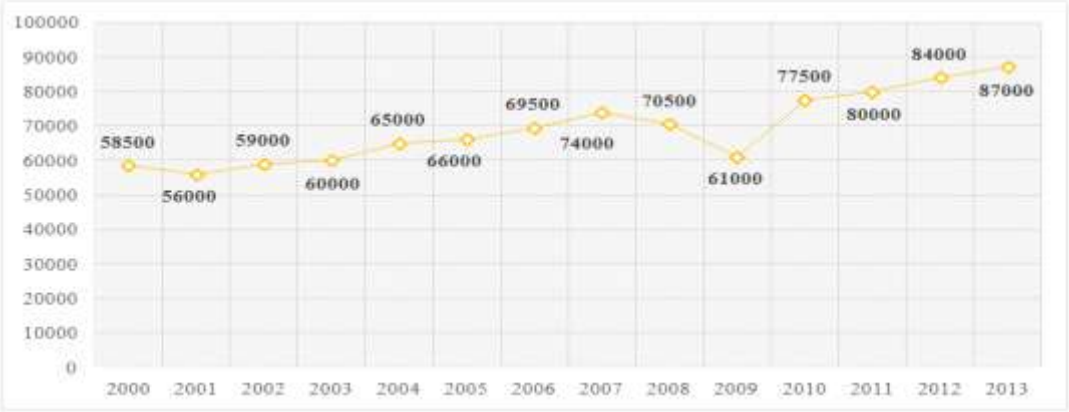

Fig. 1. evolution of the world production of vehicles [3]

III. MOROCCAN AUTOMOTIVE INDUSTRY

3.1 Overview

Development of Moroccan automotive industry was led by SOMACA in Casablanca, a former state enterprise founded in 1959. Since1990[s], SOMACA underwent a process of privatization and its shares are now fully owned by french automobiles manufacturers. There are many companies related to automotive sector in Casablanca, most of them produce parts and components that meet the need of the market for automotive spare parts and provide repair and maintenance services. Although Morocco turns into a producer of new vehicles for export with the commissioning of Renault factory in Tangier, very few local companies are integrated into production chain for assembly of new vehicles.Following the increase in SOMACA production and a strong inflow of Foreign Direct Investment (FDI) from European Union (EU), US and Japanese parts manufacturers have in recent years, improved the manufacturing value chain of Moroccan automotive sector.

National Pact for Industrial Emergence (NPIE) designated the automotive industry one of its key sectors. On September 2007, Renault unveiled a plan dedicated to the establishment of a new assembly plant for passenger cars in Tangier, whose annual capacity is 340 000 vehicles, and whose construction cost was evaluated 1 billion EURO. Renault completed its initial construction phase and commissioned its first assembly line in February 2012, which has an annual capacity of 170000 units. It is also reported that the company achieved in October 2013 the construction of a second production line which has the same capacity of 170000

units per year. Morocco's domestic demand for cars remains limited due to the size of its population: an average of 130000 units per year, for a population of 32.3 million. In 2012, French brands accounted for nearly 50% of market share in terms of sales (Renault 37% - PSA 14%). Implementation of free trade areabetween EU and Morocco offered a much more favorable position with European car manufacturers in pricing on the automotive market, compared with other international competitors.

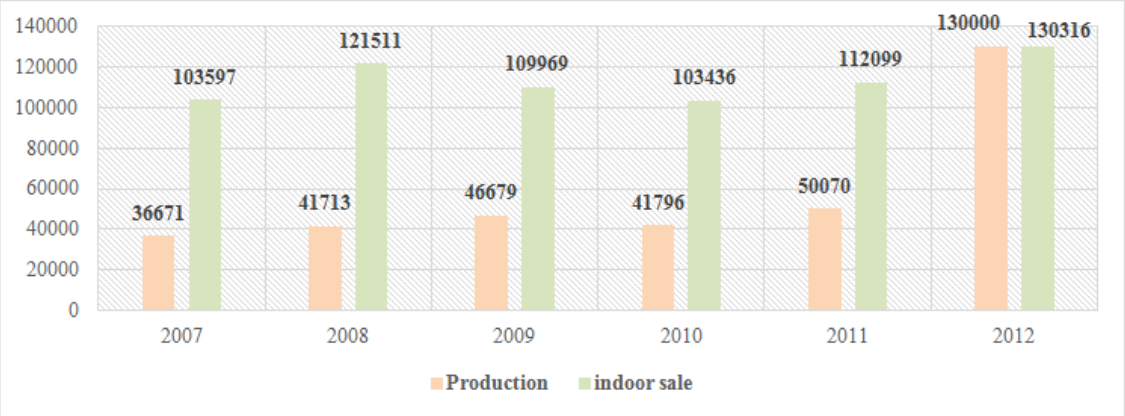

Fig.2.production and sales of Moroccan automotive sector [4]

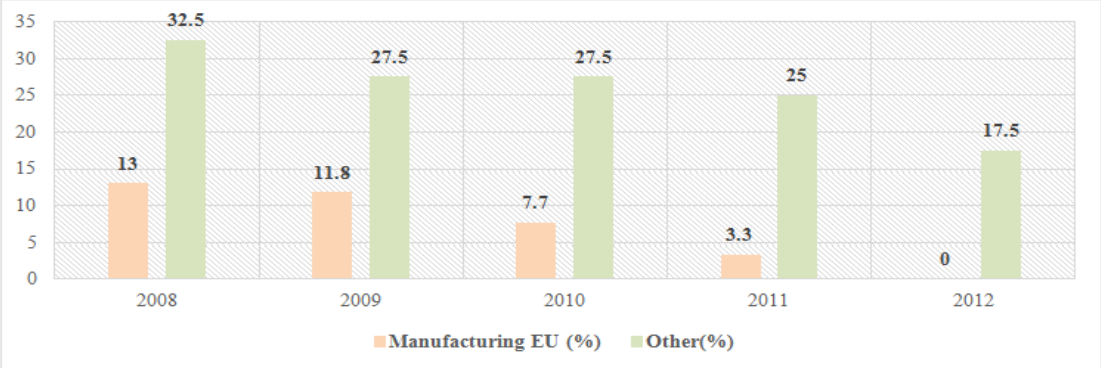

Fig. 3.tariff rates of import vehicles in Morocco [5]

N.B.: SOMACA, the only automobile assembler in Morocco till 2011, represents all cars production between 2007 et 2011.

Fig. 4.examples of auto parts manufactured in Morocco

3.2 NPIE (2009-2015) and recent developments

NPIE defines the creation of a stable industrial base in the long term around a network of suppliers and "mega-sites" of automotive industry as a medium term goal for development of Moroccan automotive sector, which aims to generate 70000 additional jobs.In addition to 350 hectares of Tangier Free Zone (TFZ) already exist, where many international companies in automotive industry have established their production bases, two Integrated Industrial Platforms (P2I) dedicated to automotive sector have been developed in Tangier and Kenitra. In Tangier, Tanger Automotive City, which is a new free zone of 300 hectares, located in front of

Renault plant, is under development. In Kenitra, Atlantic Free Zone (AFZ), with a size of 350 hectares, has been already developed and hosts many international companies including the Japanese Sumitomo and Fujikura (SEWS Morocco).In addition, the government has also initiated the development of specific human resources for automotive sector with the establishment of four Institutes for Training Professionals Automotive Industry (ITPA) under the Public-Private Partnership (PPP).The state also received financial support for these initiatives on the part of international organizations such as French Development Agency (FDA) and Korean International Cooperation Agency (KICA). The incentives for automotive industry include:

1. A full tax exemption on corporate income during the first 5 years and a tax rate of 8.75% for the next20 years in free zones.
2. No VAT applied on imports or exports.
3. No tax on dividends (against 10% on local businesses).
4. Financial support (with a ceiling of 1.8 million euro or 10% of total investment):

- 30% of the cost of investment (building construction) with a ceiling of 182 €/m^2.
- 10% of equipment costs for investment in machinery exceeding 220000 €.

Because of these efforts, Morocco has managed to increase number of firms workingin automotive sector to 200, and the employees number of sector to 75000 in 2012 [6].

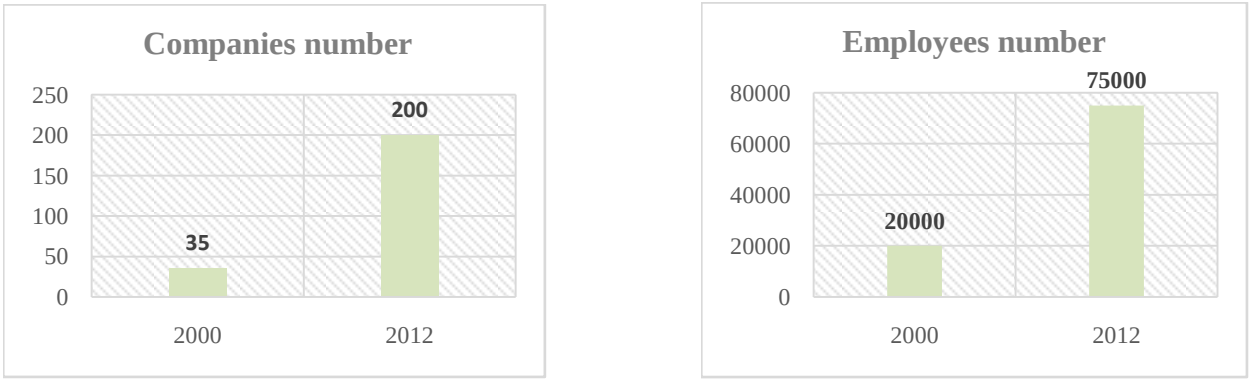

Fig. 5.augmentation of investments in automotive sector (2000-2012) [7]

3.3 Foreign direct investments in Moroccan automotive industry

Incomes of foreign direct investments from automotive industry have risen sharply in recent years. They rose to 3.6 billion dirhams in 2012 against only 913 million dirhams in 2010. This is explained by increased flow of direct investment for construction segment which reached 3.2 billion dirhams in 2012 despite the decline in investment revenue recorded in other segments, including particularly the wiring.Similarly, foreign direct investments in automotive industry accounted 43.9% in 2012 against 19.2% in 2010 of total revenue in respect of foreign direct investments in manufacturing. The year 2012, ishowevermarked by expansion of foreign investments in this sector due to the implementation of Renault assembly plant in Tangier with an annual production capacity of 170000 vehicles. Ultimately, capacity will increase to 400000 vehicles/year.

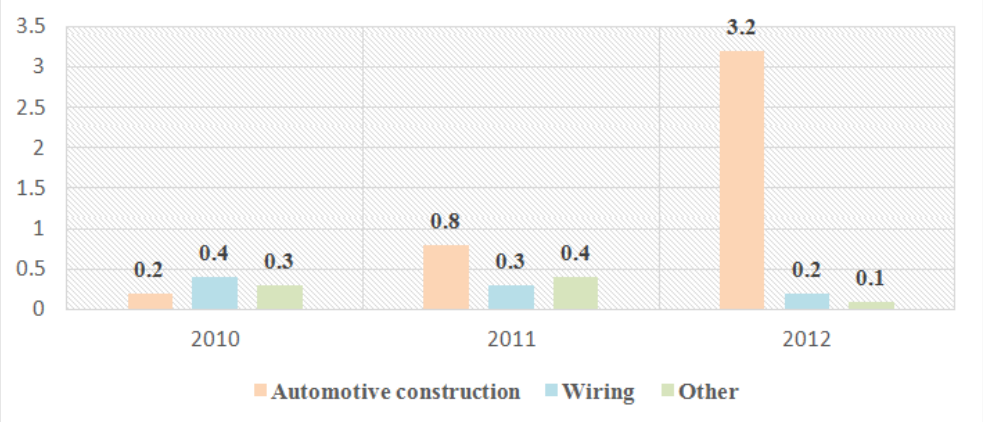

Fig. 6.direct investments evolution of automotive industry by main segments [8]

3.4 ports evolution of automotive industry

Automotive exports passed from 12.7 billion dirhams in 2005 to 25.2 billion dirhams in 2012, with an average annual growth rate of 14.6%. This increase occurred in exports is mainly due to the growth of the segment of automotive construction in Moroccoby starting the activity of Renault Tangier industrial complex which helped to increase export volume of carsto 89,712 units whether 7.3 billion dirhams in 2012 against only 2.7 billion dirhams in 2011.

As for other segments of automotive industry, wiring comes first in terms of exports. Despite the decline in 2009 due to economic crisis, exports of automotive cables have reached 14.8 billion dirhams in 2012 against 10.1 billion dirhams in 2007, an average annual growth rate of 8%. A third important segment is the one of the seats and seat caps whose exports amounted to 1.3 billion dirhams in 2012. Over a period of 6 six years (2007-2012), automotive industry has created an additional export of 12.4 billion dirhams (25.164Mdh against 12.738Mdh). This performance has contributed to overall development of Moroccan exports of around 18.2%. So, exports share of this sector related to the total Moroccan exports is increased to 13.6% in 2012 against 10.1% in 2007.To report that automotive sector is characterized, from 2009, by a positive trade balance, which generates anexcess of order of 3.6 billion dirhams in 2011 and 2.5 billion dirhams in 2012.

Tab. 2. exports evolution of automotive industry by segment (In millions of dirhams) [9]

Segment	2007	2008	2009	2010	2011	2012
Wiring	10080	10737	9015	14661	17603	14806
Automotive construction	511	530	1044	1229	2705	7295
Seats / Caps seats	1077	1252	915	1189	1652	1303
Rubber processing	34	19	27	150	184	238
plastic processing	182	282	246	220	216	217
Metal Processing	143	118	149	153	130	209
Heavy weights	245	314	256	196	105	192
Other	466	407	373	599	766	904
Total	12738	13659	12025	18397	23361	25164

3.5 Morocco's position on world map of auto industry

Compared to African countries competitors (Tunisia and Egypt), Morocco comes in first position in terms of global market share with a remarkable improvement in its export performance over last eight years. This share reached 0.23% in 2012 against 0.1% in 2007 and exceed those of Tunisia and Egypt respectively recorded 0.15% and 0.08% in 2012. Market share of emerging countries in Eastern Europe provide information about potential to export of automotive industry in these countries, especially Czech Republic and Poland which display the respective market shares of 2, 3% and 1.7% in 2012. For its part, Turkey recorded a market share of almost constant over the past eight years of around 1.4%. In view of increased competition on world market of automobile industry, the main African and European countries competitors submitted in this study saw their market share decline in 2012 while Morocco continues to improve its competitive position in the exterior markets.

Tab. 3 : trade of Moroccan automotive industry with partner countries (In millions dhs) [8]

	2009		2010		2011		2012	
	Export	Import	Export	Import	Export	Import	Export	Import
EU	10910	9717	16652	12431	22028	18187	23748	21056
France	4842	3146	7989	3990	9088	5695	10865	8728
Spain	4426	2199	5071	3057	8085	5010	7352	5189
Germany	219	1871	730	1998	507	2588	762	2959
Italy	582	657	1321	761	1571	1134	1535	919
Great Britain	278	50	698	52	1185	78	1276	70
Egypt	362	11	440	7	290	7	764	1
Turkey	229	95	470	80	468	181	194	210
Tunisia	98	64	569	213	188	198	26	235
United States	6	100	4	102	7	117	34	249
Other	420	1065	261	1274	381	1088	396	967
Total	22372	18975	34205	23965	43798	34283	46952	40583
trade balance	(+3397)		(+10240)		(+9515)		(+6369)	

Morocco's commercial transactions involving various products of automotive industry are experiencing strong focus on countries of European Union which represent, in 2012, 93% of all commercial transactions in property of auto industry. These transactions generate surpluses between 2010 and 2013 against the deficit balances in 2008 and 2007, particularly because of the activities development of wiring and automotive

construction. France and Spain, major trading partners, involved in 2012 to 67% in total trade conducted with foreigncountries. The trade balance reached on transactions with these two countries remains positive between 2010 and 2013. Apart from countries of European Union, Egypt became in 2012 the first African country importer of assets of Moroccan automotive industry, passing to764 million dirhams against 290 million dirhams in 2011. This increase in exports to Egypt is explained in particular by sales of Dacia brand cars produced in Morocco by Renault -Tangier plant. Commercial transactions with United States remain very weak and generate widely deficit balances. This increase in exports to Egypt is explained in particular by sales of Dacia brand cars produced by Renault in Morocco-Tangier plant. The commercial transactions with United States remain very weak and generate widely deficit balances.

3.6 Transformation of manufacturing value chain

Most multinational companies in automotive sector (suppliers senior assemblers) located in Morocco exported more than 90% of their goods. Taking full advantage of free trade agreement signed between EU and Morocco, they have established the "processing for export and assembly" as a business model: they import almost all parts and components using their own global supply chain, perform assembly work in Morocco With the help of a good manpowerand export their products to automotive assemblers (including assemblers Japanese) located in European zone. Many businesses in FDI indicated that the main factors that have accelerated FDI in automotive sector (mainly assembly companies with strong human capital, such as cables manufacturers) in Morocco are:

1. A stable political and social base in the country;
2. Cost of labor is lower than that of Eastern Europe countries (including Romania), which functioned as auto parts manufacturing centers of labor-intensive work;
3. Existence of quality works, particularly those of women, who are able to follow continuously and precisely defined procedures, once training is completed and experiences are accumulated;

Moroccan workers have some level of adaptation and understanding of production methods and quality control as 5S, Kaizen and Lean production.From these viewpoints, Morocco will continue to be one of potential destinations for relocation of factories of first-tier manufacturers supplying European market.Renault plant of Tangier, with its role as an international assembly on a large scale, has attracted for Morocco a large number of supplier firms already providers of Renault. Japanese DENSO (air conditioners for vehicles manufacturer) and MITSUBA (manufacturer of wiper systems) are examples. Furthermore, metal stamping and plastic injection business, which require higher investment costs have also emerged in the country. This means that the integration of Moroccan automotive sector increased gradually, which will strengthen the local supply chain in the sector and increase the variety of auto parts and components for export. However, current level industrial liaison (manufacturing value chain) is still feeble: there are only a few small and medium locak eenterprise (SMEs) which function as first or second-tier supplier in value chain. The promotion of related industries composed of local SMEs is a major challenge in establishing industrial linkages between local suppliers and existing potential investors, including global automakers and auto parts manufacturers. Currently, six subsidiaries of Japanese automotive companies operating in Morocco. Their presence and contribution to automotive sector and to local employment have been strongly felt since the first Yazaki factory was established in Tangier in 2001. The total number of local staff employed by these Japanese subsidiaries is reported at over 26000 in December 2013. Some are expanding their capacities, their total number of Moroccan employees exceed 30000 in 2014. They have developed and practiced production systems and quality control of their standards in their production lines in Morocco, whether according to Japanese model, a model fitted to European plants, or a global standard model. This has contributed to transfer and implementation of a higher level of industrial technologies in these companies in Morocco combined by training of newly recruited workers and continuous training. While this trend is still limited within each company, increase in global FDI manufacturers in automotive sector in Morocco has led job creation, diversification of export products,thereby a strong development human resources and crop production transfer (Monozukuri) for further industrial development.

3.7 Technological upgrading of Moroccan SMEs operating in automotive sector

In recent years, Morocco has managed to attract FDI of many companies, including auto parts suppliers senior, who producing products such as wiring harnesses, car seats, car bodies, air conditioning systems for vehicles, steering wheels and wipers games. There is currently little local Moroccan SMEs which are linked to these global suppliers of automotive parts, for two reasons:

1. Leading international producers use their own global supply chain, and importing almost all necessary pieces and elements procured by suppliers of second (and third) row, elsewhere in the world.
2. Most local SMEs do not have capacity to provide required products by FDI companies with the quality, quantity, price and / or adequate delivery time. If local SMEs are able to upgrade their management

techniques and production technologies, number of Moroccan suppliers of second and third tier able to link with global producers of auto parts and senior who are in Morocco, will be increased.

In order to increase local integration, the following areas need to be improved in Morocco:

1. Production technologies

- **Machine processing**

Treatment with milling and turning is widespread in Morocco. In order for Moroccan SMEs to be able to provide high quality auto parts which meet strict quality standards required by customers (businesses FDI), they must acquire/strengthen the following basic processing technologies:

- Machining operations;
- stamping operations;
- Surface Treatment (galvanizing, alumite treatment, coating, heat treatment, etc.);
- Electrical discharge machining;
- machining, manufacturing (plastic molding, die casting, etc.);
- Laser therapy;
- Welding;

- **Electrical Technology**

Carriers and assembly machines are used in the manufacture of parts and components intended for motor vehicles. In order for Moroccan SMEs to be able to use effectively these machines with reinforced maintenance capacity, they must acquire the following technologies:

- Basic electrical engineering technology (electrical measurement,…);
- Control technology (e.g. sequencer, pneumatic equipment, actuator and censor,…);
- Programming (e.g. Control Program, 3D design and CAM program,…).

2. Management Techniques

During our visits to some wire companies (Yazaki,Delphi,Fujikora,…) in TFZ,we found that the majority of them use Kaizen as tool for continuous improvement because this tool does not demand too much invesisement and guarantee a good improvement:

- **Improvement Kaizen**

Most SMEs have adopted lean production practices, with some level of success. There is however still a lot of improvements which should be donein this domain, and supervision as well as expert advice for some time, probably for a year is needed to build capacity and establish a solid foundation for continuous improvement. An important aspect which should be addressed when introducing the practice of Kaizen methods for SMEs is the necessity for experts of Improvement Moroccan Initiative (IMI) to improve their understanding of specific production technologies in this sector in addition to their knowledge and know-how in general management techniques. IMIhas provided on-site consulting services on management techniques (Lean Manufacturing) for SMEs, which are oriented towards widespread use in all sectors. IMI experts must acquire a certain level of understanding of production technologies used in each individual company. With increasing knowledge of specific production technologies of automotive sector, IMI expertsbecome able to effectively detect problems of existing production systems. This knowledge will enable to IMI experts to provide practical advice on how to solve problems encountered in each automobile manufacturing business using management techniques such as Kaizen.

- **Promote effectively kaizen technical**

Information sharing between SMEs on how was applied Kaizen and succeeded in producing tangible results is an effective way to ensure that the concept is henceforth widely known, and Kaizen technique has become the norm in Moroccan automotive sector. Introduction of a systematic approach, based on the detailed planning of various promotional activities, is necessary so that INMAA effectively disseminates concept and method of Kaizen to a wider range of local SMEs, and raises public awareness to subject in Morocco. The introduction of a systematic approach, based on the detailed planning various promotional activities, is necessary for the IMI effectively disseminates the concept and Kaizen method to a wider range of local SMEs, and raises public awareness to this subject in Morocco.

When harvesting informations from over 10 local SMEs in TFZ, we evaluated their levels of production andtechniques management using a performance evaluation scale with 5 levels (1 = low, 5 = excellent). Comparison between these two levels between Japanese affiliated companies located in Morocco and local SMEs is presented below:

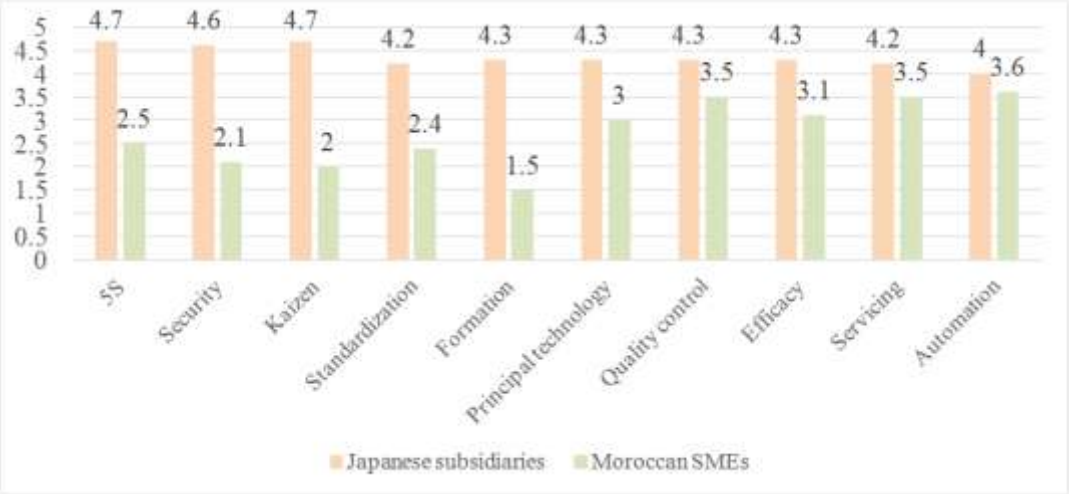

Fig. 7.production levels and management techniques of Japanese affiliated companies and local SMEs [10]

IV. CONCLUSION

Moroccan automotive industry has experienced in recent years a remarkable growth, supported by increased foreign investment flows and the performance achieved in terms of exports, particularly for wiring and construction. Wiring activity remains the strongest determinant of automotive industry with a turnover representing almost 59% of total sector exports. Activity of car manufacturing should, meanwhile, progress in the coming years in terms of productivity, given the new industrial platforms created or planned in emerging plan to attract new investment and encourage, among others, arrival of other manufacturers to Morocco. To attiendre this goal, Moroccan automobile sector should raise the following main challenges:

- Improving local supply by inviting more international providers of second and third tier;
- Strengthening technical and managerial capacities of Moroccan SMEs so that they can deliver to international suppliers of first, second and third place;
- Increasing number and improving competence of managers, engineers and middle executives who do not have sufficient knowledge and expertise both of basic production and of management technique in automotive sector;

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