

Factors Influencing Purchase of 'NANO' the Innovative Car from India-An Empirical Study

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Abstract: This study attempts to find the factors, which are important for choosing the revolutionary car 'Nano' launched by one of the leading Indian automobile industry called 'Tata Motors'. The year 2009 has been significant for Indian automobile industry as numbers of new models were launched for the domestic market and also registered a significant growth in exports. The report published by Cygnus research ranked Indian automobile sector to be number one on the basis of sales growth and Profit After Tax (PAT) growth during October- December 09 over October- December 08 over other 14 manufacturing sectors. The paper considers 22 factors, which may be important in the customer decision-making process. Two approaches viz. Grey Relational Analysis and RIDIT analysis is used to rank the factors.

Key words: Automobile, grey relational analysis, nano, RIDIT

INTRODUCTION

India has become a fast-growing auto market over the past decade. Growth has been driven by rapid economic growth and increasing wealth-double-digit average wage gains over the past decade and more than a three-fold surge in equity markets. The growth in Indian economy encounters the growth in industrial production. According to the Society of Indian Automobile Manufacturers (SIAM), the Indian automobile industry has maintained a steady growth of 20% till May 2005. The industry currently contributes about 5% of the GDP and it is targeted to grow fivefold by 2016 and account for a geographically diversification.

The development in automobile sector overhauls the perception of potential car buyers, with their increased disposable income, enormous information search, and availability of lucrative financial options. People today are more pragmatic before acquiring the automobile.

For most people, purchasing a car is one of the most important and expensive investment, next to purchase of a house; for the automotive manufacturers, first-time car buyers give them the opportunity to create positive brand image which definitely could be reflected on in next coming years because consumers could make repeat car purchasing. The small car market changed very rapidly due to the fierce competition and advanced technology; therefore, it requires the automotive manufacturers and

car dealers to understand the consumers' preference on time and take fast actions to reflect market changes quickly. So, it would be very interesting to know consumers' preference in today's fast-changing small car market. In this context this study is carried out to understand how the customers' buying process is, what the critical elements of making their purchasing decision for the innovative car "Nano".

Review of Indian automobile industry: The last few years have witnessed revolutionary changes in the management systems and manufacturing innovations of the world automotive industry. A proprietary study conducted by McKinsey and the Associated Chambers of Commerce and Industry of India (summarized in PTI, April 18, 2005; Newsweek International November 28, 2005, and the Financial Times, December 1, 2005) estimates that by 2015 global auto production is likely to reach \$1.9 trillion dollars, of which around \$700 billion dollars will be produced in low cost countries. The United Nations Development Program (UNDP) report hailed India as a powerful force in the global automobile industry, and recognized that it has the strength to sustain leadership and growth in the face of the global trading order. The growth in Indian economy encounters the growth in industrial production. According to the Society of Indian Automobile Manufacturers (SIAM), the Indian automobile industry has maintained a steady growth of

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20% till May 2005. The industry currently contributes about 5% of the GDP and it is targeted to grow fivefold by 2016 and account for a geographically diversification. The growth curve of India Auto Inc. has been on an upswing for the past few years. In addition to matching competitor's new products and upgraded machinery, technology is over 10% of India's GDP. Automotive Mission Plan (AMP) expects the industry to reach a turnover of \$150-200 billion in the next ten years from the current \$45 billion levels. Over the last five years the production of four wheelers in India has increased from 9.3 lakh units in 2002-03 to 23 lakh units in 2007-08 reporting a CAGR of 20%.

The Indian car manufactures are today serving a wide variety of transportation solutions across, different load levels. There is a drastic growth in sales and distribution setup, which enables the automobile company to ensure playing a vital role. Moreover the company's proximity to their raw material and component suppliers help them in reducing procurement costs. Automobile manufacturers have clearly committed themselves to supply the market with ever safer and more environment friendly products and are continuously investing huge R&D resources in further product improvements and in developing radically new propulsion systems. The following section discusses the development of Indian automotive industry.

Emergence of the Indian auto industries: The auto industry traced in India can be classified into three distinct phases namely: Period prior to the entry of Maruti Udyog Ltd, period after the entry of Maruti Udyog Ltd and Period post Liberalization (Kathuria, 1990). The Indian auto industry has come a long way since 1940s. Since its independence in 1947, India has pursued, initially, a strong anti-imperialist automobile economic policy by promoting self-reliance (D'Costa, 1995a). This policy established a basic industrial foundation and a technical-education infrastructure to sustain future growth. This fell behind the global technology frontier due to increasingly autarkic and sometimes dysfunctional policies (Bhagwati, 1993). India was characterized by a slow-growing, high-cost economy with shoddy and scarce products. Subsequently, since the 1980s, various economic and industrial sectors were gradually and selectively deregulated, privatized, and internationalized (D'Costa, 2006).

The evolution of this economic nationalism has been devised to promote domestic business and increasingly to sustain their global competitiveness. The key breakthrough occurred in the year 1982. The Government of India created Maruti Udyog Limited, a public sector

company. The period prior to the entry of Maruti Udyog Ltd was characterized by small number of auto majors like Hindustan Motors, Premier Automobiles, Telco, Bajaj, and Mahindra and Mahindra. However, cumulatively political and social forces gave way to a curious partnership between the Govt. of India and Suzuki Motors of Japan in the early 1980s (D'Costa, 1995b). The government owned approximately 80% of the equity. For the first time India became an investor in a car project and in a successful monopoly (D'Costa, 1995b). This was marked as the beginning of the second phase of the auto industry. The auto industry in the country really showed a spurt in growth during this period. This period witnessed the emergence of a new generation of auto manufacturers who were required to meet the stringent quality standard of Maruti's collaborator Suzuki of Japan. The good performance of Maruti resulted in an upswing for the domestic automobile industry. This Joint Venture (JV) resulted in a significant addition to the country's car production volume, which helped satisfy the unmet consumer demand. The JV served another important function: by bringing in cars at a low cost that were based on modern (and fuel-efficient) automobile technology, it galvanized the existing Indian firms to start upgrading their own technology, thereby initiating a modernization of the Indian passenger car industry. The other major Indian manufacturers also all moved to upgrade their own offerings, catalyzed partly by Maruti's entry into the Indian car market: HM entered into collaboration with Isuzu of Japan for the manufacture of gasoline and diesel engines and power-train assemblies, and with Vauxhall of the United Kingdom for design and tooling technology, which in turn led to production of a new model called Contessa (a derivative of the Vauxhall Victor). Premier Auto Limited (PAL) entered into a technical agreement with Nissan of Japan for their A-12 engine and matching transmission, which was placed in a Fiat 124 body. PAL also entered with a consultancy agreement with AVL of Austria to improve its existing gasoline engine, and through an acquisition, an arrangement with FNM of Italy for diesel engines (leading to a diesel car being offered in 1989) (Mohanty *et al.*, 1994). Standard Motors began offering a luxury car, the Rover 2000, in collaboration with Austin Rover of the U.K. (Venkatramani, 1990).

In the year 1991, when India moved away from an inward looking industrialization strategy to a more 'open' economy (Narayanan, 2001), a newly elected Indian government took over and faced with a balance-of-payments crisis initiated a series of economic liberalization measures designed to open the Indian economy to foreign investment and trade. The

governments play a key role in shaping the growth of the auto industry in emerging economies (Amsden and Kang 1995). There for the Government of India revisited its Industrial Policy and allowed for capacity expansion as well as entry of foreign capital and firms. In this situation the Indian automobile industry needs to restructure itself to retain competitiveness. The new automobile policy announced in 1993 included removal of licensing restrictions on production, automatic approval of foreign investment up to 51% in Indian firms opening the doors for foreign firms to enter the Indian market (subject to government approval, up to 100% foreign equity participation was also allowed) (Sagar and Chandra, 2004). The government followed up its liberalization measures with significant reductions in the import duty on automobile components. These measures have spurred the growth of the Indian economy in general, and the automotive industry in particular. Since 1993, the automotive industry has been experiencing growth rates of above 25%. Prior to the delicensing of this sector in 1993, customers could purchase just three models: one made either by Hindustan Motors, Maruti-Suzuki or Premier Automobiles. By 1996, a total of eighteen automobile companies from the US, Europe, and East Asia had began operations in India (Mukherjee and Sastry 1996).

The entry of foreign automobile manufactures ranging from Mercedes, Ford and General Motors to Daewoo following the government liberalizing the foreign investment limits saw the beginning of the third phase of the evolution of the industry. The auto industry witnessed huge capacity expansions and modernization initiatives in the post liberalization period. Technological collaborations and equity partnerships with world leaders in auto components became a common affair. This increasing success in turn gave India confidence to accelerate liberalization.

In 2001 the Government of India (GOI) lifted virtually all restrictions on direct foreign investment in the auto industry. Indian passenger car production, barely over 200,000 units in 1993-94, doubled to just over a half-million units in 2000-01. In the next four years, the production nearly doubled again, topping one million vehicles in 2004-05, and hitting 1.3 million vehicles in 2005-06 including utility vehicles and MPVs (Economic Times April 29, 2006). Annual sales have seen an increase by over a multiple of 5, from around 320,000 units in 1996 to 1.7 million in 2008, thanks to a combination of rising per capita incomes, relatively easier availability of finance and young demographics (SIAM, 2008). This sector as a whole has emerged as a

significant engine of growth for the Indian economy. India is on every car manufacturer's map. The Automotive Mission Plan 2006-2016 has set an ambitious turnover target of \$145 billion for the industry from a modest \$38 billion today (Narayanan and Vashisht, 2008).

So the Indian automobile industry is playing a pivotal role on the Indian Economy and also redefining the lifestyle of Indian consumers. In this context the Indian Automobile sector is also increasingly adopting an outward looking approach and exploring new markets and territories.

Understanding Small car market: The Indian automobile industry has seen rapid change over the last decade in terms of both product characteristics as well as manufacturing processes. The focus has tilted away from volumes to a lower cost model as espoused by the emerging markets. This eventually led to a transformation of the Indian market towards "small" and "mini" cars. Maruti Udyog Limited (MUL) dominated sales in "mini" segment (less than 340 cm length, generally less than 800 cc engine displacement) (Sagar and Chandra, 2004). In the year 1996, MUL had approximately 80% of the country's car market share.

The reason can be attributed to the fact that many of the earlier entrants into the Indian car market did not target these segments. Furthermore, MUL was able to offer its vehicles at a very competitive price since it had relatively high indigenization levels, an established vendor base, and a depreciated plant (ICRA, 2003a). But it has lost significant ground with the entry of Hyundai Motor India Limited (HMIL) with its line-up of small cars. These compact or small sized cars are technologically advanced and offer greater number of features (ICRA, 2003b). The launch of Tata Motors' Indica in the year 2003-04, another small car, drastically reduced Maruti's domestic sales to just over 51%. Hyundai and Tata account for approximately 19 and 16% respectively during this period. Thus Indian car market is heavily skewed towards mini and compact vehicles, this segment alone account for about 80% of the car sales in the country Table 1.

Today, the small car segment is a sunrise sector, as new car registrations have grown from 625,000 in 2001 to over 1.3 million in 2006. The sub-1500 cc or 'mini and compact car' segments account for over 66% of new sales (KPMG, 2007). Rising incomes level of middle class, heterogeneous consumer preference, better financing for vehicles are the reasons driving this growth. The Annual KPMG International report suggests that it is the small car

Table 1: Passenger vehicle sales and exports, 2003-04

Passenger vehicles	Domestic sales	Exports
Passenger Cars	696,207	125,327
Mini	167,565	10,479
Compact	369,537	84,077
Mid-size	139,304	30,739
Executive	14,337	0
Premium	5,368	32
Luxury	96	0
Utility vehicles	144,981	3,067
Multi purpose vehicles	59,564	922
Total	900,752	129,316

Source: Society of Indian Automobile Manufacturers (SIAM)

Table 2: Auto affordability forecast

Segment	Price (USD '000)	2005 (%)	2009 (%)
Segment A1 and A2 (Mini and compact)	6.25-12.5	35.06	48.46
Segment A3 and A4 (Mid Size and Executive)	12.5-30.0	8.9	14.53
Segment A5 and A6 (Premier and Luxury)	Over 30.0	2.43	4.5

Source: KPMG International (2007)

segment that will continue to dominate the passenger car market, with almost 50 per cent of households being able to afford a small car by 2009 (Table 2).

The Indian car industry is overflowing with small cars and automobile manufacturer in India are investing accordingly. According to Mr. P Balendran, Vice President (Corporate Affairs), "General Motors India, the growth is happening only in the small car segment. People buying small cars are very cost conscious. General Motors is planning to launch its second small car in India in the 800-900 cc segments. The compact car will be unveiled in 2010". According to Hiroshi Nakagawa, India head of Toyota Kirloskar Motors, "Small cars play a very important role and cover as much as 75 per cent of car volumes in India and currently does not include in Toyota Kirloskar's portfolio. Toyota had announced Rs 1,400 crore investment to launch a 'strategic small car' for the Indian market by 2010. The entry car will be enhanced with below 1200-cc in petrol and below 1500cc in diesel". The Xenitis group Chairman, Santanu Ghosh said the company will be launching an affordable four wheeler car that is priced lower than INR 1 lakh which is approximately equivalent to US\$ 2000. Another auto major, Peugeot Motor Company from France, is also planning to enter the small car market in India by 2011. It is coming to India with a spacious five-seater car, which is designed especially to cater the whopping small car consumers of India. Hyundai is also gearing up to launch a small car for 3,500 dollar (over Rs 1.45 lakh) by 2011. Nissan Renault is expected to team up with Indian manufacturer Mahindra and Mahindra to promote a sub-

Rs 1.5 lakh car. Nissan Renault CEO Carlos Ghosn commented, "We will be part of this competition and we are investigating at the level of the alliance, how we can make a \$3,000 car".

Tata Motors has already unveiled the world's cheapest passenger car "Nano" for around US\$2,500. Tata Nano gives a fuel efficiency of 23.6kmpl (under standard test condition), the highest among all petrol-run cars in the country. Nano is 3.1 m (10.23 feet) long, 1.5 m wide and 1.6 m high and can accommodate four to five people. Nano with its two cylinder 623 cc, 33 horsepower rear mounted Multi-Point Fuel Injection (MPFI) petrol engine can touch the top speed of 105 Km. Nano surpasses Indian regulatory requirements and Euro IV emission norms and guarantee less polluting than most of the bikes on Indian roads. With the launch of Tata Nano, the stage is set for around a dozen new small and compact cars to be launched in India in the next two years. It is in this context this study is carried out to understand the Indian consumers mind towards the smallest car Nano.

Factors influencing car purchase: A study by Lang motors (2007) found a list of 20 factors to be the most important factors that influence purchase of car. They are as follows 1 - Reliability / Dependability, 2 - Exterior Styling, 3 - Price / Cost to Buy, 4 - Interior Comfort, 5 - Value for the Money, 6 - Fun to Drive, 7 - Reputation of the Manufacturer, 8 - Quality of Workmanship, 9 - Engine Performance, 10 - Road-holding / Handling, 11 - Fuel Economy, 12 - Storage and Cargo Capacity, 13 - Ride Quality on Highway, 14 - Durability / Long Lasting, 15 - Safety Features, 16 - Future Trade-In / Resale, 17 - Length of Warranty, 18 - Rebate / Incentive, 19 - Discount / Value Package, 20 - Environmentally Friendly Vehicle. Similarly a study by Power and associates (2005) listed the following nine to be the most important reasons for car purchase - 1 Styling, 2 Reliability, 3 Costs too much, 4 Poor quality, 5 Resale value, 6 Too small, 7 Lacked performance, 8 Didn't offer incentives, 9 Poor gas mileage. A study published in Anonymous (2008a) UK found for as many as 71% of customer price was the most important factor, followed by fuel economy, running costs, fuel type and Vehicle Excise Duty (VED) costs. Similarly an article published in Anonymous (2008b) quoted After Price; Reliability is the number one factor for buyers. Car buyers' rate reliability over fuel efficiency as their primary decision makes. Fuel efficiency and safety rank second and third in importance Performance not a top priority for most car buyers. This study intends to prioritize the important factors with reference to Nano from Indian consumers' point of view.

MATERIALS AND METHODS

This study tries to explore the potential reasons behind the intention to book a TATA Nano. We have used two relatively new techniques i.e., RIDIT and Grey Relational Analysis (GRA) in the paper. The purpose is to quantify the order of relative importance of the antecedent reasons for selection of a TATA Nano. The review of literature revealed the factors that affect the choice of car purchase. The 22 indicators identified are as follows - style / Look, interior design, space inside, accessories, power, safety features, performance, environment friendly, Features of the car fulfils requirements, attractive colors, comfortable, price, high fuel efficiency, financing option, running cost, resale value, warranty, value for money, Companies reputation, brand name, status / prestige, overall possession satisfaction. The country of origin is another important factor but we have not used it, as all the respondents were Indians. It was assumed that the respondents are aware about the origin. And there is a question about TATA’s reputation. Using the above-mentioned indicators a scale was developed to capture potential consumers’ views. The same was administered in two major cities of Orissa, a fast growing state in Eastern part of India. The study was carried out during summer 2009. A total of 130 responses were collected from the field and final 108 responses were used for final analysis after data filtration.

Overview of the RIDIT: The ridit analysis is an acronym (‘Relative to an Identified Distribution’) plus the productive suffix ‘-it’ denotes a transformation” (Bross, 1981). We may quote the inventor of this analysis to understand its meaning and relevance: - “In 1950s studies of crash-injuries in highway accidents, the response variable used a graded scale (e.g., none, minor, moderate, severe, fatal). The common practice in analysis of contingency table data then (and sometimes now) was to avoid empty cells by collapsing to a dichotomous scale (e.g., nonfatal, fatal). In an effort to avoid losing information in this way, ridit analysis is used, which involves a simple empirical cumulative probability transformation of the entire scale.

Fleiss *et al.* (1979) have reported that ridit analysis begins with the identification of a population to serve as a standard or reference group. Virtually the only assumption made in ridit analysis is that the discrete categories represent intervals of an underlying, but unobservable, continuous distribution. Given the distribution of any other group over the same categories, the mean ridit for that group may be calculated. The resulting mean value is interpretable as a probability. In summary, ridit analysis provides a simple alternative or adjunct to rank order statistical analysis, and may be viewed as adding an intuitively appealing, descriptive element to it. The detailed algorithm of RIDIT analysis is provided in Appendix A.

Overview of the GRA: A system having incomplete information is called Grey system. The Grey relation is the relation with incomplete information (Chih-Hung Tsai, 2003). The Grey relational analysis is a highly effective method for determining how a discrete data sequence is related to other data sequence. Data for the grey relational analysis must meet the following requirements: non-dimension, scaling, and polarization. Grey relational analysis is a method to analyze the relational grade for discrete sequences. The grey relational analysis is unlike the traditional statistics analysis handling the relation between variables. Some of the drawbacks of the later are: (i) it must have plenty of data; (ii) data distribution must be typical; (iii) a few factors are allowed and can be expressed functionally. But the Grey relational analysis requires less data and can analyze many factors that can overcome the disadvantages of statistics method (Chih-Hung Tsai, 2003). Grey Relational Analysis (GRA) is used in order to build a ranking and suggest a best choice on a set of alternatives. Through the GRA, a Grade Relation Grade (GRG) is obtained to evaluate the multiple performance characteristics (Kuang, 2008). The detailed algorithm on GRA is provided in Appendix B.

RESULTS AND DISCUSSION

The sample for the study consisted of 108 respondents drawn from two major cities of Orissa a fast

Table 3: Demographic profile of the sample

Age	20-30	30-40	40-50	50-60	60-70
No. of respondents	40(37.03%)	28(25.92%)	32(29.62%)	4(3.7%)	4(3.7%)
Occupation	Business	Central Govt.	Professional	Pvt. Company	State Government
No. of respondents	44(40.7%)	16(14.81%)	8(7.4%)	30(27.7%)	10(9.25%)
Family size	3	4	5	6	7
No. of respondents	26(24.07%)	54(50%)	16(14.81%)	12(11.11%)	0
Annual Income	< 3 Lacs	3-5 lacs	5-7 lacs	7-9 lacs	> 9 lacs
No. of respondents	14(12.96%)	45(41.66%)	28(25.92%)	15(13.89%)	6(5.55%)

Table 4: RIDIT values and GRA grades

S. no.	Scaled items	RIDIT values	GRA grades
1	It's "price" is affordable	0.397	0.760
2	I rely on Nano as it is a "Tata Product"	0.444	0.717
3	I love the name "Nano"	0.448	0.729
4	It is available in "attractive colors"	0.684	0.546
5	I love it's "style / look"	0.618	0.588
6	It has a "high fuel efficiency"	0.669	0.550
7	I am satisfied with the "financing option"	0.755	0.496
8	I like its "interior design"	0.518	0.665
9	Overall it is a "comfortable" car	0.501	0.679
10	The "space inside" Nano surprised me	0.383	0.765
11	Overall I will be very happy to possess a Nano	0.447	0.720
12	Overall it is "value for money"	0.227	0.920
13	Features of this car fulfils my requirements	0.419	0.745
14	It is an "environment friendly" car	0.436	0.731
15	I believe it's "running cost" will be low	0.553	0.641
16	The "warranty" offered is satisfactory	0.680	0.552
17	I liked its "power"	0.560	0.631
18	It will add to my "status / prestige"	0.464	0.706
19	It has proper "safety features"	0.246	0.909
20	I feel it will have a good "resale value"	0.313	0.843
21	There are adequate "accessories" available	0.627	0.589
22	Test drive "performance" was of high standards	0.452	0.717

developing state in Eastern part of India. The demographic profile of the sample is shown in Table 3.

Using the algorithms furnished in the Appendix A-B respectively the RIDIT values and the GRA grades were calculated for each of the scale items and is shown in Table 4 along with 22 parameters used.

The findings have been sorted as warranted by the respective analysis (Chien-Ho, 2007), so as to compare the rankings of the scale items for their degree of importance or agreement.

It is observed that there is positive correlation between the two methods used for prioritizing the factors. It is interesting to observe from the Table 5 that 16 out of 22 ranks as assigned by two techniques are matching. The Table 5 shows that the top most reason for selecting to book a TATA Nano based on the findings is its price. It is followed closely by the fact that it is a TATA product. The third important reason is the name Nano seems to have caught the imagination of the consumer. The least important reason for selection of the car being, "it's test drive performance". This can be taken it is also another indication for the correctness of the findings for none of the customers had the opportunity of test-driving the vehicle. The respondents had only got to view the vehicle in the show room.

Rest of the items constitute three clusters i.e. cluster one (consisting of items 10, 1, 13, 14, 2, 11, 3, 22, 18 can be referred to as first hand overall perception of the vehicle); cluster two (consisting of items 9, 8, 15, 17 can be referred to as perception of performance promised) and cluster three (consisting of items 5, 21, 6, 16, 4 can be referred to as perception about real performance of the TATA Nano post purchase). These three fall the same order between the top three reasons and the least important reason for selecting TATA Nano. Based on the ranking we may infer that next to the top three reasons for selecting the car is cluster one i.e. the first hand overall perception about the vehicle.

Table 5: RIDIT and GRA comparative ranking

Sr No.	Scaled items	RIDIT values	RIDIT rank	GRA grades	GRA rank
1	It's "price" is affordable	0.227	12	0.920	12
2	I rely on Nano as it is a "Tata product"	0.246	19	0.909	19
3	I love the name "Nano"	0.313	20	0.843	20
4	It is available in "attractive colors"	0.383	10	0.765	10
5	I love it's "style / look"	0.397	1	0.760	1
6	It has a "high fuel efficiency"	0.419	13	0.745	13
7	I am satisfied with the "financing option"	0.436	14	0.731	14
8	I like its "interior design"	0.444	2	0.729	3
9	Overall it is a "comfortable" car	0.447	11	0.720	11
10	The "space inside" Nano surprised me	0.448	3	0.717	2
11	Overall I will be very happy to possess a Nano	0.452	22	0.717	22
12	Overall it is "value for money"	0.464	18	0.706	18
13	Features of this car fulfils my requirements	0.501	9	0.679	9
14	It is an "environment friendly" car	0.518	8	0.665	8
15	I believe it's "running cost" will be low	0.553	15	0.641	15
16	The "warranty" offered is satisfactory	0.560	17	0.631	17
17	I liked its "power"	0.618	5	0.589	21
18	It will add to my "status / prestige"	0.627	21	0.588	5
19	It has proper "safety features"	0.669	6	0.552	16
20	I feel it will have a good "resale value"	0.680	16	0.550	6
21	There are adequate "accessories" available	0.684	4	0.546	4
22	Test drive "performance" was of high standards	0.755	7	0.496	7

Spearman Rank Order Correlations between RIDIT rank and GRA rank is 0.596838 which is significant at p<05000

CONCLUSION

As per Cygnus Research (2009) report among the manufacturing industries, automobiles witnessed highest growth followed by steel. Automobiles led to strong demand due to signs of revival in economy and increasing trend in hiring especially in IT sector and cheaper bank credit. In this context Tata Motors strategy of producing of people’s car for India is rightly timed. The project is the realization of dream of Ratan Tata Chairman of Tata groups to provide car to common men of India. The study carried out intends to have an insight into prospective consumers mind for the car Nano. A total of 22 factors have been identified through literature review and these factors are prioritized with reference to the small car Nano. The finding of the study shows that price of the car is most important factor for selecting Nano followed by the name TATA which stand quite tall in the country. The colour variant, style, fuel efficiency and financing option offered by the company are other important factors which attract the customers towards the car. Power, safety feature, prestige involved, resale value of the car etc. are some of the features which ranks low in the priority of the consumers.

Appendix A:

Algorithm for RIDIT Analysis (Chien-Ho, 2007): Suppose that there are m items and n ordered categories listed from the most favoured to the least favoured in the scale, and then RIDIT analysis goes as follows.

- 1) Compute ridits for the reference data set.
 - Select a population to serve as a reference data set. For a Likert scale survey, the reference data set can be the total responses of the survey, if the population cannot be easily identified.
 - Compute frequency f_j for each category of responses, where $j = 1, \dots, n$
 - Compute mid-point accumulated frequency F_j for each category of responses.

$$F_1 = \frac{1}{2} f_1$$

$$F_j = \frac{1}{2} f_j + \sum_{k=1}^{j-1} f_k \text{ where, } j = 2, \dots, n$$

- Compute ridit value R_j for each category of responses in the reference data set.

$$R_j = \frac{F_j}{N} \text{ where, } j = 1, \dots, n$$

N is the total number of responses from the Likert scale survey of interest. By definition, the expected value of R for the reference data set is always 0.5.

- 2) Compute ridits and mean ridits for comparison data sets. Note that a comparison data set is comprised of the frequencies of responses for each category of a Likert scale item. Since there are m Likert scale items in this illustration, there will be m comparison data sets.

- Compute ridit value r_{ij} for each category of scale items.

$$r_{ij} = \frac{R_j \times \pi_{ij}}{\pi_i} \text{ where } i = 1, \dots, m$$

π_{ij} is the frequency of category j for the i th scale item, and π_i is a short form for the summation of frequencies for scale item i across all categories, i.e.

$$\pi_i = \sum_{k=1}^n \pi_{ik}$$

- Compute mean ridit ρ_i for each Likert scale item.

$$\rho_i = \sum_{k=1}^n r_{ik}$$

- Compute confidence interval for ρ_i . When the size of the reference data set is very large relative to that of any comparison data set, the 95% confidence interval of any ρ_i is:

$$\rho \pm \frac{1}{\sqrt{3\pi_i}}$$

- Test the following hypothesis using Kruskal-Wallis statistics W .

$$\begin{cases} H_0: \forall i, \rho_i = 0.5 \\ H_0: \exists i, \rho_i \neq 0.5 \end{cases}$$

$$W = 12 \sum_{i=1}^m \pi_i (\rho_i - 0.5)^2$$

W follows a χ^2 distribution with $(m-1)$ degree of freedom. If H_0 cannot be accepted, examine the relationships among confidence intervals of ρ . The general rules for interpreting the values of ρ are shown below.

- A scale item with its ρ_i value statistically deviate from 0.5 implies a significant difference in the response patterns between the reference data set and the comparison data set for the particular scale item. If the confidence interval of a ρ_i contains 0.5, then it is accepted that the ρ_i value is not significantly deviate from 0.5.
- A low value of ρ_i is preferred over a high value of ρ_i because a low value of ρ_i indicates a low probability of being in a negative propensity.
- The response patterns of scale items with overlapped confidence intervals of ρ are considered, among the respondents, to be statistically indifferent from each other.

Appendix B:

A procedure for the grey relational analysis, which is appropriate for Likert scale data analysis, consists of the following steps (Chien-Ho, 2007).

- Generate reference data series x_0 .

$$x_0 = (d_{01}, d_{02}, \dots, d_{0m})$$

where, m is the number of respondents. In general, the x_0 reference data series consists of m values representing the most favoured responses.

- Generate comparison data series x_i .

$$x_i = (d_{i1}, d_{i2}, \dots, d_{im})$$

where, $i = 1, \dots, k$. k is the number of scale items. So there will be k comparison data series and each comparison data series contains m values.

- Compute the difference data series Δ_i .

$$\Delta_i = (|d_{01} - d_{i1}|, |d_{02} - d_{i2}|, \dots, |d_{0m} - d_{im}|)$$

- Find the global maximum value Δ_{max} and minimum value Δ_{min} in the difference data series.

$$\Delta_{max} = \max_{\forall i} (\max \Delta_i)$$

$$\Delta_{min} = \min_{\forall i} (\min \Delta_i)$$

- Transform each data point in each difference data series to grey relational coefficient. Let $\gamma_i(j)$ represents the grey relational coefficient of the j th data point in the i th difference data series, then

$$\gamma_i(j) = \frac{\Delta_{min} + \zeta \Delta_{max}}{\Delta_i(j) + \zeta \Delta_{max}}$$

where, $\Delta_i(j)$ is the j th value in Δ_i difference data series. ζ is a value between 0 and 1. The coefficient ζ is used to compensate the effect of Δ_{max} should Δ_{max} be an extreme value in the data series. In general the value of ζ can be set to 0.5.

- Compute grey relational grade for each difference data series. Let Γ_i represent the grey relational grade for the i th scale item and assume that data points in the series are of the same weights, then

$$\Gamma_i = \frac{1}{m} \sum_{n=1}^m \gamma_i(n)$$

The magnitude of Γ_i reflects the overall degree of standardized deviance of the i th original data series from the reference data series. In general, a scale item with a high value of Γ indicates that the respondents, as a whole, have a high degree of favoured consensus on the particular item.

- Sort Γ values into either descending or ascending order to facilitate the managerial interpretation of the results.

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