Volume 5 • Issue 1 • January / February 2014

INTERNATIONAL JOURNAL OF

BUSINESS RESEARCH AND MANAGEMENT (IJBRM)

ISSN : 2180-2165

Publication Frequency: 6 Issues / Year

CSC PUBLISHERS
http://www.cscjournals.org

INTERNATIONAL JOURNAL OF BUSINESS RESEARCH AND MANAGEMENT (IJBRM)

VOLUME 5, ISSUE 1, 2014

EDITED BY
DR. NABEEL TAHIR

ISSN (Online): 2180-2165

International Journal of Business Research and Management (IJBRM) is published both in traditional paper form and in Internet. This journal is published at the website http://www.cscjournals.org, maintained by Computer Science Journals (CSC Journals), Malaysia.

IJBRM Journal is a part of CSC Publishers

Computer Science Journals

http://www.cscjournals.org

INTERNATIONAL JOURNAL OF BUSINESS RESEARCH AND MANAGEMENT (IJBRM)

Book: Volume 5, Issue 1, January / February 2014
Publishing Date: 11-02-2014
ISSN (Online): 2180-2165

IJBRM Journal is a part of CSC Publishers
http://www.cscjournals.org

Published in Malaysia

Typesetting: Camera-ready by author, data conversation by CSC Publishing Services – CSC Journals, Malaysia

CSC Publishers, 2014

EDITORIAL PREFACE

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Self-Owned Brand Rises from the Ash Marketing Advertising of LUXGEN and Its Role in the New Automobile's Brand

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Abstract

In 2009, Taiwan YULON Group actively developed its self-owned brand LUXGEN and launched the first automobile named as LUXGEN7 MPV. This research investigates how LUXGEN uses advertising and differential threshold stimulation to persuade the consumers that such automobile is of excellent quality and reasonable price, making up the insufficiency in popularity during its debut to the market. From the perspective of differential threshold stimulation, this research will study on its impact to the new self-owned brand according to the four advertising cases of the LUXGEN automobile.

Keywords: Differential Threshold Stimulation, Self-owned Brand, LUXGEN, Case Study.

1. INTRODUCTION

In 2001, in the emerging markets in Mainland China, India and Russia etc., the overall automobile sales were only 13.65 million automobiles, less than one quarter of global market share. In 2008, the global economic was severely hit by the financial tsunami, market sales in developed countries were embogged, however, during the last decade, the automobile sales in emerging countries had exceeded the sales in USA and other developed countries. According to the data published by FOURIN, the automobile sales in emerging countries were accounting for 37% of the global market, and such sales had achieved to 53% in 2011. With the rapid growth of economic in Asian countries and the sustainable improvement of national income, the Asian region has been deemed as one of the most potential automobile markets in the world [15].

With the strong development of global economic, automobile sales were also achieving fantastic outcomes in each country; the overall global sales had reached to 80 million automobiles in the whole year of 2012, achieving a historic high record. From the perspective of country, automobile sales were growing in most of the countries, of which Mainland China was dominating the market overwhelmingly, recording automobile sales of 19.3 million in the overall market; the runner-up and the third place were the USA and Japan, recording automobile sales of 14.84 million and 5.36 million respectively[16] [20].

From 2001 to 2005, the automobile sales market in Taiwan was growing stably, achieving the sales peak of 510 thousand automobiles in 2005, however, due to the subprime mortgage crisis in the USA in 2007, the sales of automobile declined obviously. Moreover, the decline of sales

was declining to the lowest in 2008 due to the impact of financial tsunami, recording automobile sales of 229,497 only(see Table 1). Under the background of rising oil price and all kinds of negative factors in the market, YULON Motor Company, established in 1953, started to integrate group resources and actively develop the business of self-owned brand. After five years of research and development, YULON Group had launched its new self-owned brand LUXGEN, launching the first automobile of such brand named as LUXGEN7 MPV in September 2009 and then secondly LUXGEN7 SUV in September 2010.

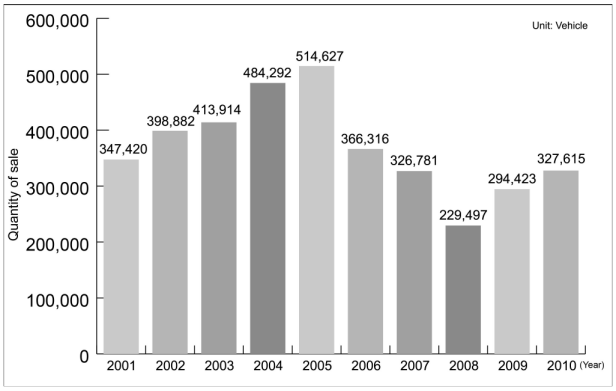

TABLE 1: Sales Statistics of Taiwan Automobile Market from 2001 to 2010.

After 1990, with the rising of China's automobile market, automobile sales in mainland were achieving several historic record highs. Starting from 2010, the Economic Cooperation Framework Agreement (ECFA) between Taiwan and Mainland China has been promoting the economic cooperation plan between two sides, automobile components and spare parts were included in the project of Early Harvest List of ECFA, zero-tariff preference is available, symbolizing further integration of automobile industry between Taiwan and mainland. Both have their own competitive advantages respectively, however, Taiwan must breakthrough from the thoughts of its traditional role and focus on the China automobile market's future development trend again, so as to look for the most appropriate position in the automobile market across the Straits, eventually, developing a automobile of self-owned brand became a way out under such backgrounds.

YULON Group has been developing in automobile industry for almost sixty years, experiencing amendment of government policy and laws and decrees and the opening of economic trade, encountering competitors both at home and abroad and saturated domestic sales market and other factors. Despite possessing abundant competitive advantages in the industry, challenges facing the developing self-owned brand automobile in Taiwan have been existing all the time:

- Comparing with the rising of emerging automobile market in the Mainland China, the development of Taiwan's automobile market was restricted to the frame of assembling and original equipment manufacturer , besides, the domestic market demand was also relatively small, restricting the development of automobile industry. The systems in the upstream, midstream and downstream of the overall automobile industry were still focus on automobile assembling, development of non-critical components and design of internal accessories, independent technology cannot be established; therefore, the development of Taiwan's automobile industry was restricted by the parent manufacturers of technology and lack of independence. Besides, the domestic labor cost was relatively high and the challenges of dumping of low price commodities from Mainland China were also needed to be faced, together with the saturated market of domestic demand, it's difficult to achieve a high-growth in Taiwan's automobile industry. When facing a small market scale, the automobile industry was still in low speed development status and lack of competitiveness in international export sales.

- Since the scale of Taiwan automobile market is not big and the market is saturated, after the signing of ECFA, the tariff between Taiwan and Mainland China would be exempted. With the rising of emerging market and the increasing demand in automobile, if Taiwan's automobile industry was still playing a passive role, it would be difficult to survive in such a small market.

- With more than fifty years of development in Taiwan automobile industry, the automobile market has been changed from the previous seller's market into buyer's market, furthermore, with the changes of living styles and the appearing of consumer confideness, the manufacturer can only provide differential automobile qualities and services, improve vehicle shopping environments and enhance brand image, so as to win the consumers' favor and to drive the growth of performance.

2. LUXGEN AND SELF-OWNED BRAND

With entry into 21st century, the increasing improvement of technology and competitive low labor cost in the world factories in Mainland China, Vietnam and India had been forcing the USA, Japan, Korea and other countries to accelerate their brand operation, therefore, it's far more important for Asian enterprise to develop a powerful brand [23] [25]. During the establishment of a powerful brand, the challenges of many power international brands still exist, and the consumers are generally holding the concept that Asian brands were relatively inferior [17] [24]. Therefore, under the environment of global competition, enterprise brand has been the important source of sustainable competitive advantage and the core element of enterprise strategy [3] [5] [13] [14] [18]. The enterprise should only reform from the low margin businesses of pure ODM and OEM to the section and positioning of high added value, so as to achieve sustainable development and operation. In 1969, Al Ries and Jack Trout firstly published the positioning concept in the Industrial Marketing, The characteristics and interests provided by an enterprise must be able to specify the differences among the competitors and be accepted and acknowledged by the consumer[2]. Under the environment of global sustainable competition, many Taiwan manufacturers start to be aware of the importance of brand establishment and create brands to pursue higher commodity values successively [26] [27].

Aaker (1992) [1] proposed that brand is a kind of asset and liability with the combination of brand name and symbol; it can increase or decrease the added value of product. Kolter (1996) stated that brand is the so-called combination of name, term, symbol, mark and design. American Marketing Association (AMA) also presented that a brand is a customer experience represented by a collection of images and ideas; often, it refers to a symbol such as a name, logo, slogan, and design scheme. Brand recognition and other reactions are created by the accumulation of experiences with the specific product or service, both directly relating to its use, and through the influence of advertising, design, and media commentary [4] . A brand is a "Name, term, design, symbol, or any other feature that identifies one seller's good or service as distinct from those of other sellers." Basically, brand is a commitment, because sellers should commit to provide consistent and specific product characteristics, interests and services to the customer.

The definition of self-owned brand refers to the brand self-developed by and its intellectual property right is owned by the enterprise. Before YULON Group launched its first LUXGEN7 MPV in September 2009, its first self-designed automobile of self-owned brand with the name of FEELING was launched in 1986, it was a beginning of YULON's technology upgrading. With the glory of the first self-produced automobile in Taiwan at that time, FEELING was in the spotlight and an attractive commodity in 1986, together with advertising activities and innovative products, FEELING had gained more than 5000 orders when it come into the market, one year later, it officially participated in the 27th Tokyo Automobile Show in Japan, becoming the first Taiwan automobile participating international automobile show.

The automobile FEELING adopted the model of separating production and sales, at that time, YULON Motor played the role as manufacturer and Chinese Automobile Company (CAC) was

responsible for the sales. CAC had been monopolizing YULON Motor's marketing and service resources for a long time, and there were complicated relationships among YULON, CAC and NISSAN, besides, the sales condition was not mature and YULON was lack of experience in operating a new brand, causing the sales of FEELING was in standstill in the later stage, in the last year of FEELING's product life, YULON and CAC finally ended the thirty years of cooperation in production and sales in 1988 because of FEELING.

With the changes of overall production and sales system and decline of FEELING's sales performance, during 1994~1998, YULON Group was taking the strategy of combination of production and administration, process reengineering and differentiation to make a change. During 1999~2003, with the cooperation with international strategy to invest on Philippine NISSAN and establish Fengshen Automobile jointly with Dongfeng Automobile Group to explore markets in Southeast Asian and Mainland China, YULON was transiting to manufacturing services industry. After learning the lesson from the previous marketing event on FEELING, apart from the joining of major shareholders such as hTC Corporation, Everlight and their subcontractors etc. In the internal resource integration of Taiwan YULON Group, Hua-Chuang Automobile Information Technical Center was taking the lead in the development of self-owned brand. Apart from good quality, the biggest characteristic of the new automobile was the combination of precise technology and abundant electronic equipments, in 2009, the first smart technology automobile brand LUXGEN came into the market. In the initial stage, LUXGEN didn't use price as an appeal, which was different from the normal marketing methods adopted when launching a new automobile, but integrated the world's No.1 high technology industry in Taiwan to make the consumers have a different cognition of LUXGEN brand with normal automobiles from the perspective of automobile specification, performance and allocation. In the first stage, "Brand Taiwan" was used in the advertising and marketing strategy to come into the market. And the facts showed that, the brand positioning of the world's first automobile with smart technology was deeply implanted in consumer's heart, since the LUXGEN7 MPV's official hand over in September 2009, LUXGEN have been establishing its brand recognition among those strong and competitive competitors in Taiwan automobile market, furthermore, with the successive launch of LUXGEN7 SUV and LEXGEN7 CEO, LUXGEN become the top 6 brand in Taiwan automobile market in 2010 with the market share of 5.1% [22]. It's been 23 years since YULON firstly launched the FEELING automobile with self-owned brand in 1986, two self-owned brands were launched in different times, but with totally different outcomes. .

3. METHODOLOGY

In marketing advertising strategy, the stimulation of differential threshold in psychophysics is normally used as sales tactics. Psychophysics is a science studying on stimulation and sense, Fechner proposed measuring methods of sense and relevant theories in the book of Element der Psychophysik in 1860. The development of psychophysics can be divided into theory of signal detection and sensory magnitude. The scope of influence had expanded the psychophysics' scope of application, expanding from the previous sensory threshold measurement to the study of sensory process, learning, memory, social behaviors and other issues etc [21] .

Differential threshold means the sensory system is sufficient to sense the differences of different stimulation, within the scope of absolute threshold; it can perceive the minimum value in the changes of stimulation quantity. For example, one student is carrying a schoolbag of 1kg, if a paper cup of 20 grams is added, such student will not sense the difference in weight, however, if a mug of 300 grams is added, the sense of difference in weight will be obvious, then "300 grams" is the value of differential threshold. From the concept of differential threshold, the addition of mug changes the weight of schoolbag, which should be above the differential threshold. According to the principle of differential threshold, the consumer's sense of differences between two stimulations is a relative effect but not the absolute differences. For example, if McDonald is promoting a double beef burger and the price is the same as before, the marketing personnel will hope that consumers will experience the perceptive stimulation. From consumers' perception to the differences of two stimulations, especially perception in product price, consumers can

obviously sense the price reduction or quality improvement. Whether the consumers' reference price in mind is high or low is an important factor in determining price perception. Such methods are commonly used in sales promotion, such as t-shirt, original price was $25, now $9.9 only, trying to establish a reference point in consumers' mind [2] [8] [10] [11].

- In the beginning of 2002, in Taiwan automobile market, Ford Metrostar was competing with the strong competitor TOYOTA Camry. Ford Metrostar emphasized its German car ancestry in market segmentation to participate in such fierce competition. For example, in the advertising film, it quoted the story of "The blind man and the elephant", making the best use of sensitive function of hearing sense, delivering the ideas that even the blind person can sense the taste of a German Benz (http://www.youtube.com/watch?v=sfv81LdLKeM). The automobile advertising amplifies the product image from the perspective of differential threshold, making the consumers to notice that Ford Metrostar possesses the production workmanship of meticulousness and high quality as German automobile. In its sales strategy, it adopted the strategy of limited quantity in supply and favorable price with high class automobile homes interior decoration, attracting the attention of consumers who are in favor of German cars, and taking the lead in the automobile market with excellent market share in that quarter.

- An Ad named as "Printing 800 pieces at one time" for Canon PIXMA E600 printer was published in Taiwan Business Weekly in May 2012, using a title with double meanings: "Ho(thick)! Printing 800 pieces at one time", showing the differences of the product from other competitive brands. The printed photo was a photo of French bulldog instead of the traditional photo of family fun, and the target audience was the young generation who loving pets instead of family fun. That was to say, if the economical young generation needed to choose a printer, such printer would be their perfect choice. The overall article in the magazine illustrated that, among the same printers, Canon PIXMA E600 was printing more pieces than others, the stimulation of differential threshold on printable pieces indicated that it would help the consumers to save the expensive ink costs for the printer, which would shorten the consumers' time of making purchase decision and increase their purchase intent.

With the improvement of technology and vehicle manufacturing workmanship, differences among automobile products have been narrowing gradually, and with the change of consumers' living styles nowadays, consumers' requirements on automobile are different from the past, in respect of commodities that consumers have recognized and adapted, brand advertising becomes an important factor to influence consumers' purchase intent. Taiwan YULON Group's self-owned brand LUXGEN automobile integrated the industry of Taiwan's world No.1 information technology, besides, with the cooperation of Industrial Technology Research Institute, Chinese Academy of Sciences and other national institutions, and with Hua-Chuang Company as the partner, Taiwan YULON Group is capable of possessing differential products with competitive advantages. In the Taiwan automobile market with fierce competition, positioning the brand as smart technology automobile will create a differential sense stimulation in consumers' mind.

The purpose of this research is to study on that, when a new self-owned brand coming into market, whether the stimulation of product differential threshold has differences in the advertising communication of different communication media. There are various ways of advertising classification, according to scholar's conclusion, according to the media class, advertising can be divided into print advertising, broadcast advertising, outdoor advertising, transit advertising and outdoor advertising etc. Automobile advertising is applicable to nationwide media, such as television and magazine; however, the features of media in outdoor activity and onsite exhibition are easier to attract the potential target customer groups. Therefore, this research has selected 4 cases for study. From the collected data, we have selected cases with relatively significant performance in differential threshold as the study object of this research, case 1 and case 2 are the advertising magazine Ad and television commercial of LUXGEN automobile respectively when it coming into market; case 3 and case 4 are the outdoor marketing campaign and onsite sales exhibition hall of LUXGEN automobile respectively.

4. ANALYSIS AND FINDINGS

Automobile is a product of high involvement, consumers will search information on automobile brand through various channels for the references of appraising an automobile brand and for their favorites which will determine their final choice of brand[19]. Automobile industry normally establishes an automobile's brand image in consumers' mind through advertisement; therefore, such advertisement must accomplish two tasks: attract attention and deliver the meaning. Advertising is an action to influence consumers through delivering message to them. The so-called message extensively refers to the presentation of all kinds of characters, pictures and sounds carrying delivery meanings, and its purpose is to deliver and present the carrying contents [6]. Ducoffe (1996) indicated that, through the transmission of message, advertisement will form the so-called advertising value in consumers' mind, so as to influence consumers' behavior, advertising attitude, and even the purchase intent[9].

According to the consumers' favorites in different times, advertising design with differential threshold is easier to attract consumers, generate brand cognition and further form a positive attitude, creating a better advertising effect than the traditional marketing methods.

FIGURE 1: LUXGEN7 MPV Magazine Ad.
Figure 1 demonstrate an example of LUXGEN utilizing a magazine Ad. to persuade costumers that the technology products would no longer be cold but closer to you as a family.

The magazine Ad on LUXGEN7 MPV (see Figure 1) used being smart humanizes technology as a catch and took humanoid robot as visual performance, emphasizing the positioning of LUXGEN brand as smart technology automobile. The creative concept emphasized in the whole article was that: because of LUXGEN, technology products would no longer be cold but closer to you as a family. The structure feature of humanoid robot and two structures of knowledge of the automobile had extended the relational similarity [7], according to the technique of expression using humanoid robot as metaphor; obviously, the LUXGEN7 MPV's meticulously care to the passenger through high technology allocation was the selling point of such article. From the catch and four pictures of internal allocation, the LEXGEN7 MPV is equipped with world's first full functioned vehicle smart computer LUXGEN THINK$^+$ automotive integrated information platform, Eagle View$^+$ 360° displaying of automobile body, "Side View$^+$ blind spot monitoring system" could also display the automobile's side image on the screen, together with the comfortable interior seat and through the visual impact with picture of humanoid robot and the anchor of advertising catch, it indicated that the differences of LUXGEN7 MPV from other competing vehicles were that LUXGEN was of high technology allocation. Besides, in the article, detailed words were used to explain the catch of being smart humanizes technology, demonstrating that because of being smart, LUXGEN is just like your trusty housekeeper, protecting you and your kids in a safe castle. LUXGEN7 MPV further widened the distance between its own allocation and that in other competing brands, trying to change the readers' traditional impression on the current existing cold technology products.

FIGURE 2: LUXGEN7 MPV Television Commercial " Guardian".
High technology humanoid robot was interpenetrated appropriately
in the video, the utilization of visual language further convince customers that LUXGEN smart technology
can help you to solve such problems.

Case 2 is a snapshot (see Figure 2) from LUXGEN7 MPV's television commercial " Guardian" when LUXGEN7 MPV came into market in 2011, it was produced by Shape Advertising. The super in the frames of ending cut said: Automobile starts to understand love(http://www.youtube.com/watch?v=qtUBZwDZ7jI&feature=relmfu). The video was full of emotional background music and overlapping sound (OS):

Because human's eyes cannot see everything
Because the light cannot penetrate every dark place
Because of "think ahead"
Automobile starts to understand LOVE

We can known that such television commercial utilize smooth frames to deliver the meaning, television advertising was still the media delivering the message of LUXGEN the fastest and most extensive. In the end of each OS, it interpenetrated the high technology allocation of LUXGEN. In the video, the driver (father) and the passenger (daughter) are the characters being protected, besides, high technology humanoid robot was interpenetrated appropriately in the video, the utilization of visual language portrayed that in the urban traffic, there are dangers of being hit at any time, drivers cannot see everything on the dark road, and LUXGEN smart technology can help you to solve such problems. The whole video clearly portrayed the brand positioning and smart technology of Taiwan self-owned brand LUXGEN, and the meanings expressed in the video aroused the target customer groups' requirements to protect their family all the time.

With hundred years of development, the automobile had entered into the whole new smart automobile generation from the traditional automobile, and the key was being smart. LUXGEN7 SUV was positioned as the world's first automobile with smart technology, allocated with Think^{+} vehicle integrated information platform, among the same high technology products, it has become the indispensable allocation in many high price automobiles. LUXGEN used the television commercial to deliver the facts that the overall allocations of the vehicle are of excellent quality and reasonable price, making up the insufficiency in popularity in the initial stage when a new brand coming into the market.

FIGURE 3: LUXGEN7 SUV Brand Experience Campaign.
LUXGEN demonstrated in a campaign that while all glass windows of LUXGEN were covered,
the driver was able to blindly drive the LUXGEN7 SUV on a narrow ascending steep road.

The event of LUXGEN brand experience campaign (see Figure 3) was held in Xinyi Planning District, Taipei City, Taiwan. The greatest feature of an outdoor activity was that consumers can actually experience the benefits of the product. In the beginning of the activity, all glass windows of the LUXGEN were covered, the driver drove the LUXGEN7 SUV with the vehicle body covered and surmounted the simulated small route in the way of blind driving on overland, and the LUXGEN7 SUV distinguished itself with the assistance of the advanced Eagle View$^+$ and Side View$^+$ technology. The LUXGEN brand experience meeting was not so much a part of the marketing advertising activity as an activity allowing consumers to experience the fun of driving with high technology. Of course, normal consumers would not cover their automobile windows when driving on the road, with respect to the smart technology allocations equipped in LUXGEN, consumers might heard about them in other high price import vehicles but never actually experienced them, and they would not sense how such technology will help when driving a automobile. LUXGEN7 SUV was equipped with smart 3 models 4WD system, the features of 4WD can also be executed to go forward when encountering a steep slope. When the seesaw was facing downwards, dangerous descent would be simulated, which indicated the excellent braking performance of LUXGEN7 SUV. With the control of 4WD system and traction control system (TCS), the risk of losing control of vehicle would be reduced, when encountering surface gathered water on rainy days or in case of oil leakage, the TCS can be utilized to get through such risks. The LUXGEN had integrated Taiwan's unique high technology industry, allowing consumers to own an automobile at a reasonable price with multiple values.

FIGURE 4: LUXGEN Exhibition Hall.
In the experience theater, consumers could interact with the virtual reality screen in an independent and undisturbed space, experiencing six major functions of THINK$^+$, Eagle View$^+$ 360° and Night Vision$^+$.

The LUXGEN exhibition hall (see Figure 4) imported the touring concept of automobile museum, which was different from the traditional concept of automobile exhibition hall. It illustrated the technology-based brand and product experiencing process, providing five unique services, namely welcome reception, digital technology experience, experience theater, FOYU and expert inquiry system allowing consumers to experience sales and services differential processes through actual experience and interaction, such unique and special sales tactic and space exhibition had brought totally different vehicle purchase services and feelings to the consumers.

In the digital technology experience area, consumers could use 32 inches touch screen to acquire information on the brand, product, dynamic test drive, automobile handover procedures and negotiation assistant etc. In particular, in the experience theater, consumers could interact with the film to feel the similar virtual reality in an independent and undisturbed space, experiencing six major functions of THINK$^+$, Eagle View$^+$ 360° and Night Vision$^+$, after the virtual interactive experience in experience theater, consumers could master the product characteristics more clearly when in actual test drive. Consumers could not only see but also touch when in the automobile exhibition hall. Seeing is believing. The abundant audio video contents in exhibition hall allowed consumers to have an all-around cognition on LUXGEN products before actually appreciating the automobile.

In the automobile market in 2010, automobiles of the same level with and in the same price zone as full-size MPV of LUXGEN7 MPV included TOYOTA Previa 2.4 from Japan and Chrysler Town & Country from the U.S.A (see Table 2).

From the perspective of home-made automobile, the price of LUXGEN7 MPV seemed a little high, however, when comparing with the imported automobiles of the same level, LUXGEN utilized Taiwan's unique global electronic technology, with the joint research and development with renowned smart mobile phone practitioner hTC, it was equipped with comprehensive vehicle integrated information platform – LUXGEN THINK$^+$, possessing the six major functions of entertainment system, telephone communication, satellite navigation, traffic safety, owner exclusive and system setup, which was the world's first full function Win CE vehicle smart computer. At the same time, LUXGEN7 MPV was also equipped with four global top advanced technologies, including Eagle View$^+$ 360° surround imaging system, Night Vision$^+$ night driving image enhancing system, Side View$^+$ blind spot monitoring system, and LDWS$^+$ lane departure warning system. The "Eagle View$^+$ 360°" indicated that when the gearbox was in reverse gear, the front seat screen would display the image around the automobile body. In order to reduce the blind spot when changing a driving lane, the "Side View$^+$" could also display the image of automobile side on the screen through the CCD lens on the rearview mirror at the automobile side. What's more, the crash test of LUXGEN7 MPV had won the high appraisal of four stars from MIRA, an authoritative safety test institution in Britain, and the excellent structural design of automobile body even gained a high score of 15.8 (The full score in side crash was 16). Such assisting systems hadn't been equipped entirely in the general imported automobile, but LUXGEN7 MPV had already equipped them in home-made automobile. When comparing with the imported automobile, LUXGEN was of reasonable price but in possession of equipments that only high class imported automobile at the price of nearly NT$4 million would possess. In addition, the marketing advertising had led the consumers to sense the product differences, accumulating LUXGEN's brand popularity in the initial stage of coming into market.

Automobile Type	**LUXGEN7 MPV**	**TOYOTA New Previa**	**Chrysler Town & Country**
Length/width/height(mm)	4845/1876/1768	4795/1800/1750	5096/1997/1749
Speed control system	*Aisin 5AT + AMT	4AT + AMT	4AT
Engine type	2.2 DOHC 16V ＋Turbo	2.4 DOHC 16V	3.3 V6 OHV 12V
Horsepower	175hp/5200rpm	170hp/6000rpm	174hp/5100rpm
Electronic assistant	*ESC	S-VSC	—
Brake system	*4-wheels disc brakes	—	—
Front seat LCD	*10.2 inch	7 inch	—
Backseat video and audio system	*10.2 inch	10 inch	7 inch
Satellite navigation	*●	Optional	—
Automotive integrated information platform	*●	—	—
Technology auxiliary system	*●	—	—
Price (NT$)	*1.068 million	1.59 million	1.179 million
Time-to-market	2009/08	2006/02	2006/06

TABLE 2: Comparison Table of LUXGEN7 MPV and Automobiles of the same class in 2010
*** :** factors that show LUXGEN's significant advantage in contrast with the other two vehicles.

5. CONCLUSION AND IMPLICATIONS

The main purpose of marketing activities is to create values for customers, when creating values, requirements arise, so marketing is the channel for advertising communication. This research has studied on the self-owned brand LUXGEN developed by YULON Group, from the 4 cases, we found that the influence of stimulation of differential threshold on the advertising of LUXGEN automobile's coming into market was significant. Apart from the higher added values of the product itself and greater differences between the product and other competitors, the reasons for significant influence also included the application of stimulation of product's differential threshold in different marketing medias, those were the important factors why such brand could promptly enter into the market when initially coming into the market.

In the end of 20th century, many traditional OEM industries in Taiwan started to switch to self-owned brands of high values, such as GIANT bicycle, acer computer etc. As to the self-owned brand automobile developed by YULON, after experiencing several stages, from the technical support of Japan NISSAN and to the exit of CAC's sales system, YULON has switched from the role of manufacturing capacity expansion towards the self-owned brand. The segmentation of OEM and branding business had divided into two companies, namely YULON and YULON-NISSAN respectively, allowing YULON to get over the shackles of foreign automobile factory and have space to develop self-owned brand. After years of efforts, the overall quality of manufacturing automobiles in Taiwan had become close to standards of advanced countries. With integrated industrial chain, the automobile manufacturers had established production scales to develop top-ranking products. With the sharply rise of mainland's market in recent years, YULON had integrated the competitive advantages in logistics across Mainland China and Taiwan to expand the scale of LUXGEN automobile to reduce the costs, achieving the significant reduction of costs with massive economic production(see Table 3).

	FEELING	LUXGEN
GDP at year of debut	USD 4,007	USD 16,359
Technological innovation	Operate and control	High tech LUXGEN THINK+
Product positioning	Urban type sport sedan	Multiple passenger sports utility vehicle
Advertising strategy	Sporty speedster	The world's first smart technology automobile
vehicle types	1	3(increasing)
Production and sales	Separated production and sales	Combined production and sales
International market	—	Mainland China, Russia
Organizational management	—	Production and sales service in place at the same time
Customer service	—	Digitalized sales maintenance service
Time-to-market	1986~1988	2009~

TABLE 3: Comparison of Competitive Advantages of Self-owned Brands Successively Developed by YULON Group.

For a long time, the sales status of Taiwan automobile market was in standstill due to the traditional sales model. Comparing to other countries and regions, Taiwan's automobile market was small in scale and with various brands. With the marketing method of differential threshold, the LUXGEN had provided the customers cognitions of the brand LUXGEN different from that in normal automobiles, so that customers could make a choice according to their cognitions. Customers were able to sense the differences of allocations, which improved the brand recognition during the initial stage of coming into the market. The higher exposure rate of the brand indicated higher opportunity to be known by the customers, so was the higher opportunity

of being chosen, meanwhile, it could also help customers to be capable of arousing and strengthening their memories on the brand.

In the last decade, with the development of computer technology, the modeling of automobile's body and its components could be more complicated and accurate, accelerating the progress in automobile's design for manufacturing and reducing the costs of vehicle type development. In the past, international automobile factories even needed to design components by themselves, however, currently, the development of computer technology had helped the component manufacturing industries to improve their design capability. LUXGEN7 MPV entered into the market with the brand positioning as the world's first automobile with smart technology, bringing significant influence on the upgrading and development of Taiwan's automobile industry; besides, with the worldwide top advance technology and provision of higher cognition values to target customers, the LUXGEN7 MPV had widened its differences with other competing brands.

The current vehicle type of LUXGEN automobile included MPV, SUV and Sedan, satisfying diverse market requirements with abundant vehicle types. According to the role shown in the advertisement, we could known that the target audience of LUXGEN were mainly adult male. With the completion of subsequent product lines, target audience could expand to female and young generation. The brand strategy of LUXGEN automobile was to operate high brand value, position middle and high-end price, and apply appearance, internal decoration and allocation as its competitive advantages. The establishment of marketing methods was a very critical factor for success in developing self-owned brand. In respect of channel service, LUXGEN automobile initiated the global 3D automobile experience, importing 3C technology allocation into the exhibition hall by extending the brand spirit of smart technology Upon LUXGEN5 Sedan's coming into market, LUXGEN automobile had upgraded the original automobile exhibition hall, launching the worldwide pioneering LUXGEN's actual automobile exhibition hall in the future, which overturned the concept of traditional automobile exhibition hall, applying 3C technology completely in the process of automobile appreciation. At the same time, since 2009 when the first LUXGEN automobile product came into market, as time went by, the expansion of maintenance service networks and improvement of maintenance service efficiency would also become one of the competitive priorities. Since the domestic sales of automobile started to go for quantity gradually, the more the automobile sold, the greater pressures and requirements in after-sale services, and the accumulated maintenance problems would damage the intrinsic brand image.

In September 2010, YULON Motor and Dongfeng Automobile officially established joint venture Dongfeng YULON Automobile Company, manufacturing and selling the brand LUXGEN. In July 2011, LUXGEN7 SUV was selected as the first joint venture vehicle type of Dongfeng YULON, after production in Mainland China, it was given a Chinese name as "BIG LUXGEN7 SUV". In 2012, the brand LUXGEN planned to put LUXGEN7 MPV and LUXGEN5 Sedan into production in mainland market, copying the successful experience in Taiwan to Mainland China market. In the coming ten years, LUXGEN will launch 11 new vehicle types of automobiles in mainland market, covering SUV, MPV, Sedan and Roadster. Meanwhile, YULON Group will cooperate with DERWAYS, a private operated automobile manufacturer in Russia, to establish the first overseas subsidiary in Russia other than Taiwan and Mainland China, so as to achieve the brand competitive advantages afterwards, furthermore, it will also be possible to develop successful automobile of self-owned brand.

This research had studied the influence of differential threshold stimulation on the marketing advertising of self-owned brand LUXGEN. The import of technology and special business model of Taiwan automobile will not only strengthen the competitiveness of Chinese automobile, but also will help LUXGEN automobile in its further interest to the global market in the future, which is also a direction of subsequent research. Future approach may include quantitative research to analyze the difference of customer's behaviors for Mainland China and Taiwan. Difference of advertising value in terms of the effect of differential threshold stimulation will be discussed.

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Determinants of Supply Chain Performance of Indian Manufacturing Organizations

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Abstract

This paper aims at proposing various determinants of supply chain performance of Indian manufacturing organizations. The determinants are summarized based on extensive literature review of empirical research articles on supply chain management (SCM) and performance measurement approaches. This study is a part of a larger research project exploring SC related practices. A critical analysis is carried out so as to identify research gaps in context of performance measurement of supply chains, as well as to propose directions for future research. A conceptual model is also proposed. Critical investigation of selected articles led to an idea that there can be significant effect of selected variables on SC Performance. It is to be seen that how various parameters, taken from the literature review, affect SC performance and ultimately contributing to its competitiveness. The various parameters like supplier-buyer relations, external supply chain, environmental factors, human metrics, information sharing and performance measurement approaches are taken in a single study in the context of Indian manufacturing organizations. Based on a pilot study with sample size of 100, empirical tests resulted in reduction of items. Based on the obtained results, the organizations can enhance the SCM performance by improving the current practices/strategies through focusing on the determinants that significantly influence SCM performance. Further research can be carried out by using data of various supply chains of other sectors and industries of India to generalize the research.

Keywords: SCM, Performance Measurement, Manufacturing Organizations.

1. INTRODUCTION

In today's highly competitive global environment, performance can no longer exclusively be determined by the decisions and actions that occur within a firm as the contribution of all members involved gives overall results of the supply chain (SC). The competition has changed from being between individual organizations to being between supply chains. As organizations form global alliances, it is essential that they understand how supply chain management (SCM) can be successfully implemented (Halldorsson et al. 2008). A supply chain consists of all stages involved which directly or indirectly fulfill a customer request. Its being is to satisfy customer needs and in the process, to generate profits for itself. SC not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and the end users themselves.

The maturity of the supply chain governs a company's performance, affecting it's profitability. Indian manufacturing industries are facing competition both from multinational companies and imports in the domestic markets. The new competition parameters include improved quality, products with higher performance, reduced cost, a wider range of products with better services; all delivered at the same time (Dangayach and Deshmukh, 2003). It is a well-known fact that many companies have not succeeded in maximizing their supply chain's prospective because they have failed to develop the performance measures and metrics desired to fully integrate their supply chain, thereby maximizing effectiveness and efficiency (Gunasekaran et al., 2004).

Recently, many firms have realized the potential of SCM in their day to day operations. However, there are many firms which do not have enough insight for development of effective performance measures and metrics needed to achieve a fully integrated SCM. The reason is that they do not have the access to a balanced approach and a clear distribution between the metrics at strategic, tactical, and operational levels (Bhagwat & Sharma, 2007). And, what can't be measured can't be improved. Even though SCM is very pertinent subject today, yet there is no effective tool available to measure supply chain efficiency of any manufacturing organization. Supply chain measurement is more like a qualitative statement unlike productivity or quality measurement, where the parameter can be measured objectively and expressed in a unit or in any ratio. Measuring supply chain performance (SCP) can assist in better understanding of the SC and improving its overall performance (Chen & Paulraj, 2004).

The manufacturing sector is growing rapidly in India and China and has shrunk in most advanced economies. The growth will require several changes, which include significant increase in productivity and quality at the plant levels, pursuit of worldwide competitive manufacturing strategies and operations and successful integration into the global supply chains (Deloitte, 2007). Emerging markets concentrate on mass manufacturing and competing on price. The top three countries in the Global Competitiveness Index are Asian, namely China, India & Korea (CIMA, 2010). In a World Bank Report (2012), India is ranked as 46th on Logistics Performance Indicator (LPI). Thus, the various reports strongly suggest the need of a comprehensive supply chain performance measurement system (SCPMS).

This paper will focus on critically discussing the determinants of supply chain performance (SCP) which may subsequently lead to competitiveness of the firm. In the paper, we will introduce firstly the concept of the supply chain and supply chain management. Secondly, we will discuss briefly about various performance measurement approaches. Then, various determinants of supply chain measurement will be put forward. Finally, we will discuss and reflect on the overall effect of all the determinants on the SCP. In totality, the paper contributes to the design and implementation of conceptual framework involving critical variables measuring supply chain performance in the context of Indian manufacturing organizations.

2. SUPPLY CHAIN AND SUPPLY CHAIN MANAGEMENT

A supply chain (SC) is a network of organizations to perform a variety of processes and activities to generate value in the form of products and services to end consumers (Christopher, 1992). Alternatively, a supply chain is a network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the end customer (Christopher, 1998). SC is defined as the "network of facilities and activities that performs the functions of product development, procurement of material from suppliers, the movement of materials between facilities, the manufacturing of products, the distribution of finished goods to customers, and after-market support for sustainment".

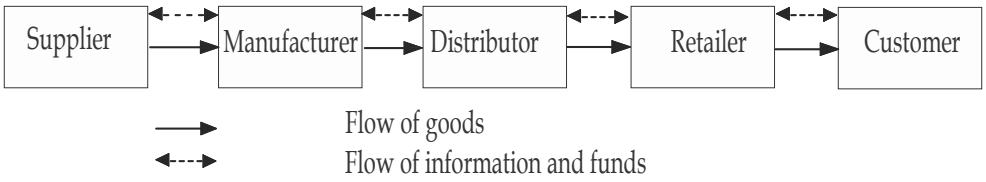

FIGURE 1: The Basic Supply Chain (Chopra and Meindl, 2001).

Supply chain management (SCM) is an integrated function with full responsibility on linking business functions and process, with and through companies, managing the dynamic of financial, material and information flows, between the different stages of supply chain. SCM is one of business strategy increasingly being used in the business world today and has become the focus of academic as well as corporate attention in recent years (Ballou, Gilbert & Mukherjee, 2000). There are many articles published in various disciplines to try to define the SCM and discuss future directions and the corresponding empirical research methodology (Cooper, et al., 1997; Lambert & Cooper, 2000; Larson & Rogers, 1998). SCM practices as a multi-dimensional construct that encompasses upstream and downstream sides of supply chain (Li et al, 2006). SCM involves an integrated and process-oriented approach to the management, design and control of the supply chain, with the aim of producing value for the end consumer, by both customer service and reduce cost (Bowersox and Class, 1996).

3. PERFORMANCE MEASUREMENT APPROACHES

Performance Measurement (PM) is the process of quantifying the effectiveness and efficiency of actions. Supply Chain Performance (SCP) refers to the overall supply chain‘s activities in meeting end-customer requirements, including product availability, timely delivery, and all the required inventory and capacity in the supply chain to deliver that performance in a responsive manner. SCP crosses company boundaries since it includes basic materials, components, subassemblies and finished products, and distribution through various channels to the end customer. It also crosses traditional functional organization lines such as procurement, manufacturing, distribution, marketing & sales, and research & development. In the Indian context, there have been many attempts to measure the performance at the organizational level, but very few attempts have been made to measure the performance at inter-organizational level (Saad and Patel, 2006).

New organizations have to deal with various kinds of performance pressures and suitable approaches are needed (Gunasekaran et al., 2005). The study is also the direct justification for the need of a new performance measurement. Supporting the idea of new performance measurement system, few other approaches have been proposed. There is an integrated approach for measuring supply chain performance, combining economic value added (EVA), the balanced scorecard (BSC) and activity based costing (ABC), clearly emphasizing the need of overhead handling and a balanced approach (Yao and Liu, 2006).Other approaches focuses on ERP-based supply chain performance and proposes an integrated method, total related cost measurement, to evaluate supply chain performance of a three-echelon, ERP-based supply chain system (Ho, 2007).

Many researchers have proposed new performance measures and metrics considering the changes in markets and enterprise environments. However, there are some confusion surrounding those measures and metrics regarding their importance and specific areas of application in SCM systems. The use of new emerging metrics defined in five categories has been suggested: external, consumer, value-based competition, network performance, and intellectual capital (Basu, 2001). A study based on a survey of 22 firms‘ SC systems, concluded that SC partners do not share a common vision of or react to the same set of metrics (Spekman et al., 1998). Recently, many research papers that deal with performance measurement in a SC context (Van Hoek, 1998) have appeared in the literature. However, most of them are prescriptive

and not based on historical facts and their analysis and changing market and operations environments or well grounded empirical analysis.

Author(s)	Year	Author(s)	Year
Artz	1999	Li, G. et al	2005
Baiman et al	2001	Li, S. et al	2005
Beamon	1998, 1999	Lockamy and McCormack	2004
Bourne et al	2000, 2002	Lohman et al	2004
Cachon and Lariviere	1999	Lummus et al	2003
Chan	2003	Maloni and Benton	1997
Chan and Qi	2003	Melnyk et al	2004
Chen and Paulraj	2004	Ramdas and Spekman	2000
Dasgupta	2003	Schmitz and Platts	2004
Toni, D. and Tonchia	2001	Stephens	2001
Fynes et al	2005	Talluri and Sarkis	2002
Graham et al	1994	Van der Vorst and Beulens	2001
Gunasekaran et al	2001, 2004, 2005	Van Hoek	2001
Harrison and New	2002	Wang et al	2004, 2005
Holmberg	2000	Webster	2002
Huang et al	2004, 2005	Windischer	2003
Kleijnen and Smits	2003	Windischer and Grote	2003
Lai et al	2002		

TABLE 1: Journal article and books of performance measurement systems and metrics for SC
Source: Craig Shepherd (2006).

A large number of measurement approaches have been developed and used for measuring SCP (Lapide, 1999). Apart from very popular Balanced Scorecard, there are other measurement approaches like Supply Chain Council's SCOR Model, the Logistics Scoreboard, Activity-Based Costing (ABC) and Economic Value Analysis (EVA). Some of the important approaches with their salient features are tabulated below in table 2.

SC Measurement Approaches	Salient Features
The Balance Score Card (BSC)	It advocates the use of Executive Information Systems (EIS) that track a number of balanced metrics that are closely aligned to strategic objectives. The approach would suggest that a small number of balance supply chain measures be tracked on the following four perspectives: Financial perspective, Customer perspective, Internal business perspective, Innovative and learning perspective
Supply Chain Council's SCOR Model	It advocates a set of SCP measures comprising of a combination of Cycle time metrics, Cost metrics, Service/quality metrics & Asset metrics
The Logistics Scoreboard (LSB)	It recommends the use of an integrated set of performance measures: Logistics financial performance, Logistics productivity performance, Logistics Quality performance & Logistics cycle time performance

Supply Chain Scorecard	The SCOR model is a pyramid of four levels that represents the path a company takes on the road to SC improvement. Level 1 - it provides a broad definition of the plan, source, make and deliver process. Level 2 - it defines the 17 core process categories that are possible components of a supply chain, Level 3 - it provides a company with the information it needs to successfully plan and set goals for its supply chain improvements. Level 4 - it focuses on implementation, when companies put specific supply chain improvements into play.
Activity Based Costing (ABC)	Activity based costing (ABC) is an accounting methodology that assigns costs to activities rather than products or services. This was developed to overcome some of the shortcomings of traditional accounting methods in tying financial measures to operational performance.
Economic Value Analysis	EVA, developed by Stern, Stewart & Co., attempts to quantify value created by an enterprise, basing it on operating profits in excess of capital employed. These types of metrics can be used to measure an enterprise‘s value added contributions within a supply chain.

TABLE 2: Salient Features of different SC Measurement Approaches.

Different types of performance measures can be divided into four categories (Toni and Tonchia, 2001) which are shown in table 3 below.

1. Cost and non-cost performance measures	Berliner & Brimson, 1988; Lockamy & Cox,1994; Partovi, 1994; Rangone, 1996
2. Balanced scorecard models, where performance is measured in financial, internal business process, customers, and learning/growth - fields.	Kaplan & Norton, 1993; Kaplan & Norton 1996; Kaplan & Norton, 1992; Kaplan, 1996; Maskell, 1992
3. Internal and external performances	Toni & Tonchia, 2001
4. Value chain models	Toni & Tonchia, 2001

TABLE 3: Different Performance measurement Measures.

4. DETERMINANTS OF SUPPLY CHAIN PERFORMANCE

In this paper, the authors propose a conceptual model by linking the relationships with supplier-buyer relations, external supply chain, environmental factors, human metrics, information sharing, performance measurement approaches; and SCM performance in a single study in the context of Indian manufacturing organizations.

Construct	Definitions	Literature
Supply Chain Performance	The overall efficiency and effectiveness of a supply chain	Beamon, 1998; 1999; Harland, 1996; Garwood, 1999; Gunasekaran et al., 2001; Holmberg, 2000; Tompkins and Ang, 1999; van Hoek, 1998; Bechtel and Jayaram, 1997; Kiefer & Novack, 1999; Narasimhan and Jayaram, 1998; Hewitt, 1999; Spekman et al., 1998.

TABLE 4: Salient Features of different SC Measurement Approaches.

4.1 Supplier Buyer Relations (SBR)

In supply chain management strategies, supplier relationship activities play an important role (Wisner, 2003). Long-term relationships refer to intention that the arrangement is not going to be temporary (Chen and Paulraj, 2004). A successful strategic alliance and integrated relationship

with suppliers and buyers is very much needed. It should be revolved around trust, loyalty, positive sum game (a win-win relationship), cross-functional teams, achieving common goals and collaboration (Chandra and Kumar, 2000). A firm's success is linked to the strength of its relationship with supply chain partners and it could reduce and increase revenue (Spekman, Kamauff and Myhr, 1998).

Construc	Definitions	Literature
Supplier-Buyer Relations	"The long-term relationship between the organization and its suppliers. It is designed to leverage the strategic and operational capabilities of individual participating organizations to help them achieve significant ongoing benefits" (Li et al., 2006, p. 109)	Li et al., 2005; Gunasekaran et al., 2001; Balsmeier and Voisin, 1996; Monczka et al., 1998; Noble, 1997; Stuart, 1997; Lamming, 1993; Sheridan, 1998; Tan et al., 2002

TABLE 5: Different Performance Measurement Measures.

4.2 External Supply Chain (ESC)

One factor common to all the world class companies in India, whether in the textile/garment field, the automotive field or the pharmacy field, is the established and nurtured supply chain network. The existing supply chains have been strengthened through increased collaboration. Integration with external partners is now very much needed. Strategic partners throughout the global supply chain collaborate to identify joint business objectives and action plans..

Today, thinking has already moved from simple supply chains to complex networks of organizations working together to create competitive advantage and value, i.e. value networks. Consequently, there are developments of networks that criss-cross organisational boundaries shifting from inter- to trans-organisational networks (Bititci et al.,2006). Differences between 'traditional' and 'networked' organisations are well discussed in literatures (Gunasekaran et al., 2005). A successful logistics network can reduce entire supply chain costs, including manufacturing and procurement costs, inventory handling costs, facility costs (fixed costs), labour cost and transportation costs (Simchi-Levi, Kaminisky and Simchi-Levi, 2000).

4.3 Environmental Factors (EF)

The effects of globalization, technology and the growing need for environmental responsibility and sustainability is forcing organizations and individuals to make changes in the way they work. The ministry of corporate affairs and the industry chamber, Confederation of Indian Industry (CII) had reported in their study about the Corporate Social Responsibility (CSR) in which the private sector plays a key role in nurturing inclusive growth. Almost all major Indian organizations have a CSR programme.

Constructs	Definition	Literature
Environmental Factors	The source of events and changing trends and regulations which create opportunities and threats for an individual organization	Lenz, 1980; Turner, 1993; Prahlad, 1998; Chen et al., 1992; Burgess, 1998; Tan et al., 1998; Thomas & Griffin, 1996; Krause et al., 1998; Aldrich, 1979; Paswan et al., 1998; Milliken, 1987; Oswald et al., 1997; Miller & Droge, 1986; Nahm, 2000, Drucker, 2002.

TABLE 6: Different Performance Measurement Measures.

However, today one thing we can be certain of is that the rate of change is set to increase even further, both in scope and magnitude. These changes are likely to be more frequent and larger than previously but they also may come from unexpected directions. The primary changes we are likely to face in the future are social rather than economic or technological.

4.4 Human Metrics (HM)

There is a heavy influence of behavioral issues while establishing and implementing the key PMs and metrics. Cultural and political factors also play a significant role in determining the right PMs

and metrics. Organizations share values in terms of tremendous trust, commitment and collaboration. Also, organizational capability and top management supports are essential for an effective SCM (Mello and Stank, 2005). It is suggested that human factor is significantly affecting the SCM effectiveness (Tony and Kelvin, 2007) and is a critical factor in achieving strategic and operational objectives and changes in the supply chain(Hoek, Chatham and Wilding, 2002).

It is found that firms lacking in the appropriate cultural elements such as shared assumptions, values and artifacts are tend to fail when implementing SCM initiatives (Mello and Stank, 2005). Moreover, the need for organizational commitment and governance for supply chain success is also reported (Fawcett, Ogden, Magnan and Cooper, 2006). The findings indicated that the following four types of managerial support are needed to achieve best SC success: top management support, broad-based functional support, channels support and infrastructural/governance support. Few more research works (Robinson and Malhotra, 2005; Wouters, 2009) clearly support the need for a performance measurement system taking the holistic picture, including the human side and organizational issues.

4.5 Information Sharing (IS)

Information sharing is defined as the access to private data between business partners thus enabling them to monitor the progress of products and orders as they pass through various processes or stages in the supply chain (Simatupang and Sridharan, 2002). The elements of information sharing comprises of consistent data acquisition, processing, storage, presentation, retrieval, and broadcasting of demand and forecast data, inventory status and location, order status, cost-related data, and performance status.

Constructs	Definitions	Literature
Information Sharing	"The extent to which critical and proprietary information is communicated to one's supply chain partner" (Li et al., 2006, p. 110)	Li et al., 2005; Monczka et al., 1998; Mentzer et al., 2000b, Stein and Sweat, 1998, Yu et al., 2001; Towill, 1997; Balsmeier and Voisin, 1996; Jones, 1998; Lalonde, 1998; Vokurka and Lummus, 2000; Lancioni et al., 2000; Ballou et al., 2000.

TABLE 7: Different Performance Measurement Measures.

Information sharing pertaining to key performance metric and process data improves the supply chain visibility thus enabling effective decision making. Information shared in a supply chain is of use only if it is relevant, accurate, timely, and reliable (Simatupang and Sridharan, 2005;Thatte, 2007). Information sharing with business partners enables organizations in taking better decisions and actions on the basis of greater visibility (Davenport, et al, 2001; Tathee, 2007). In order to make the supply chain competitive, a necessary first step is to acquire a clear understanding of supply chain concepts and be willing to openly share information with supply chain partners(Lummus and Vokurka 1999; cited in Thatte, 2007)

4.6 Supply Performance Measurement Approaches (SPA)

Most of the companies are following financial and non-financial performance measures approaches, however they are not representing them in a balanced framework. The basic question is where the financial and nonfinancial PMs would be suitable to evaluate the performance of a SC system. For example, strategic level PMs are mostly based on financial metrics. PMs at tactical level can be evaluated using both financial and nonfinancial indicators. Operational level performance evaluation is mostly based on nonfinancial indicators. While some companies concentrate on financial performance measures, others are concentrating on operational measures (Kaplan and Norton, 1992

Researchers suggested that an appropriate performance measurement system is a critical requirement for the effective management of a supply chain (Liang, Yang, Cook and Zhu, 2006). There are studies about the PMSs and metrics of supply chains by critically reviewing the contemporary literature those suggest possible areas for future research (Shepherd and Gunter,

2006). SCM needs to be evaluated for its performance in order to bring forward an efficient and effective supply chain (Gunasekaran, Patel and Tirtiroglu, 2001). For effective management in a SC, measurement goals must consider the overall SC goals and the metrics to be used. These should represent a balanced approach and should be classified at strategic, tactical and operational levels, and also as financial and nonfinancial measures (Gunasekaran et al.,2001).

Recently, many research papers that deal with performance measurement in a SC context (Van Hoek, 1998) have appeared in the literature. However, most of them are prescriptive and not based on historical facts and their analysis and changing market and operations environments or well grounded empirical analysis. In addition, they lack a complete coverage of all the performance measures and metrics in new enterprise environments considering different levels of decision-making. An overview of PMSs in SCMs environments highlights the justification for the selection of suitable metrics based on the current and emerging new enterprise environments.

There are not many review articles on performance measures and metrics in logistics and supply chain. An overview and evaluation of the performance measures used in SC models is presented and a framework for the selection of PMSs for manufacturing SCs has also been proposed (Beamon,1999). Three types of PMs are identified as necessary components in any supply chain PMSs, viz., resources, output and flexibility. Another study suggested that traditional models for PM should be separated from more innovative non cost measures such as the time, quality and flexibility (De Toni and Tonchia, 2001).

The authors propose to suggest the suitability of any particular approach in the context of Indian manufacturing organizations.

5. PROPOSED MODEL

There is a model to examine relationship between supply chain performance (SCP) and degree of linkage among supplier, internal integration and customer (Lee, Kwon and Severance, 2007). In line with this knowledge, the researchers propose that a model for manufacturing companies can also be developed.

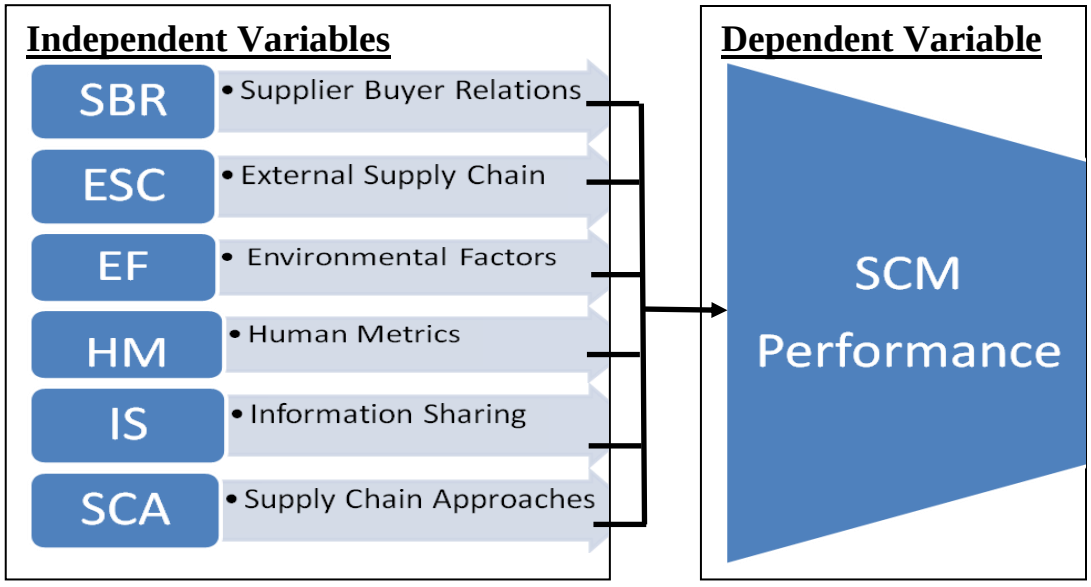

FIGURE 2: Proposed Conceptual Model (Marwah A.K., et al, 2012).

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.596	.613	33

TABLE 8: Reliability Scores.

6. METHODOLOGY

This study is part of a larger research project exploring SC related practices, their relevance to managers, and their impact on firm performance and eventually on firm competitiveness.

Methodology used in this study is based on the views of Beamon (1999), that are, PMS should develop a reliable metrics to provide feedback on various performance areas by eliminating the overlapping (duplication) metrics and to include the most important metrics of logistics and supply chain management. Beamon (1999) has focused on the major metrics such as time, resource utilization, output and flexibility to provide a context for developing more detailed performance measures and metrics in new enterprise environments.

The sample of this pilot study focuses on departments of purchasing, production, logistics and distribution in the Indian manufacturing companies. Questionnaire (both online and offline) are the main instruments of this study. Questionnaire items were designed after an extensive literature review. 5–point Likert scale was used. There were total 105 items (excluding 17 demographic items). Questionnaire was emailed to various responded and out of 108 responses which were received, 100 responses were complete in all respects and therefore taken for this pilot study.

7. RESULTS

Factor analysis was performed on each construct using SPSS to reduce unnecessary items from the questionnaire and reliability analysis was also done to test how well the items in a set were positively correlated to one another. The factor analysis reduced total number of items from 84 to 33. The summary of items before the factor analysis is shown in table 9. The final questionnaire was tested for reliability. The internal consistency reliability will be higher if the Cronbach's alpha is closer to 1 (Sekaran, 2003). The final questionnaire shows the value of Cronbach's alpha as 0.596, which is acceptable for new scale (Table-8).

S. No.	Items	Details
1	SBR1	We consider quality as our number one criterion in selecting suppliers
2	SBR2	We regularly solve problems jointly with our suppliers
3	SBR3	We have helped our suppliers to improve their product quality
4	SBR4	We have continuous improvement programs that include our key suppliers
5	SBR5	We include our key suppliers in our planning and goal- setting activities
6	SBR6	We actively involve our key suppliers in new product development processes
7	ESC1	Our supply chain partner feels like "part of the family" in this supply chain relationship
8	ESC2	Our supply chain partner feels "emotionally attached " to this supply chain relationship
9	ESC3	This supply chain relationship has a great deal of personal meaning for our supply chain partner
10	ESC4	Our supply chain partner feels a strong sense of belonging to this supply chain relationship
11	ESC5	Our supply chain partner works towards achieving the common goal
12	ESC6	Our supply chain partner shares risk with you.
13	ESC7	Our supply chain partner is afraid of what might happen if he leaves the supply chain relationship
14	ESC8	Our supply chain partner believes that a firm must always be loyal to its supply chain relationship
15	ESC9	Our supply chain partner thinks that firms these days move from alliance to alliance

		too often
16	ESC10	Jumping from alliance to alliance seems unethical to our supply chain partner
17	ESC11	Our supply chain partner work towards reputation of the firm rather that profitability
18	ESC12	Our supply chain partner is ready for mutual investments on certain projects
19	HM1	The degree of dealings between us and our supply chain partner is very high
20	HM2	The relationship between us and our supply chain partner is very stable
21	HM3	We are quite involved in the marketing and planning efforts of our supply chain partner
22	HM4	We and our supply chain partner seek advice for each other when doing marketing analysis
23	HM5	We and our supply chain know the strengths and weaknesses of each other very well
24	HM6	Our firm is powerful enough to ask our supply chain partner to readjust price strategy
25	HM7	Our firm is powerful enough to ask our supply chain partner to readjust their product
26	HM8	Our firm can provide training support to our supply chain partner
27	HM9	Our supply chain partner perceives that our firm is perfectly honest and truthful
28	HM10	Our supply chain partner perceives that our firm is perfectly having high integrity
29	HM11	We would like to inform our supply chain partner everything about new developments
30	HM12	We willingly share all information that might help your supplier make better decisions
31	EF1	We are affected by mergers and acquisitions
32	EF2	Globalization has helped in our performance
33	EF3	We are affected by the infrastructure facilities provided by the government
34	EF4	Customers' needs are unpredictable
35	EF5	Customers' requirements regarding product features are difficult to forecast
36	EF6	Customers' product preferences change over the year
37	EF7	The properties of materials from suppliers can vary greatly within the same batch
38	EF8	Suppliers' engineering level is unpredictable
39	EF9	Suppliers' product quality is unpredictable
40	EF10	Suppliers' delivery time can easily go wrong
41	EF11	Competitors' actions are unpredictable
42	EF12	Competition is intensified in our industry
43	EF13	Competitors are from different industries
44	EF14	Competitors are from different countries
45	EF15	Competitors often introduce new products unexpectedly
46	EF16	Technology is changing significantly in
		our industry
47	EF17	Technological changes provide opportunities for enhancing competitive advantage in our industry
48	EF18	Technological breakthrough results in many new product ideas in our industry
49	EF19	Improving technology generates new products frequently in our industry
50	IS1	We inform trading partners in advance of changing needs
51	IS2	Our trading partners share proprietary information with us
52	IS3	Our trading partners keep us fully informed about issues that affect our business
53	IS4	Our trading partners share business knowledge of core business processes with us
54	IS5	We and our trading partners exchange information that helps establishment of business planning
55	IS6	We and our trading partners keep each other informed about events or changes that may affect the other partners
56	SPA1	Sales
57	SPA2	Cash flow
58	SPA3	Profit / Sales
59	SPA4	Quality of accounting policies
60	SPA5	Customer complaints
61	SPA6	Percent of missed delay rates
62	SPA7	Customer Surveys
63	SPA8	Percent of products rejected by quality control
64	SPA9	Manufacturing cycle time
65	SPA10	Capacity utilization
66	SPA11	Safety record
67	SPA12	Absentee rates
68	SPA13	Employee training
69	SPA14	Customer diversification
70	SPA15	Percent of sales from proprietary products
71	SPA16	Environmental policies implemented
72	SPA17	Community involvement
73	SPA18	Experience/reputation of management
74	SPA19	Continuity of management
75	SPA20	Number of new products (last three years)
76	SPA21	Percent of sales due to new products
77	SCP1	Our supply chain is able to meet special customer specification
78	SCP2	Our supply chain is able to rapidly adjust capacity so as to accelerate or decelerate production in response to changes in customer demand
79	SCP3	Our supply chain is able to rapidly introduce large numbers of product improvements/variations
80	SCP4	There is high level of communication and coordination between all functions in our firm
81	SCP5	There is a high level of integration of information systems in our firm

82	SCP6	Our firm fills customer orders on time
83	SCP7	Our firm has short order-to-delivery cycle time
84	SCP8	Our firm has fast customer response time

TABLE 9: Initial Questionnaire Items (before factor analysis).

8. DISCUSSIONS

The increasingly global nature of competition requires that firms utilize all of their available resources in order to survive and succeed. Consequently, their supply chains need to be very efficient. The present work aimed at narrowing down the different variables leading to SC performance. At this stage, pilot study results indicate the need of an exhaustive model to assess the SC performance. Also, with so many variables and factors, use of structural equation modeling (SEM) is intended.

9. IMPLICATIONS AND FUTURE SCOPE

This study is a part of a larger research project exploring SC related practices. The methodology involves literature review of empirical research articles on performance measurement, SCM and competitiveness. The authors' intention is to fill up the gap about the lack of research in supply chain management which investigates the role of critical success factors in manufacturing organizations of India. Furthermore, the study to be carried out resulting from the proposed model is expected to investigate the critical success factors that contribute to the SCM performance in order to increase the competitive advantage of the Indian manufacturing organizations.

The study intends to survey manufacturing organizations of India. The implications of our research work would be to benefit the manufacturing organizations to be surveyed in terms of new and customized SC performance approaches, with due consideration to their geographical location and related SC constraints. However, the scope of this study is limited only to manufacturing organizations. It can be further extended to cover other industries and sectors.

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