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Innovation Strategies of Automobile Industry
——An Assessment of the Middle Class in Asia——*

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Abstract

Recently, there are several scholars and researcher have strived to explain the increasing the size of middle class in emerging Asian countries. After the Second World War Asia was a region 'poor', 'low-income' image. Over the last couple of decades these Asian countries been miraculous. Economic growth has driven that prosperity and helped to shifting them from low income country to middle and high income country. The middle class comprises more than 60 percent of the population of Asia. The importance of the middle class lies in the fact that it is the fastest growing size of the population. These shifting have the potential to fundamentally change consumer purchasing power refers to the buying power

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of an individual customer or a specific market to buy certain quantities of goods and services. Evidence shows that increase of the Asian middle class has already hugely expanded markets for consumer goods in recent years.

For multinational corporations (MNCs) the middle class in Asia thus presents significant business opportunities. But a satisfactory understanding of the MNCs specific causative factors is still missing. Since the 1990s, Asia, like most other emerging markets, has a high demand for consumer goods, such as a home electrical appliance and is already established within the middle class. However, a new range of products such as automobile is increasingly being geared towards this group as well. This study investigates the contribution of consumer demographics to such relationships. According to a McKinsey & Company report in 2013, there is a big opportunity is in smaller vehicles (subcompacts, microcars, and super-minis); these already account for more than 30 percent of global sales and could reach more than 30 million vehicles by 2020. More than 60 percent of this market is located in emerging economies, where sales are set to grow 5 to 6 percent a year until 2020. However, in this paper will analyzed on purchasing affordability of middle class, and find out vehicle markets opportunity and innovation strategy of the automobile industry to contribute the middle class in Asian countries and regions.

Key words: 1. Middle class, 2. Innovation strategy, 3. Automobile.

I Introduction

During my research journey of more than thirty years I have visited several times in East, Southeast and South Asian countries and the surrounding regions several times. I met thousands of people who are professional, business people, working in government and private offices and organizations. I found them bright eyes of self-confidences, with dignity, progressive and prosperous. After

Second World War Asia was a region ‘poor’, ‘low-income’ image. Over the last couple of decades these Asian countries has miracle. Economic growth has driven that prosperity and helped to shifting them from low income country to middle and high income country[(1)]. Vis-a-vis household income categories from low income to middle income, middle high income and high income classes are growing. The importance of the middle class lies in the fact that it is the fastest growing segment of the Asian low class population. This shifting has the potential to fundamentally change consumer purchasing affordability which refers to the buying power of an individual customer or a specific market to buy certain quantities of goods and services.

The study conducted includes research papers, National Household Surveys in Asian countries, surveys of research and government documents, documents from the World Bank (WB), Asian Development Bank (ADB), the United Nations Development Program (UNDP), Organization for Economic Co-operation and Development (OECD), The United Nations Conference on Trade and Development (UNCTAD), website of various countries and international organizations, and newspapers have to study various aspects of Asia. This study will try to clear up the concept of middle class and verify the innovation strategies and business opportunities of the automobile industry in Asia. The discussion of this paper is organized as follows: Section 2, Assessment of the Middle Class in some Asian countries; Section 3, Business Opportunities in Asia; Section 4, innovation strategy of the Asian automobile industry; and Section 5, concluding remarks.

Ⅱ Assessment of the Middle Class in Some Asian Countries

Accelerating economic growth in Asia has led to decreasing inequality, structural change and falling absolute poverty rates, helping millions of people growing up to middle class. It is true that Asian lives have improved

enormously. Asia's middle class is one of the fastest growing population groups in the world. More than 60 percent of the world population has live in middle class in 2015. According to OECD report in 2011, the size of the "global middle class" increase from 1.8 billion in 2009 to 3.2 billion by 2020 and 4.9 billion by 2030. The World Economic Forum (2013), predicts that the explosion of Asia's middle class population is impressive. In total, the size of the middle class in China, India and Southeast Asia will rise from 1.2 billion people in 2012 to almost 2 billion by 2020. (Media Business Asia, 2015, website). However, it will discuss and literally survey about definition of the middle class in Asia in the next.

1． Literature Review and Definition of Middle Class

There is no universally recognized definition of middle class. Historically, the middle class was a social class characterized by intellectuals that were neither capitalists nor workers. In feudal Europe, in 350 BC, the Greek philosopher Aristotle claimed in his magnum opus *Politics:* "*Thus it is manifest that the best political community is formed by citizens of the middle class, and that those states are likely to be well-administered in which the middle class is large,* [⋯] *and where the middle class is large, there are least likely to be factions and dissensions.*" Aristotle viewed the middle class in political terms, defining the middle class as the class that held the greatest political power (Mulgan, 1977). The middle class represented the group falling between the peasantry and the nobility. Sociologists have typically defined the Western middle class on the basis of education and occupation in a white-collar job. The foundations of India's middle class were laid in the mid19th century under British colonial administration, primarily using the colonial educational system. This supplanted the traditional system with a wide network of institutions designed to train people to help run the state (Dharampal, 1970). In fact, the Indian middle class was before colonial creation.

Economists have tended to identify the middle class using income (Table 1). But there is no consensus among economists about whether relative or absolute income matters, or within what ranges of relative measure or absolute measure income the middle class lies. For those using the relative measure, the middle class is defined as individuals or households, thus creating a middle class definition that is absolute at the bottom end and relative at the upper end of the distribution.

An absolute measure defines the middle class as those earning some benchmark income range. However, with the middle class in recent years, it is important to keep a proper perspective on its potential purchasing power parity (PPP)[(2)]. It do not mean rich, but it mean families with houses, cars, technology, education, and a greater need for financial services. The McKinsey Institute's (2007) more narrow definition of the middle class is a group with higher levels of disposable income. A wider definition of the middle class that include households with less disposable income, however, goods such as televisions and mobile phones have become increasingly popular. Goldman Sachs has

Table 1: Income-based definitions of the middle class (US$)

Author	Consumption in $PPP
NCAER (2004)	$8.2-$41 per capita per day
ADB(2005)	$2-$20 per capita per day
WB(2005)	$2-$13 per capita per day
McKinsey Global Institute (2007)	$64-$322 per household per day
Banerjee and Duflo (2008)	$2-$10 per capita per day
Goldman Sachs (2008)	$16-$82 per capita per day
Ernst & Young (2010)	$10-$100 per capita per day
Ravallion (2010)	$2-$13 per capita per day
Edward and Sumner (2010)	$10-$50 per capita per day
Meyer and Birdsall (2010)	$10-$50 per capita per day
Lopez-Calva and Ortiz Juarez (2011)	$10-$50 per capita per day
Milanovic (2012)	$10-$22 per capita per day

Source WB, 2013,32.

defined middle class households as having an income of between US$6,000 and US$30,000 a year. By contrast, experts working in development tend to use a much lower figure – between US$10 and US$100 a day (Brian, 2013).

Bhalla (2007) defines middle class to be those earning more than US$ 3,658 (2006 prices) a year or US$ 10 a day, in purchasing power parity terms.

Banerjee and Duflo (2008) defined the middle class as those whose daily consumption lies between US$2–$10 (2005 PPP US$). In the Banerjee and Duflo case, to be part of the middle class one is required to have more than US$2 per capita per day and less than US$10 while Milanovic and Yithaki's estimate is 6 times greater (12 US$) than the lower threshold and 5 times greater than the upper (50 US$). Both intervals can be reasonable but they define two completely different groups.

Kharas and Gertz (2010), investigating a larger and potentially richer set of individuals, used a definition as those making between US$10–$100 (2005 PPP US$) per day, but used national accounts per capita household consumption means to adjust their survey distributions, rather than going with the typically lower survey means.

This is an important observation noted by Kharas in a report titled 'The Unprecedented Expansion of the Middle Class" published by the Brookings Institution (Working Paper 100, February 2017). Kharas defines middle class as a four person household with annual income between US $14,600 and US$146,000 with per capita incomes between US$10 and US$100 per person per day in 2005 Purchasing Power Parity (PPP) terms. Kharas (2010) also defines the middle class is 'middle of the Pyramid'[(3)] (Kharas, 2010; World Bank, 2007; Ernst & Young, 2013; Bank of America Merrill Lynch, 2016).

Ravallion (2010) assesses the increase in the number of people in the "middle class" over the last several decades, defining the developing country middle class as those people with income per capita between US$2 and US$13. Ravallion also focused on the middle class in developing countries, defining

them as the population lying between the median poverty line of developing countries and the poverty line of the United States, which is the upper boundary of those being middle class, i.e., lying between US$2 and approximately US$26.5 (2005 PPP US$) per person per day.

John West (2014), stated the ADB has chosen an "absolute measure", defining the middle class as those people with consumption expenditure ofUS$2-$20 per person per day. While opting for its US$2-$20 a day definition, the ADB does break up its middle class into three sub-groups the lower middle class with consumption of US$2-$4 a day, the middle-middle class with US$4-$10 a day and the upper middle class with US$10-$20 a day. Other researchers have chosen relative or hybrid measures.

The World Bank's measure US$2–$13 per day, the celebrated economic growth of emerging nations has put millions of people into middle class in recent years. In China, the number of people earning US$2–$13 per day has increased from 175 million in 1990 to 800 million in 2005, and in India 150 million to 265 million over the same period. Over those 15 years estimated the middle class almost double globally, growing from 1.4 to 2.6 billion.

2．Population Size of Middle Class in Asia

According to ADB (2010) estimated the size of the Asian middle class will expand to 2.7 billion by 2030. China and India will see the largest number middle class status. Middle class belongs US$ 2 to $13, in East Asia alone, 806 million people (Table 2) already count themselves as middle class – more than the total population of the European Union. ADB also mentioned, over the next two decades, it is estimated that the middle class will expand by another three billion, coming almost exclusively from the emerging world. A significant proportion of the new Asian middle classes are also expected to be at the upper end of the income bracket and boast impressive spending power. Asia's middle and upper middle class are emerging as a powerful economic force–

Table 2: Economic class in Developing World (Unit: millions person, US$)

Region	Year	Low income class		Middle income class		
		Below $1.25	Between $1.25-$2	Between $2- $4	Between $4- $13	Above 13
Developing world	1991	835	396	283	235	98
	2001	678	507	519	399	104
	2011	397	472	661	800	290
	2017	288	442	637	943	536
Central and South-Eastern Europe (non-EU) and CIS	1991	4	7	23	79	35
	2001	7	11	35	81	13
	2011	3	5	17	90	48
	2017	2	4	15	83	65
East Asia	1991	401	156	84	21	11
	2001	218	174	210	126	23
	2011	52	76	210	375	112
	2017	15	22	109	407	290
South-East Asia and the Pacific	1991	93	48	33	20	4
	2001	74	69	62	34	7
	2011	37	64	102	76	18
	2017	22	51	107	111	33
South Asia	1991	221	129	62	6	3
	2001	228	179	102	15	2
	2011	161	230	185	47	4
	2017	119	252	237	86	6

Source: Guardian News and Media Limited, website.

sophisticated, influential, increasingly wealthy (ADB, 2010).

According to Nielsen, middle class lifestyles, still out of reach for most people in South and Southeast Asia, are set to become more common over the course of the decade. Between 2012 and 2020, the middle class will grow by 330 million in India to become 540 million strong, and by 210 million in Southeast Asia to represent 400 million people (Nielsen, 2016).

China and Vietnam have made the greatest progress in increasing the share of their middle class populations. By 2030 Asia will represent 66 percent of the

global middle-class population and 59 percent of middle-class consumption. According to the World Bank, the middle class of South and East Asia accounted for 1.4 percent of the global population and 2.1 percent of global income in 2000. By 2030, the World Bank forecasts that this same group will account for 8.9 percent of the population and 7.7 percent of global income – much higher than the middle class growth in other developing regions. Despite this impressive achievement, the lower middle class constitutes the predominant share of the middle class for most developing Asian countries. In China, Indonesia, and the Philippines, the lower middle class is more than half of the total middle class, and only a few per cent of the population is in the upper middle class group. In India, the lion's share of the middle class is in the lower middle class group (Table 3). Malaysia and Thailand stand out for having bigger shares of their populations in the middle-middle and upper middle classes. The middle class is rapidly expanding in emerging Asia and developing countries which has been contributing the expansion of demands on the automobile have never been greater than now.

3．Factors Driving the Growth of the Middle Classes

Factors affecting the growth of the middle classes in Asian countries and surrounding regions are macroeconomic and social development achievements have been impressive over the last two decades due to stable economic growth, good governance, democracy, stability of politics, and improved institutions. Some others factors are also contributing to growth of middle class, they being growth in emerging markets, increased productivity, an attractive business environment, female labor participation, urbanization, increasing educational attainment and the establishment of a social safety net (Euromonitor International, 2015). However, there are many factors is contributing to driving the growth of middle class. Here some important factors will be briefly discuss as follows.

Table 3: Population size of the economic income levels in some Asian countries (thousand person)

Countries	Income (US$ per day)	2009	2015	2020
China	BOP ($4-$10)	747,675	431,699	207,489
	New MOP ($10-$20)	464,807	630,526	578,203
	MOP ($20-$100)	90,305	226,063	412,212
	TOP (Over $100)	25,232	73,539	185,357
India	BOP ($2-$4)	831,005	482,323	276,113
	New MOP ($2-$10)	303,884	635,101	713,625
	MOP ($10-$20)	22,207	117,424	280,114
	TOP (Over $20)	11,688	27,778	64,026
Indonesia	BOP ($2-$4)	145,108	65,688	36,862
	New MOP ($2-$10)	76,808	138,212	133,973
	MOP ($10-$20)	5,519	33,454	68,639
	TOP (Over $20)	2,530	6,837	14,745
Malaysia	BOP ($4-$10)	2,192	1,075	589
	New MOP ($10-$20)	8,401	5,009	2,980
	MOP ($20-$50)	10,424	10,201	7,924
	TOP (Over $50)	7,084	14,442	21,251
Philippines	BOP ($2-$4)	53,439	43,525	39,154
	New MOP ($2-$10)	31,972	45,274	52,393
	MOP ($10-$20)	5,344	11,319	16,492
	TOP (Over $20)	1,382	2778	4,151
Thailand	BOP ($4-$10)	23,174	15,623	11,218
	New MOP ($10-$20)	30,100	30,611	28,012
	MOP ($20-$50)	9,451	16,357	24,485
	TOP (Over $50)	2,007	4,273	7,275
Vietnam	BOP ($2-$4)	68,850	52,015	35,442
	New MOP ($2-$10)	15,530	32,622	43,433
	MOP ($10-$20)	1,294	4,712	12,410
	TOP (Over $20)	604	1,269	2,726

Source: Euromonitor International, 2015.

1）Economic Growth Factors

Rising incomes lead to more consumption, which in turn leads to higher economic growth, then more employment opportunities and subsequently higher wages and the circle starts again. The growth of the middle class and the

economic growth of Asia are in a virtuous cycle (Figure 1). According to ADB (2010) as rapid economic growth has reduced poverty across Asia, the middle class has grown rapidly in size and purchasing capability. Economic growth can help reduce poverty through an increase in household income, providing earnings to obtain the minimum basic needs. Thus, over the past 30 years, a number of Asian countries have achieved remarkable progress, transforming themselves, and have passed through a couple of development stages from largely agrarian, underdeveloped economies into dynamic industrial and export-oriented economies. The economies of East and Southeast Asian countries and the surrounding regions, have each reached upper middle income status within a span of about 30 years, achieving remarkable improvements in the standards of living and quality of life for their citizens as well as increasing the size of the middle class.

Figure 1 shows that economic growth and ultimate result of creating employment, production, and trade, and it contributes to export-oriented industrialization. Economic growth turns out to be an effective and popular measure in the ongoing struggle against poverty, enabling those without access to lending institutions to borrow money and start businesses as well as self-employment.

The economic growth process in Asian countries is distorted with MNC, FDI (foreign direct investment). Therefore, FDI has played a substantial role in providing capital and technology necessary for industrialization and in contributing to the high economic growth rate in the Asian Pacific region [(4)]. In the 1970s, Japanese FDI led the high economic growth of the East Asian regions, which became newly industrialized economies (NIEs), with Japan as the pulling or leading goose, and then, the NIEs and Japan both led Southeast Asian or ASEAN countries, the later geese (Chowdhury, 2003).

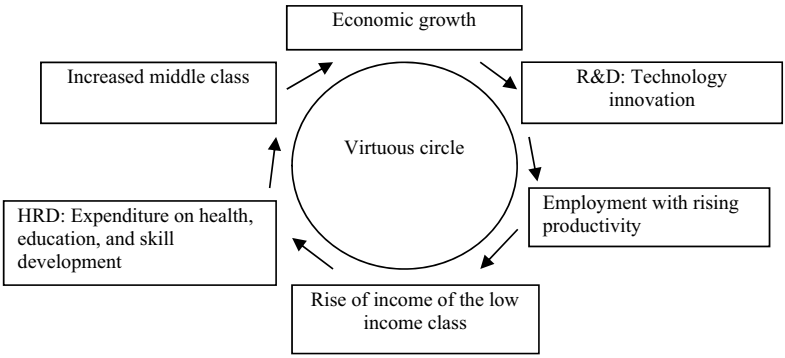
The development model refers to the relationship between income and poverty reduction as an economy develops, where economic development

is defined and measured by increasing income per capita. According to this development model, as incomes increase, poverty decreases, that is to say human resource quality also increases, but only up to a point whereupon additional increases in income lead to middle class specifically improvements in enterprises and production quality. This innovation in turn boosted economic growth, setting off a virtuous cycle of growth, consumption, innovation, and more growth (ADB 2010).

2）Social Business factors

The concept of Social Business is still not clearly defined and its boundaries to other fields of study remain uncertain. There is no universal theory of the phenomenon. Many theories of entrepreneurship have come from different research and thought, with many authors emphasizing different factors to explain it. Muhammad Yunus, who was the founder of the Grameen Bank in 1976 Bangladesh, also introduced the idea of Social Business, which has been acceptability around the world. That the Social Business concept is

Figure 1. Virtuous circle of links to economic growth, poverty reduction, and rise of middle class



Source. Chowdhury, 2013, 833.

catching up globally is clear from the fact that it is being adopted by leading corporations including BASF, Intel, Danone, Veolia, Uniqlo and Adidas as well as entrepreneurs and social activists in various parts of the world. The aims of social business are addressing the problems of poverty, development, environmental hazards, social security, and massive unemployment, and others. Social business means to contribute to society through personal or group or non-profit corporations or foundations' activities. Under these considerations Asian countries and regions have many of the above activities to contribute to poverty alleviation and improve others' social index and bettering middle classes.

3）BOP Factors

Another factors also contributing growth of middle class which has moved up from "the bottom of the pyramid" (BOP). Prahalad & Hart (2002) developed the idea of the existence of a fortune at the base of the pyramid. They believe that the BOP market is a very attractive potential market but largely ignored. At the heart of their theory is located the idea of a shared benefit for MNCs and poor population, as consumers and not as individuals out of the economic cycle.

According to Prahalad, the BOP means lifting billions of people out of poverty and desperation, averting the social decay, political chaos, terrorism, and environmental meltdown that is certain to continue if the gap between rich and poor countries continues to widen through the investment of MNCs (Prahalad, 2014,8). In addition to, Prahalad has explained, the BOP, has since given rise to a focus on the new global market segment in emerging markets. This is the middle class, which is positioned just above the BOP as the middle of pyramid. The BOP theory states that MNCs can reach profitability and help to eradicate poverty and drive the middle class, by designing and implementing sustainable solutions for the BOP consumers.

Education and spatial mobility are often key factors in procuring a middle-class job. They allow people to move into a new sector or industry with higher

wage rates, or to relocate to an urban agglomeration where there are greater job opportunities. This is expected to translate into sustained growth of middle-class jobs in the future.

ILO (International Labour Organization) says there is evidence that growth in the middle class means more spent on health and education – leading to a "virtuous circle" of higher productivity and faster development for wider society, thus helping create more political stability through an increased demand for accountability and good governance. ILO estimates can show the evolution of the middle class over time. For each country, the assumption is that mean household expenditure will grow at the same rate as real GDP growth per capita. (Kharas, 2017, 3).

Ⅲ Business Opportunities in Asia

Most Middle-class households allocate part of the household budget to leisure and entertainment. This demonstrates that middle class households, apart from spending more on education and health, are also likely to spend more on household appliances such as electrical goods like televisions and refrigerators, cars as well as other products. As an example from Prahalad, as mentioned in India's case, the poor often do buy "luxury" items. In the Mumbai, 85 percent of households own a television set, 75 percent own a pressure cooker and a mixer, 56 percent own a gas stove, and 21 percent have telephones (Prahalad, 2014). In addition to being better off in material terms, the middle class are in general both more satisfied and more optimistic about the future than their poorer compatriots.

Legendary British economist John Maynard Keynes argued that rising incomes among those at the top of the income distribution will affect the economy very differently than will rising incomes at the bottom of the income distribution. He developed this idea into the concept of the marginal propensity

to consume, writing in *The General Theory: … it is also obvious that a higher absolute level of income will tend, as a rule, to widen the gap between income and consumption. For the satisfaction of the immediate primary needs of a man and his family is usually a stronger motive than the motives towards accumulation, which only acquire effective sway when a margin of comfort has been attained. These reasons will lead, as a rule to a greater proportion of income being saved as real income increases* (Keynes, 1953, 97).

Some others evidence shows that as income increases, the amount of spending increases. The middle class in Asia thus presents significant business opportunities. The sales growth of consumer goods such as televisions and mobile phones to the middle class has already been established, but a new range of products such as financial services is increasingly being geared towards this group as well. The rise of the Asian middle class has already hugely expanded markets for consumer goods in recent years (Table 4). As the ADB

Table 4: Durable consumer goods penetration rate per household of major Asian Countries

Goods	Year	India	China	Indonesia	Malaysia	Thailand	Vietnam	Philippines
Air-conditioned	2009	1.8	53.0	6.7	26.2	13.6	4.58	10.6
	2011	6.5	58.0	7.3	34.2	14.6	9.5	12.9
Color TV	2009	33.8	96.5	86.5	96.5	96.6	6.0	90.3
	2011	65.9	96.8	70.9	98.8	93.1	89.5	72.9
Car	2009	3.9	3.9	7.8	61.5	13.3	1.1	11.8
	2011	8.4	14.6	8.7	63.2	14.8	1.5	10.9
Personal Computer	2009	6.2	30.9	14.6	37.7	27.5	11.0	23.8
	2011	9.1	34.6	13.2	65.8	26.3	19.5	17.2
Refrigerator	2009	17.9	60.1	25.1	84.8	87.3	29.9	47.5
	2011	20.1	73.5	30.6	97.2	90.1	50.0	41.4
Washing Machine	2009	21.1	71.4	28.0	91.8	50.8	12.6	37.9
	2011	—	74.8	30.5	89.8	55.8	22.5	32.1
Microwave oven	2009	16.2	29.0	22.8	37.2	61.0	17.1	29.1
	2011	18.1	32.2	24.7	27.4	39.9	20.9	31.8

Source: Euromonitor, 2014, 22.

reports, emerging Asia's middle class has increased dramatically. There are already about 150 million upper-middle-class consumers in developing Asia[(5)], accounting for more than US$3 trillion in spending annually (ADB, 2010).

John West (2014), states that the signs of Asia's growing middle class are everywhere in the economy through the sales of consumer durables like refrigerators, television sets, mobile phones, and automobiles. China has now overtaken the US as the world's largest automobile market, while China and India are now the world's first and second largest markets for mobile phones. Table 4, shown sales of consumer durables such as refrigerators, televisions, mobile phones, and automobiles have expanded significantly in virtually all countries in the region.

1．Market Size of Vehicles in Asia

Vehicle ownership is a status symbol in many Asian countries. There so many South and Southeast Asian car owners also believe their car is an important symbol of success they have achieved in life. There is no doubt, however, that the emergence of a new middle class, with spending power to match developed nations, will offer tremendous opportunities to businesses. Table 5, shows Asia Pacific was the world's second largest automobile market with 21 million

Table 5: Market growth forecasts(Units: cars, millions).

Region/year	2001	2005	2010	2020
North America	19.6	21.5	23.0	24.0
Western Europe	16.6	15.0	15.0	15.0
Asia Pacific	12.4	18.5	21.7	30.0
Central/Eastern Europe	2.5	3.0	4.5	10.0
South America	2.4	3.0	4.0	7.0
Middle East	1.3	2.0	3.0	3.0
Africa	0.8	1.0	5.0	12.0
Total	55.6	64.0	76.2	101.0

Source: Peter Wells 2004, 16.

vehicles sold in 2010, and prediction become world's largest automobile market in 2020 with 30 million units, but it has already world's largest automobile market, with 46 million vehicles sold in 2016 (IOCA website).

At this level, consumers start having the kind of disposable incomes that will allow them to buy the cars, televisions and other goods. With increasing middle and high middle classes in the Asia-Pacific region and stable economic growth, the demand for vehicles has expanded. The increasing demand for light or medium-sized vehicles in Asian market are shown below (Table 6).

Specialization in automobile sector is increasingly becoming segment specific as each of these countries is finding its more suitable segment one. China is specializing in components, India small vehicles [(6)], Thailand in pick-up trucks and passenger cars and Indonesia in utility vehicles. Along with the growth in the middle class population, vehicle technologies have also innovated significantly, mainly driven by emission regulations and the push for improved fuel economy.

Table 6: Sales of New Vehicles in Asian Countries

Countries	2005	2010	2011	2012	2013	2014	2015	2016
China	5,758,189	18,061,936	18,505,114	19,306,435	21,984,079	23,499,001	24,661,602	28,028,175
Japan	5,852,034	4,956,148	4,210,224	5,369,721	5,375,513	5,562,888	5,046,510	4,970,260
South Korea	1,145,230	1,511,373	1,586,405	1,532,087	1,543,564	1,661,868	1,833,786	1,823,041
India	1,440,455	3,040,390	3,287,737	3,595,508	3,241,302	3,177,005	3,424,836	3,669,277
Thailand	692,506	800,357	794,081	1,423,580	1,330,672	881,832	799,632	768,788
Indonesia	533,917	764,710	894,164	1,116,230	1,229,811	1,195,409	1,031,422	1,048,134
Malaysia	551,042	605,156	600,123	627,753	655,793	666,487	666,677	580,124
Pakistan	167,007	152,354	163,260	157,656	141,778	146,882	229,688	211,295
Philippines	97,063	170,348	165,056	184,248	211,959	234,747	288,609	359,572
Sri Lanka	4,000	3,000	8,000	9,500	12,000	15,500	17,000	34,900
Taiwan	446,477	252,500	285,790	270,078	258,753	282,130	262,593	262,346
Vietnam	35,264	112,224	110,938	80,487	96,692	134,562	208,566	271,833
Bangladesh	15,000	40,400	39,900	43,400	42,500	51,900	54,800	44,400

Source: IOCA (International Organization of Motor Vehicle Manufacturers) http://www.oica.net/

China, remained the world's largest accounts for 28 percent of global automotive and fastest growing car market (Table 6). The Chinese car market grew by 18 percent to a new record of over 28 million vehicles in 2016. As vehicle manufacturers, China surpassed the United States in the production in 2008. During this period, China produced 9,299,000 units against 8,695,000 units in the US (Caroline, 2017, 2). In 2016, China produced 28.11million units, Japan 9.20 million units, and South Korea 4.2 million units (Table 7). The Chinese automobile market makes clear, these opportunities can arise very quickly and multinationals need to be ready to respond. China has around 150 million people who are considered to be part of the global middle class and within the next decade this number is expected to reach 500 million.

India also showed strong growth in vehicle sales, driven by declining interest rates and strong domestic economic growth. In 2016 new passenger vehicle sales 3.66 million (Table 7), increased by 14.7 percent. Thus far in 2017, the Indian new car market has expanded by 12 percent the fastest growth rate of any major car market in the world.

Indonesia, is South-east Asia's largest vehicle market, enjoyed a moderate

Table 7: Production of Motor Vehicles in Asian Countries

Country	2011	2012	2013	2014	2015	2016
China	18,418,876	19,271,808	22,116,825	23,722,890	24,567,250	28,118,794
Japan	8,398,630	9,943,077	9,630,181	9,774,665	9,278,238	9,204,590
South Korea	4,657,094	4,561,766	4,521,429	4,525,932	4,555,957	4,228,509
India	3,927,411	4,174,713	3,898,425	3,840,160	4,160,585	4,488,965
Thailand	1,457,798	2,429,142	2,457,057	1,880.007	1,909,398	1,944,417
Indonesia	838,388	1,065,557	1,206,368	1,298,523	1,098,780	1,177,389
Malaysia	533,695	569,620	601,407	596,600	614,664	513,445
Pakistan	162,194	159,599	142,145	146,130	229,686	220,950
Philippines	53,921	55,360	66,632	77,628	112,493	135,840
Vietnam	31,182	40,470	37,576	48,871	50,000	66,030
Bangladesh	n.a.	n.a	162	536	540	580

IOCA (International Organization of Motor Vehicle Manufacturers) http://www.oica.net/

recovery in 2016, with sales rising by 4.7 percent to just over one million units – driven by new models and falling interest rates. The market is expected to grow slowly in the next few years, reflecting moderate economic growth in the country.

Philippines and Vietnam have also increased their vehicle sales. Despite vehicle ownership being low in these countries, strong economic growth combined with low interest rates has attracted new buyers. A decline in sales of 13 percent was recorded in Malaysia, due to slower economic growth. A rebound was expected in 2018, and this is currently being seen.

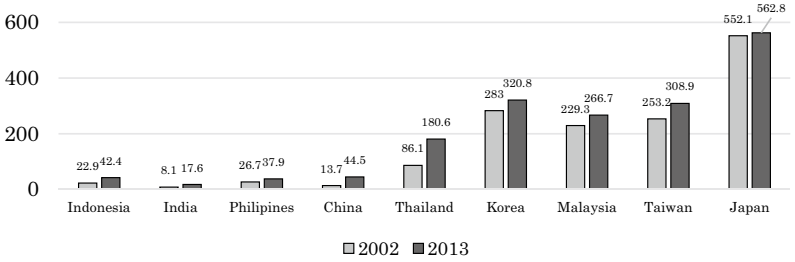
Thailand declined by 3.9 percent in 2015, with a weak fourth quarter cancelling out moderate growth earlier in the year. The recovery is expected to continue through 2017 as economic growth picks up. In 2016 was an excellent year for vehicle sales in Thailand at 768,788 units (Table 6).

South Korea remained at near record levels in 2016, helped also by low interest rates and sales tax incentives in the first half of the year. This market is forecast to weaken in the short term economic growth slows. In 2016, sales reached 1,823,041 units.

However, one major growth opportunity is in smaller or light vehicles (Figure 2); these already account for more than 30 percent of global sales and could reach more than 30 million vehicles in 2020. More than 60 percent of this market is located in emerging economies, where sales are set to grow 5 to 6 percent a year until 2020.

According to an Automotive World report, 2015, across the region there were some 168 million cars and commercial vehicles (CVs) in circulation in 2013 (Table 8). Asia Pacific is already the world's largest automobile market, with 46 million vehicles sold in 2016 (IOCA website). But electric cars sales growth is not so fast. After two successive years of growth, the region's light vehicle (LV) market dipped in 2014 to 11.5 million units, and heavy commercial vehicles (HCVs) sales fell to 401,000 units, the second successive year of decline. LV

Figure 2: Light Vehicles per 1000 person



Source: Ashvin website

Table 8: Global Sales Forecast for Next Generation Vehicles

Next Generation Vehicles	2013	2018	2023
Hybrids	1,583,200	2,519,600	4,347,970
Plug-in Hybrids	72,780	180,000	810,000
Electric Vehicles	79,500	310,000	950,000
Total	1,735,480	3,009,600	6,107,970

Sources: Fourin, website

demand weaken in 2015 but steady growth since 2016 should take the market to just below 13 million units by 2019.

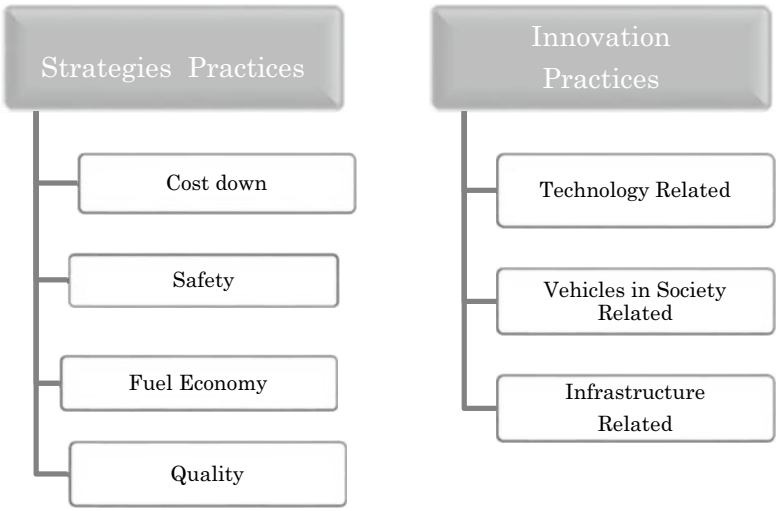
HCV demand declined in 2015, but increased in 2016, the market was above 460,000 units by the end of the forecast period. China's light vehicle (LV) market rose in 2014 for the third successive year, increasing by over 12 percent to a record 20.6 million units.

Ⅳ Innovation Strategy of the Asian Automobile Industry

Development, competition, innovation, computer-aided design (CAD) and computer-aided engineering (CAE) tools are being used to replace physical prototypes and testing processes make vehicles a giant computers on wheels. Consumers want to buy cars from companies that bring latest technologies,

reliability, safety, utility or fuel economy. Low cost is also top priority all world markets. There is an important goal for any business, which is how to develop, produce, and sell a good or service at a profit. At the most basic level, companies will invest when they expect that they will have customers to buy the goods and services they produce at a price that yields a bigger profit than alternative uses of the investment funds. Asia's automobile industry continues to expanding domestic demand and increasing development strategy and innovation. In China, India and ASEAN, automakers are actively boosting investment to meet expanding vehicle production for middle classes. In fact, increased emphasis is appearing in almost every automakers–as it can only be done by playing on two practices, one is strategic practice and another one is innovation practices (Figure 3). As described in above having a middle class is one of the most important factors in the expansion of market demand, primarily

Figure 3: Innovation Strategies of Automobile Industry



Source: Compile by Author

through its effects on productivity and innovation.

1．Strategies Practices

It is an important strategy practices to catch the middle class markets. Customer expectations of vehicle quality, reliability, safety, and utility are at an all-time high. At the same time, worldwide overcapacity has put pressure on the industry to maintain, and even reduce, vehicle price. The ability to consistently deliver the right products on time, with high quality, and at an affordable price to the middle class has distinguished outstanding companies in almost every industry.

The development of electric vehicles meanwhile, comes as the tightening of global emissions regulations prompts more automakers to develop battery powered cars, as the industry struggles with research costs and intense competition from technology companies over technology like self-driving cars. Automaker in Asia have already undertaken innovative solutions, such as competition, leadership, organizational behavior, supply chain management, and marketing which are traditional disciplines of strategy. However, it will discuss cost down, safety, fuel economy and quality strategies as follows.

(1) Cost down strategy

The automobile industry has too much production capacity, too many competitors, too many innovations, too much redundancy, overlap. The industry is in the grips of a global price-war. In recent years worldwide overcapacity has put pressure on the automobile industry to maintain, and even reduce price. According to IOCA, in Europe, Southeast and South Asia including China will be low-cost cars with sales prices between US$ 3,500 and US$ 8,200 (IOCA, website). Naturally, the segment is under enormous cost pressure and promises only small profits. However, most original equipment manufacturers (OEMs) will want to have a low-cost design and low-cost models. Auto makers has

to innovated materials, modules and processes that radically lower costs and quality.

(2) Safety strategy

At the fourth Global Automotive Industry Meeting, held on February 28th, 2006 in conjunction with the Geneva Auto Show, Chief Executive Officers of the major automakers of the world agreed that, for all light vehicles which do not already have them, they would install safety belts by July 2008 or when designing or redesigning these vehicles. Automobile manufacturers have developed today's vehicles with greatly improved safety systems and many important safety features, making new vehicles safer than ever. Vehicle braking, stability and lighting have been improved far beyond the levels required by legislation, by a mixture of technical evolution and advanced technology, making cars more able to avoid accidents. Automakers are strongly committed to being part of the solution, and other stakeholders have an extremely important share in road safety [(7)]. Road safety is built into the vehicle, the road user and the infrastructure are important factors. Vehicle related factors contribute to road accidents however, 95 percent of road accidents can be attributed to driver behavior. The road user should obey traffic rules which are established and general public, and should follow education and enforcement campaigns. The infrastructure also related with road construction and maintenance must follow the best international practice. Only through a combination of efforts by all parties involved can road safety be further improved and mobility remain sustainable.

However, safety does not only depend on technology and automakers liabilities, it also depend on drivers. Now-a-days, there are so many accidents which occur due to careless driving, unfasten safety belt, intoxicated or driver, and driving by the aged when physically unable to do so. There are some possibilities to reduced accidents, to implement a 'Digital Tachographs[(8)]' GPS

tracking system, automatic braking and stop system. Automakers are committed to various initiatives to support with governments to encourage the adoption of and effective enforcement of laws requiring safety belt, drunken driving.

(3) Fuel economy strategy

Skyrocketing fuel prices and growing environmental concerns have shifted consumers' preferences away from consume excessively fuel pickup trucks to smaller, lighter more fuel-efficient vehicles. Fuel economy strategy is an important strategy for all vehicles. Fuel efficiency relationship between the distance traveled and the amount of fuel consumed by the vehicle means fuel economy. Oil price instability affects consumers' choice, as they cannot estimate their fuel budget (Calcars, 2006). My inclusion environmental pollution has raised a series of issues for the automotive industry (KPMG, 2010). Environmental concerns like carbon dioxide regulation has continue to be tightened to reduce emissions. Traditional vehicles manufacturing countries like USA, Japan and European Union, now face competition from emerging countries like China, India and some ASEAN countries. Competition from these countries is strong due to low production costs. Automakers has effort to develop a new technology for energy consumption and emissions. The product of this effort is hybrid electric vehicles (HEV's) offer to the fuel economy and emissions of vehicles. HEV on drive-cycle is due to differences between the cycles in the number and nature of braking events, amount of idling time, and average power requirement. The HEVs powertrain is based on the validated model of the 2004 Toyota Prius which are more sophisticated control strategies.

Another effort is electricity fuels the batteries that run car motors. Instead of using batteries, some solar cars direct the power straight to an electric motor. Solar cars can accomplish this through photovoltaic cells (PVC). PVCs are the components in solar paneling that convert the sun's energy to electricity. Renewable sources of energy like the solar energy to preserve non-renewable

sources of energy. The main advantages of the solar vehicle are that they require less maintenance as compared to the conventional automobiles and are very user friendly.

(4) Quality strategy

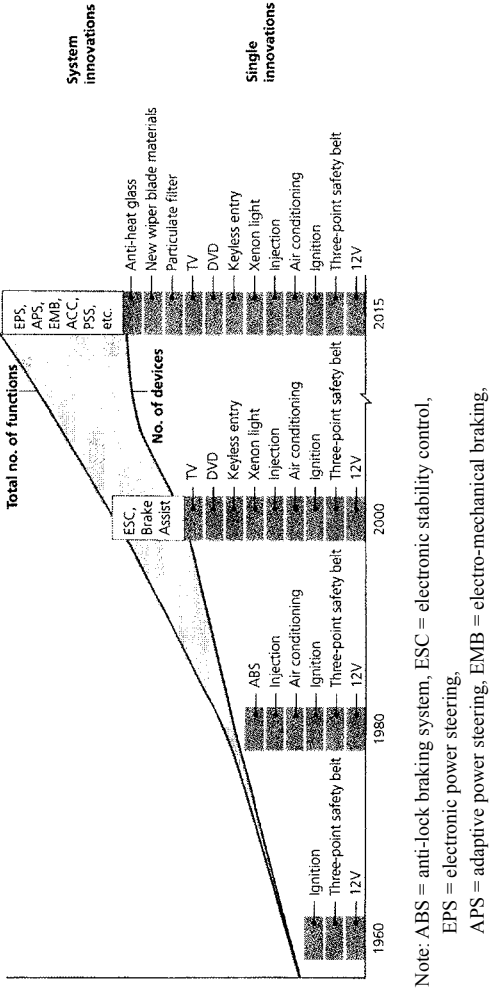
Quality is one of the four pillars in strategy practices to products: cost down, safety, fuel economy and quality strategies. At automakers improving quality is a great efforts and daily activity. Quality issues, also eliminating problems that involve engineering, manufacturing, and suppliers. To improve product quality and efficiency in production, automakers invest a large amount of time and money into developing and improving the manufacturing process, and rely heavily on research and technological innovation.

2．Innovation Practices

Innovation is an important source of product competitive positions are improved through higher product quality, greater reliability and the introduction of new product. Innovation impacts on business sustainability, Williams explains that there is a wide range of environmental problems associated with the automotive industry, including those linked to high levels of resource use in vehicle production and waste materials when the cars reach the end. (Williams, 2007, 1093-1103).

‘Next generation vehicles’[9] are sometimes successfully innovation, like hybrid and electric vehicles (EV) vis-à-vis small or light vehicle (LV) and low-cost. Over the last 75 years, significant technological development has taken place, changing and reinventing how motor vehicles are produced. Innovation pattern and industrial dynamics in the automotive industry shows (Figure 4) the trend for continuous improvement based on process innovation, and adoption of new technologies (Magnusson and Berggren, 2011).

Figure 4: Innovation and Life Cycle of Automobile Industry



Note: ABS = anti-lock braking system, ESC = electronic stability control,
EPS = electronic power steering,
APS = adaptive power steering, EMB = electro-mechanical braking,
ACC = adaptive cruise control,
PSS = predictive safety systems

Source: Jan and Jan, (2016),12.

(1) Technology Related

Technology related innovation practices for the replacement of automated labor, thus reducing production costs, decreasing production time and increasing efficiency. Technology has increasingly altered the manufacturing process of vehicles. Porter (1985) believe that technology is one of the most significant forces affecting business competition. While cars are produced at faster rates, automakers must continue to balance increased productivity and efficiency with quality and technology innovation. These are also referred to affordable, value products that meet the needs of resource-constrained customers (Sehgal, Dehoff, & Panneer, 2010). The value and affordability are the key drivers of innovation, in place of affluence and abundance (Prahalad & Mashelkar, 2010), which have traditionally guided the innovation process in MNCs.

The automobile industry is driving innovation and technological advancement. From the early stages of planning, automakers design new vehicles with a range of diverse technologies that meet customer needs for comfort, convenience, safety, fuel economy. Technological innovations, company must decide which products will benefit from a pool of innovations, and how would these product be presented in a market. To analyze the business opportunities, introduction of electric vehicles can be described as a collective innovation. Throughout the 20th century, several models of electric vehicles were produced, but none became widely adopted by consumers. The system charges itself while powering all the connected appliances through free solar energy and when sunlight is unavailable it automatically shifts to regular electricity.

Toyota is the largest automaker in Japan to incorporate solar power into a mass-produced car. The current Toyota Prius hybrid—with a 1.3 kilowatt-hour battery pack—has limited ability to store energy to power the wheels. A Toyota plug-in hybrid or electric vehicle with expanded batteries would be better suited to using solar-generated energy. But its solar panel is not the first

for a car company. Audi uses one on its upscale A8 model, and Mazda tried one on its 929 in the 1990s. In addition, a French motor company, Venturi, has produced an electric-solar hybrid. Stella, the first completely solar car designed for normal road travel, reached the U.S. in 2014. Stella can travel up to 500 miles on a single charge. It's also the first vehicle of its kind created specifically for everyday family use. According NHK, Japanese automaker Toyota, will take a 5 percent share of Mazda, and two companies will take small stakes in each other as part of the tie-up to build a $1.6 billion U.S. assembly plant. The plant will be capable of producing 300,000 electric vehicles a year, with production divided between the two automakers, and employ about 4,000 people. It will start operating in 2021 (NHK news, Friday, 19:00. 4th August, 2017).

ADB (2010) study shows that the increased demand for quality products and services promotes investment in innovation. The rising middle class, especially the lower middle class has provided the necessary stimulus for enterprises and individuals to produce new innovative products that are both affordable to the lower middle classes, while being superiority in terms of functionality and efficiency. These products range from service goods such as insurances and banking to manufactured goods such as hygiene products. What is different about this new wave of trends in innovation is that it caters to a more fastidious set of consumers who are harder to please. Examples of innovations spurred by this growing lower middle income classes abound. Some examples in India, only US$ 2,200 and fuel efficient 'Nano car', and the US$ 70 battery-operated refrigerator (ADB, 2010). As mentioned above, Asia Pacific is already the world's largest automobile market, with 46 million vehicles sold in 2016 (IOCA website), although electric cars sales growth is not nearly as fast.

(2) The Vehicle Societal Relationship

Vehicle plays a role in all aspects of modern-day society, including transportation, communication and convenient. Since the dawn of time

transportation has always been important. In recent decades personal transportation has become more prevalent and more important. Improving the vehicles business environment through innovation is especially important, as business is the main driver of innovation. Schumpeter and other scholars (Smith, 1998; Sundbo, 1998) put forward the argument that business leads to the introduction of two broad categorizations: commercial innovations motivated to achieve either revenue generation or cost-reduction; and public innovations/ policy initiatives aiming at achieving an increase in socio-economic welfare. Innovation also relies heavily on the creation of basic knowledge, through both education and science. Vehicle related innovation involves many experts working together collaboratively, including engineers, marketing and sales managers, and business strategists to create new technology. The methods for organizing this group of people to develop a new technology from new idea for new vehicle, that technology to the marketplace form the basis of the discipline of innovation strategy. The impact of innovation on society is unquestionable. Vehicle technology innovation has had a huge impact on society. While not every advance has been beneficial, there have been many positive effects of vehicle technology innovation. In order to understand the impact of these changes on society, it can be helpful to consider each innovation.

(3) Infrastructure Related

The physical infrastructure that actors need for functioning (such as IT, telecom, and roads) and the science and technology infrastructure may not be available hindering further development. From above, it can analyzed, there is a great opportunity to expand EV market with in near future. The market for electric vehicles to date has been greatly dependent upon government at national and international level (regarding carbon emissions) or local/city level (regarding air quality). Through a combination of legal Strictures and fiscal inducements, government can define a market space for electric vehicles and mobility services

(Cochin & Vezzoli, 2010). Electric vehicles cannot be deployed without parallel developments in charging infrastructure, taxation and incentive regimes, type approval processes, insurance policies, repair and maintenance facilities, and much more. As in a developed country like, Japan has about 150,000 registered electric vehicles and there are now more than 40,000 places nationwide where electric car owners can recharge their vehicles, compared with only 35,000 petrol stations. Japan is currently the only country in the world to have more charging points than petrol stations and over the coming five years the Japanese government aims to deploy 2 million regular chargers and 5,000 fast charging points.

However, to understanding this from a business context, innovating for emerging markets such as South and Southeast Asian's countries presents challenges deeply entrenched in R&D principles within the MNCs. South Asia have a large population with an annual purchasing power parity of less than $1500 (Prahalad & Hart, 2002). Govindarajan and Trimble (2012) describe these countries as "mega markets with micro customers". In order to tap into this customer base, MNCs need to develop low-priced, value-added products that can drive profits through volume. Under these circumstances, build-up of interoperable electric vehicle charging infrastructure may be hampered by a lack of standardization efforts and dominant players who deploy unique solutions rather than focus on coordinated efforts. Electric charging facilities in shared residential buildings may face planning constraints and ownership rights.

Ⅴ Conclusion

Recently, the automobile industry is challenged by rapidly changing consumer demands. The middle class, urbanization, the transition to cleaner energy sources, low cost goods, and consumer demand for increased connectivity will create opportunities for new players and both opportunities

and risks for incumbents over the coming decade. The automobile industry has enabled the introduction of new technologies, new products, improved quality and better efficiencies which in turn have acted as a catalyst to the development. This paper has attempted to analyze the current, empirically grounded economic evidence showing how income distribution affects the efficient functioning and growth potential of Asian economy. From the above analysis it has been revealed that, innovation is a strategic practices to bring more high technology to products with in the automobile industry. Furthermore, for automobile companies adopting a low cost strategy, the business opportunities, and the middle class of the automotive industry is important. The main opportunities for automotive industry lay in small and light vehicle for middle class in Asia. China is specializing in basic components, India in two wheelers, small cars and light vehicles, Thailand in passenger cars and pick-up trucks and Indonesia is making attempt to specializing in utility vehicles. One major growth opportunity is in smaller vehicles, these already account for more than 30 percent of global sales and could reach more than 30 million vehicles by 2020 (McKinsey& Company, 2013, 13).

In the competitive environment, most firms consider innovation as an essential part to sustaining competitive advantage (Dess, Lumpkin and Eisner, 2009) ; and it is clearly expressed in legendary management guru and research scholar - Peter Drucker's statement - 'An established company which, in an age demanding innovation, is not capable of innovation is doomed to decline and extinction' (Drucker, 1985). Despite of its importance, some companies are reluctant to spend either time and money for innovation, compromising company's bottom-line, as the innovation process is very challenging and uncertain until ultimate goal is achieved (Dess, Lumpkin and Eisner, 2009). Innovation based on a company's dynamic capability and its management is definitely an imperative action for any company to adapt to rapid environment and consumer need. Under these circumstance, the idea that specialization in

automobile industry is becoming size categories and specific for middle classes those have purchasing power. In Individual Asian countries are gradually finding their niche. There are some clear challenges accompanying the opportunities in next generation vehicles and electric vehicles and alternative mobility. In order to capitalize on these opportunities, the industry needs to develop infrastructure and acquire technologies and capabilities to produce vehicles that meet future purchasing affordability of middle class.

Endnotes

(1) According to the World Bank Report, the world's Middle Income Countries (MICs), which are defined as having a per capita gross national income of US$1,026 to $12,475 (2011) are a diverse group by size, population, and income level. Middle income countries are home to five of the world's seven billion people and 73 percent of the world's poor people. At the same time, middle income countries represent about one third of global GDP and are major engines of global growth.(Loayza, N., et. al., 2012, World Bank, website).

(2) Purchasing Power Parity (PPP) is an economic theory that compares different countries' currencies through a market "basket of goods" approach. According to this concept, two currencies are in equilibrium or at par when a market basket of goods (taking into account the exchange rate) is priced the same in both countries.

(3) Coimbatore Krishnarao Prahalad and Stuart L Hart (2002) "the Fortune At the bottom of the Pyramid" which was later converted into a book by the same name. In this paper they mentioned, the world economic pyramid are 75 to 100 million affluent Tier 1 consumers from around the world. This is a cosmopolitan group composed of middle - and upper - income people in developed countries and the few rich elites from the developing world. In the middle of the pyramid, in Tiers 2 and 3, are poor customers in developed nations and the rising middle classes in developing countries. The 4 billion people in Tier 4, at the bottom of the pyramid. Their annual per capita income − based on purchasing power parity in U.S. dollars − is less than $1,500, the minimum considered necessary to sustain a decent life. (C.K. Prahalad and Stuart Hart (2002) "The Fortune at the Bottom of the Pyramid." Strategy+Business 26: 54-67).

(4) The development of the East and Southeast Asian economies has already received much attention (Singh, Putti, & Yip, 1997; Chow & Kellman, 1993; Krugman, 1998; Ramstetter, 1998; Higgott, 1998; Hatch & Yamamura, 1996; Fields, 1993; Dunning, 1993; 1995; Chen,

1997; Linder, 1986).

(5) Armenia, Azerbaijan, Bangladesh, Cambodia, People's Republic of China, Georgia, India, Indonesia, Kazakhstan, Kyrgyz Republic, Lao People's Democratic Republic, Malaysia, Mongolia, Nepal, Pakistan, Philippines, Sri Lanka, Tajikistan, Thailand, Turkmenistan, Uzbekistan, Viet Nam.

(6) The Nano is a small car manufactured by Tata Motors in India. Nano was initially launched with a price tag of 100,000 rupees (US$1,600) which was ultimately increased with time. Designed to India's middle classes. The nano car have a 624-cc petrol engine, a 30-litre fuel tank and 4-speed manual gearshift. The car has air conditioning, but no power steering, reclining seats or radio. The company claims mileage of 20 km per litre.

(7) The Japanese government has introduced the tenth national road safety plan (2016-2020) are premised on the ultimate goal of eliminating road accidents altogether and were formulated on the basis of three guiding principles, namely: 1) the overarching priority of protecting human life, with a particular emphasis on promoting road safety for children, the elderly, and the disabled; 2) the application of advanced technologies to improve road safety; and 3) the promotion of research activity and technological innovation targeting greater road safety. (JAMA, website).

(8) A digital tachograph automatically records vehicle operational data (speed, time, engine revolutions per minute (RPMs), sudden accelerations and braking, etc.) on a memory card or other storage device (JAMA, website).

(9) According to Japan Automobile Manufacturers Association, Inc.(JAMA) next-generation vehicles including Hybrid Vehicles, Plug-In Hybrid Vehicles, Fuel Cell Vehicles, Electric Vehicles, Hydrogen Vehicles, Clean Diesel Vehicles, Natural Gas Vehicles, Diesel-Alternative LPG Vehicles.

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