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Editorial Message

Greetings from team IJBAI!!!

We are gearing up to welcome the New Year 2019!

It's quite a mission to retaining the core value and essence of IJBAI after completion of 6th year in a row. The objective of IJBAI is to publish up-to-date, high-quality and original research papers alongside relevant and insightful point of views and reviews. As such, the journal aspires to be exciting, appealing and accessible, and at the same time integrative and challenging. All types of papers, however, will be subject to the journal's double-blind review process.

Besides the research papers, IJBAI is proud to publish the thought-provoking columns by three of our esteemed editors viz. Madhumita Ghosh of IBM, Prof. Arnab Laha of IIM – Ahmedabad and Favio Vázquez, a bright star in the data science fraternity. In the present issue, Madhumita Ghosh's column expressed the need of being technology agnostic in rapid growing landscape. Professor Laha has shared his valuable perspective on rank data analysis and Favio Vázquez shows the way to implement agile business science framework to reap an enhanced business value and to create a ROI driven data science practice.

The paper on the performance analysis of FMCG industry examines the discriminatory power of financial ratios by using Wilks' Lambda and multiple discriminant function analysis. This research paper analyzed the financial ratios and discriminate the performance of FMCG companies based on ratios.

In today's world consumer responsiveness is highly dynamic and volatile in nature and brand switching phenomena is quite frequent. It is now understood that the final implication of communication on responsiveness is consequence of interaction and connection between these elements. Marketers in present world have been facing challenges in terms of understanding the relationship between these elements. The study "Developing Interpretive Structural Model of Consumer Responsiveness towards Advertisement" focuses explores and explains how the marketing of the product can be made more effective and efficient, by explaining the sequential approach of marketing with relevance of each of the factor.

Continuing in Consumer Insight, another study "Identifying the Best Mobile Combo Tariff Plan for Professional Students", depicts an application of Conjoint Analysis to find out the optimum combination of Data/ Voice/ SMS which are preferred mostly by post graduate and undergraduate students who are pursuing for professional courses. The paper found that superior connectivity and low cost are the main reasons for their choice of service provider. The combo offer proposed from the study is for Rs.450, 400 minutes free with 300 MB free data and 600 SMS.

The paper to study the impact of market orientation on performances of Indian SMEs uses K-mean clustering to segment the respondents based on SMEs performance. The four groups reported by the paper in terms of the performance are low performance, moderate performance with superior new product development (NPD), moderate performance with moderate NPD and superior performance with low NPD.

The paper on the impact of demonetization studies the issues and challenges faced by the common man during demonetization period and analyzed the pre and post period of demonetization. The paper reports that the increase in banks deposits by 15.7% and 14.9% in Nov-16 and Dec-16 respectively created large surplus liquidity conditions.

It is needless to say that, any papers that you wish to submit, either individually or collaboratively, are much appreciated and will make a substantial contribution to the early development and success of the journal. Best wishes and thank you in advance for your contribution to the IJBAI to create a leading source of knowledge in data science. We are sure that our readers will appreciate and learn a lot from the present issue. We would like to know your wish, suggestions and views to enrich our journal. Do send us your valuable feedback from our learned readers about the enriched version of IJBAI. We would like to thank all the researchers and renowned data science practitioners who have honored us by selecting our journal to publish some of their research cases. At the end, we extend our heartfelt thanks to all our esteemed readers who continued to support us for the last six plus years.
Sincerely yours,

Madhumita Ghosh
Joint Editor-in-Chief
&
Dr. Tuhin Chattopadhyay
Editor-in-Chief

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Columns

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Are You Technology Agnostic? Not Wise to Knot Yourself with a Specific Technology in Rapidly Growing Landscape Clustering

Madhumita Ghosh*

Being one of the accomplished data scientists for more than two decades, I have witnessed the evolution of database, statistical computation techniques and super computing power processors. Analytics adoption by enterprises are certainly a good strategy as the evolution of technology always opens newer avenues to extract business value out of their data. While working with various customers at a strategic level to help them understand how to use data and analytics to solve business problems, a suite of technologies is leveraged to unfold the optimized solution.

In today's world, access to enormous data is not a challenge. So, enterprises not only keep the data secure but also leverages the data and derives substantial value. They are still a concern about utilization of data rather data storage and management. Therefore, the role of a Chief Data Officer or Chief Analytics Officer in the organization is a voice who is advocating data and analytics at a strategic level. From that perspective, organizations need to invest in capabilities to bring in people with analytical mindset and cutting-edge technology. The better way to move ahead to consider business use cases as starting point. This step helps to reap the business value rather investing in tools and people. An enterprise needs to understand where the biggest business challenge is as per the strategic imperatives and thereby where data and analytics can make an impact.

There is a lot of buzz in the market regarding Artificial Intelligence and Analytics. The C suite is already aware that AI is going to have a big influence on their businesses however lacks in the understanding on technical know-how. It is necessary to understand which tools and technologies will help them achieve business outcomes. Enterprises are ready to invest hundreds of millions in digital transformation, but it is advisable for businesses to not lock themselves in any tool because the technology landscape is moving rapidly. Cloud will continue improving and requirement will be for a hybrid solution with the power of plug & play that can be accessed via APIs with integration points since technologies keep on changing to provide tools that deliver business value.

Currently the organizations are using multiple analytical/ML algorithms on the same data. As the world is gearing itself for the emerging tech trends, business enterprises have a long list of emerging technologies they might consider adopting in near future. From Deep Learning, Quantum Computing to Distributed Ledger Technology, business enterprises are cajoled with choices for emerging technologies viz. Computer Vision, Natural Language Generation, Edge Computing, Serverless Computing to name a few. A spectrum of opportunity emerges from those good old days of data science and machine learning, as both individuals and organizations started to experiment with emerging technologies. In these days, there is a full gamut of applications to generate the insights from the data. Hence, it is of utmost need to keep oneself tool and technology agnostic and always be the adopter of emerging trend to reap most of the business value.

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Perspective: When Data are Ranks - Analysis of Rank Data

Arnab Kumar Laha*

In many real life situations respondents are asked to rank order a set of items based on their preferences. This can happen in selection interviews where a set of candidates have to be rank ordered (say, from best to worst) regarding their suitability for a job or position or in boardroom discussions where different alternative investment proposals have to be ranked based on their risk-reward profiles. In many market research studies respondents are asked to rank order a set of items with respect to their possibility of buying them. Thus rank data occur quite commonly in our daily life.

As each expert has his/her own criteria (often unexpressed or latent) for ranking a set of items, the rankings given by different experts may differ making it difficult to arrive at a "generally agreed" rank order. In selection interview panels, it's not uncommon to find experts who differ substantially with one another regarding the rank order of the interviewed candidates. To resolve these differences, ad-hoc methods are often used such as giving points according to the ranks. As an example think of a selection interview that has five candidates who appear for an interview. After the interview each expert rank order the five candidates based on their judgment. After this an ad-hoc scoring process is adopted in which the experts' rankings are converted to scores. A possible way can be that if an expert marks a candidate to be the best s/he is given five points, the next best is given four points and so on. At the end, the total score received by a candidate is computed as a sum of the scores obtained from each expert and the final rank is arrived at based on these total scores.

Can we avoid ad-hoc procedures such as the one described above and rely on scientific methods to arrive at the "generally agreed" (a.k.a. consensus) rank order? In other words, are there methods for analyzing rank data that arrive at the "generally agreed" rank order following a scientifically valid procedure? Over the years many methods have been proposed for analysing rank data. In this article we briefly discuss a few of them.

Let the number of items to be ranked by experts be k and let there be n experts. For simplicity of discussions let us assume k=3 and n=5 and think of a situation where three candidates appear for an interview having a panel consisting of five expert members. Now, at the end of the interviews each expert provides a ranking of the three candidates in terms of their suitability with 1 being the best and 3 being the worst. Thus, each expert gives an ordering of the three candidates in terms of their suitability. If an expert ranks the candidate B as "best", A as "next best" and C as the "worst" the ranking is denoted as $\begin{pmatrix} A & B & C \\ 2 & 1 & 3 \end{pmatrix}$. Thus each ranking can be thought of as a permutation of the elements of the set {1,2,3}. In particular, $\begin{pmatrix} A & B & C \\ 2 & 1 & 3 \end{pmatrix}$ can be written as the permutation (2 1 3). Suppose the rankings given by the five experts are (2 3 1), (2 1 3), (3 2 1), (3 1 2) and (1 3 2). What would be the "generally agreed" ranking in such a situation?

A possible solution to the above problem is provided by the "Kemeny ranking". The method is based on a notion of distance between permutations. Let and be two permutations. A possible distance is the Kemeny distance (a.k.a. Kemeny and Snell distance) which is defined as

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$$d_k(\pi_1,\pi_2)=\frac{1}{2}\sum_{i=1}^{k}\sum_{j=1}^{k}|x_{\pi_1}(i,j)-x_{\pi_2}(i,j)| \text{ where}$$

$$x_{\pi_s}(i,j)=\begin{cases}1 & \text{if item } i \text{ is preferred over item } j \text{ in} \pi_s\\ -1 & \text{if item } j \text{ is preferred over item } i \text{ in} \pi_s\\ 0 & \text{if item } i \text{ and } j \text{ are tied in} \pi_s\end{cases}$$

(Kemeny and Snell, 1962). Let π_1 = (2 1 3) and π_2 = (1 1 2) . For ease of notation let the items A, B and C be denoted as 1, 2 and 3 respectively. Then we have

(i,j)	(1,2)	(1,3)	(2,3)
$x_{\pi_1}(i,j)$	−1	1	1
$x_{\pi_2}(i,j)$	1	−1	−1

Note that $x_{\pi_s}(i,j)=-x_{\pi_s}(i,j)$ and $x_{\pi_s}(i,j)=0$. Thus $d_k(\pi_1,\pi_2)=6$. In general, it can be easily seen that in case of rankings without any ties $d_k(0, 0)$ is always even.

Another distance function defined on the set of permutations is the Kendall-□ distance d_{ken}. For any two permutations π_1 and π_2, $d_{ken}(\pi_1, \pi_2)$ is defined as the number of "discordances" between the permutations π_1 and π_2. Formally, it is the number of elements in the set $D=\{(i,j):(\pi_1(i)<\pi_1(j) \text{ and } \pi_2(i)>\pi_2(j) \text{ or } (\pi_1(i)>\pi_1(j) \text{ and } \pi_2(i)<\pi_2(j))\}$ where $1 \le i < j \le k$. If π_1= (2 1 3) and π_2= (3 1 2) then D = {(1,2),(1,3),(2,3)} and $d_{Ken}(\pi_1, \pi_2)$ = 3.

Let S_k be the set of all permutations of the k items. For each permutation $\pi \in S_k$ let $D_k(\pi)=\sum_{i=1}^{n} d_k(\pi_i,\pi)$ where be the rankings given by the n experts. The Kemeny ranking (a.k.a. Kemeny median) is defined as that permutation for which $D_k(\pi)=\min_{\pi\in S_k} D_k(\pi)$. Let us now compute the Kemeny median of the five expert rankings given above. Denote the five expert rankings as . Then we get (with), π_1 = (2,3,1), π_2 = (2,1,3), π_3 = (3,2,1), π_4 = (3,1,2) and π_5 = (1,3,2). Then we get $\left(\text{with } d_k \frac{1}{2} d_k\right)$

π	$d_k(\pi_1,\pi)$	$d_k(\pi_2,\pi)$	$d_k(\pi_3,\pi)$	$d_k(\pi_4,\pi)$	$d_k(\pi_5,\pi)$	$d_k(\pi)$
(1,2,3)	2	1	3	2	1	22
(1,3,2)	3	2	2	1	0	16
(2,1,3)	1	0	2	3	2	16
(2,3,1)	0	1	1	2	3	14
(3,1,2)	2	3	1	0	1	14
(3,2,1)	1	2	0	1	2	12

Thus the Kemeny median ranking for this example is (3,2,1) = (*C, B, A*) .

Let us consider a real-life example. Every year Financial Times (FT) comes out with its rankings of business schools from all over the world. We consider the FT rankings of the business schools for the years 2016, 2017 and 2018 derive from them the relative rankings of six Asian business schools which are given in the Table 1 below. Here 1 indicates the best, 2 the next best and so on. We are interested in finding the "generally agreed" or "overall" rank for these six schools based on this data.

Table - I

	Rank 2018	*Rank 2017*	*Rank 2016*
National University of Singapore Business School	1	1	4
Indian School of Business	2	2	3
Indian Institute of Management Ahmedabad	3	3	1
Shanghai Jiao Tong University: Antai	4	4	5
Indian Institute of Management Bangalore	5	6	6
CUHK Business School	6	5	2

Since here k=6, contains 6! = 720 elements. Hence it is not possible to do the computations by hand as for the earlier example. An R program can be easily developed for computing the Kemeny median of these rankings. The Kemeny ranking comes out to be (1, 2, 3, 4, 6, 5). FT also reports the average rank obtained by an institution over a three year period. In Table 2 we report the relative rankings derived from the FT average ranks and the Kemeny ranking.

	Ranking Based on Average FT Rank	*Kemeny Ranking*
National University of Singapore Business School	1	1
Indian School of Business	2.5	2
Indian Institute of Management Ahmedabad	2.5	3
Shanghai Jiao Tong University: Antai	5	4
Indian Institute of Management Bangalore	6	6
CUHK Business School	4	5

Sometimes in surveys, where there are many items to be ranked, instead of the full rankings the respondents are asked to provide the top-m (or bottom-m) items. For example from a list of business books the respondents may be asked to provide the top-3 books based on their usefulness for a MBA student. These rankings are referred to as partial rankings. The task now is to derive the rankings of all items in the list from the available partial rankings.

The method followed for obtaining the "generally agreed" ranking from partial rankings data uses the idea of tied ranking. For illustration, let there be 10 items on a list and suppose that the respondents are asked only to provide their top-3 items. If a respondent states (a, b, c) as her top-3 items, then all the other seven items are considered as tied at rank 4. With this modification it is now possible to compute the Kendall-distance d_{ken} (0, 0). Then the "generally agreed" ranking is obtained by minimising the criterion function $D(\pi) = \sum_{i=1}^{n} d_{ken}(\pi_i, \pi)$ where π_i, $1 \le i \le n$, are the observed partial rankings $\pi \in S_{10}$. Since S_K contains $k!$ elements and $k!$ $\sqrt{2\pi e}^{-k} k^{k+0.5}$ grows rapidly with increase in computation of "generally agreed" rank becomes computationally very expensive. This is particularly a more important issue when dealing with partial rankings as the total number of items to be ranked is typically large in this case.

Over the years several probability models for ranking data has been discussed in the literature. Here we discuss briefly a probability model for complete ranking data based on a distance measure (Mallows, 1957). Such models often take the form $P(\pi) = C(\lambda)e^{-\lambda d(\pi,\pi_0)}, \pi \in S_k$ where $\pi_0 \in S_k$ and $\lambda \ge 0$ are parameters. π_0 is called the modal ranking λ and is called the dispersion parameter. $C(\lambda)$ is the normalising constant that ensures $\sum_{\pi \in S_k} P(\pi) = 1$. If λ is large then the distribution of ranks is tightly clustered around π_0 whereas if λ is close to 0 then the distribution of ranks is close to uniform. Given a ranking dataset $\{\pi_1, ..., \pi_n\}$, the likelihood can be easily obtained as

$$L(\lambda, \pi_0) = C(\lambda)^n e^{-\lambda \sum_{i=1}^{n} d(\pi_i, \pi_0)}$$

As usual the MLEs (λ, π_0) of the parameters can be obtained by maximising $L(\lambda, \pi_0)$ over all possible values of (λ, π_0). In this context it may be noted that $\sum_{i=1}^{n} d(\pi_i, \pi_0) = \min_{\pi_0 \in S_k} \sum_{i=1}^{n} d(\pi_i, \pi_0)$. Thus if d_k is used as the distance measure then π_0 is the Kemeny ranking.

An alternative approach is to view the observed ranks as perturbations of the modal rank π_0 i.e. $\pi_i = \sigma_i 0 \pi_0$ where σ_i are i.i.d. S_k valued random variables and 0 denotes the composition of two permutations. A possible distribution on σ_i can be the Multinomial distribution $M(1; p_1, ..., p_{k!})$. Because the number of parameters in such models increases rapidly with increase in the number of items k, Bayesian analysis is often useful here. For more details the reader may see Laha and Dongaonkar (2012) and Laha et al. (2017).

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Agile Business Science Framework - Create a ROI-Driven Data Science Practice

Favio Vázquez*

Data Science is an amazing field of research that is under active development both from the academia and the industry. One of the saddest facts in the data-world is that most data science projects in organizations fail. Here I'll present a new iteration of an agile framework called Business Science Problem Framework to implement data science in a way that enables decision making to follow a systematic process that connects the models you create to Return On Investment (ROI) and show the value that your improvements bring to the business.

The Problem Definition

Doing data science for business is not easy for several reasons. One of them is that most people have a partial definition, or description, of what data science actually is and what it means to be a good data scientist for solving real problems.

Because of that I'll start this article with my definition (or description) of how data science should be defined for a business:

Data science is the resolution to business problems through mathematics, programming and the scientific method that involves the creation of hypotheses, experiments and tests through the analysis of data and the generation of predictive models. It is responsible for transforming these problems into well-posed questions that can also respond to the initial hypothesis in a creative way finding the optimal threshold that maximizes the expected profit or savings. It must also include the effective communication of the results obtained and how the solution adds value to the business.

I'll explain my definition step by step below so stick with me.

Modeling is the process of understanding the "reality", the world around us, but creating a higher level prototype that will describe the things we are seeing, hearing and feeling, but it's a representative thing, not the "actual" or "real" thing. This is what we actually do in science and data science is no exception.

What I'm saying here is that data science is very much linked to the business, but it is a science in the end. A lot of people can disagree with me in the part that data science is a science. But keep your mind open and read this carefully. I think it could be very useful that we define data science as a science because if that's the case, every project in data science should be at least:

Reproducible: Necessary for making easy to test other's work and analysis.

- Fallible: Data Science and Science are not looking for the truth, they look for knowledge, so every project can be substituted or improved in the future, no solution is the ultimate. solution.
- Collaborative: The data scientist doesn't exists alone, he needs a team (even a virtual team, like collaborating in an open source project), this team will make things possible for creating intelligence and solutions. Collaboration is a big part of science, and data science should not be an exception.
- Creative: Most of what data scientists do is new research, new approaches or takes on different solutions, so their environment should be very creative and easy to work. Creativity is crucial in science, is

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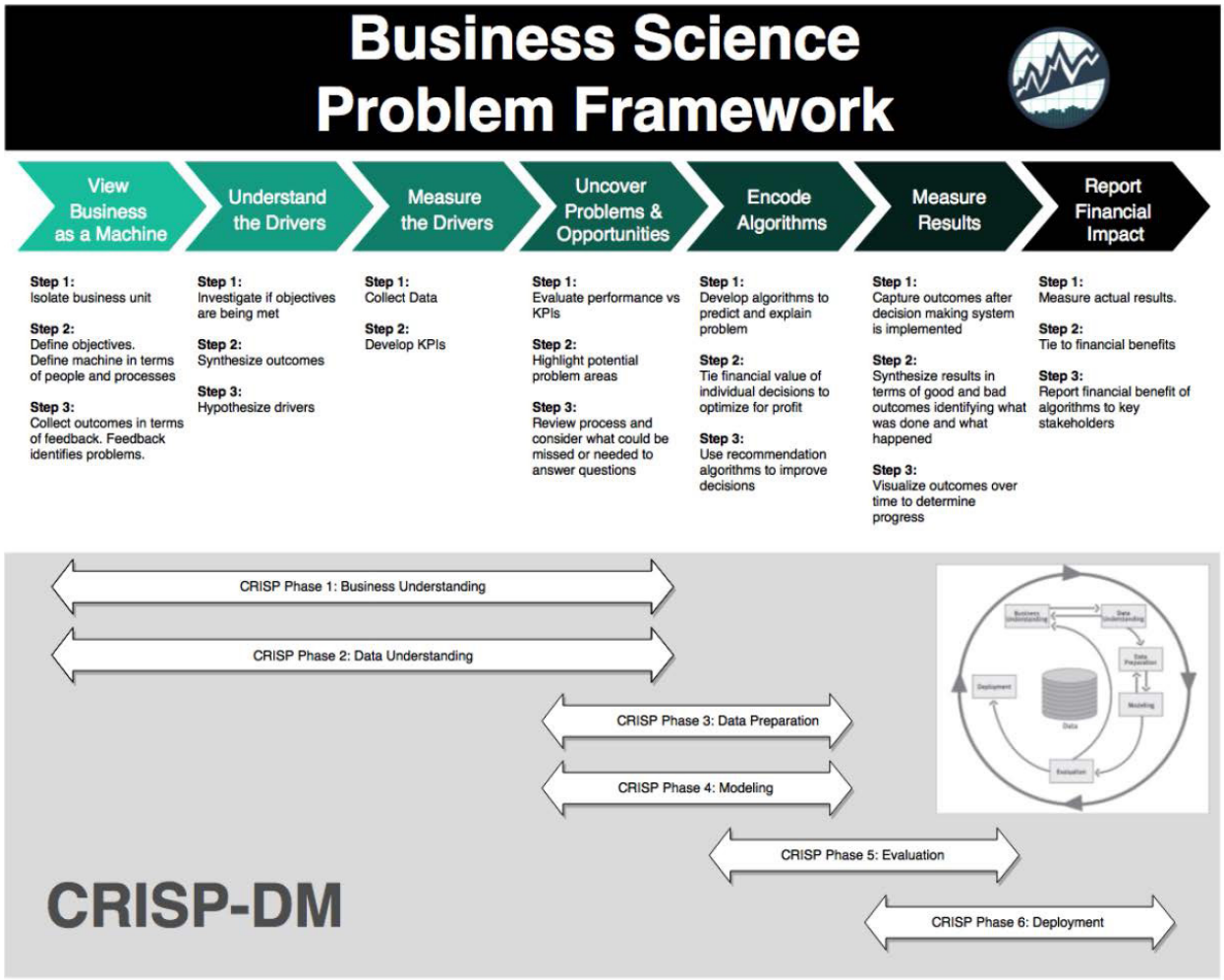
the only way we can find solutions to hard and complex problems.

- Compliant to regulations: Right now there are a lot of regulations on science, not that much on data science, but there will be more in the future. Is important that the projects we are building can be aware of these different types of regulations so we can create a clean and acceptable solution to the problems.

If we don't follow those basic principles it would be very hard to conduct a proper data science practice. Data science should be implemented in a way that enables decision making to follow a systematic process.

Data science isn't about software, knowing how to program, or being able to read data from different databases. Is about solving problems. An analogy would be saying that physics isn't about calculus, moving objects, algebra; it's about studying nature, understanding it and modeling it.

Business Science Problem Framework (BSPF)



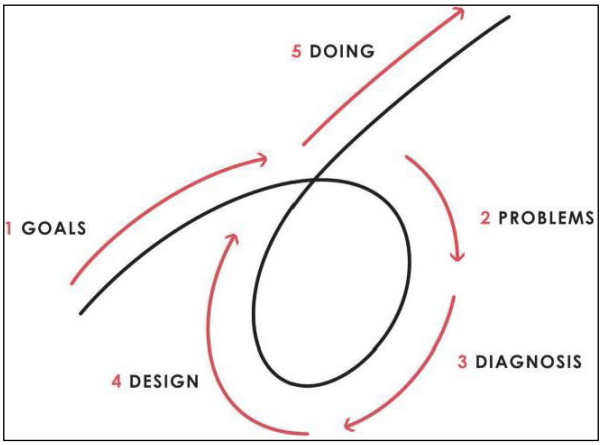
http://www.business-science.io/bspf.html (Downloadable PDF)

The Business Science Problem Framework is an agile data science process developed by Business Science. Business Science, founded by Matt Dancho, empowers data scientists by providing software, education, training, and developing the areas of business & finance. It is a proven system conceived afters years of work, trial and

error. Business Science say that clients loved the BSPF because it put a clear path forward and they loved it because it systemized their problem-solving method, making results more repeatable.

Many of the philosophies for creating the framework comes from the writings of Ray Dalio (author of Principles) along with Business Science's experience using the BSPF with clients. Beyond, high level and detailed, it's a proven framework.

Let's start with the principles before going to the BSPF. Take a look at this image:



http://jareddees.com/5-step-process-ray-dalio/

This is one of the schemas that the author presents us. He tell us that this is the process of actually achieving your goals, and that failure is an important step in the journey. This is an iterative process, meaning that you will have to go through it over and over again; forever. You'll always have new goals and you'll also face new problems, but if you learn from them, by first recognizing them and creating a good design you can solve these problems and achieve your goals.

Agility in Data Science

If we go back to data science, and we apply this to solving business problems, the first thing we have to do is recognize that it has to be an iterative process. Agility is a word for doing that in the IT world, and that's why I'm calling the BSPF an agile framework.

Agility is fundamental to business' ability to successfully build systems in a world where it's difficult to predict the future—James Kobielus.

We need agility to adapt. And if we want to go further, and beyond our common sense and intuition, we need to do it in a systematic way and then we can solve complex business problems.

The process of an Agile Data Science Workflow proposed by Russell Jurney is an amazing way of understanding how and why data science together with agility helps us going beyond, seeing more and solving problems in a creative way.

We are used to jump to conclusions really fast, not analyzing every side of things. We are used to see what our eyes are seeing and "trusting our gut".

Sadly, the common sense that reigns in our culture is Aristotelian and Medieval (Études d'histoire de la pensée scientifique—Alexandre Koyré). That means that intuition fails a lot of times when trying to understand the world, also this "common sense" comes sometimes with judgement, something that creates a bias in the way we see things.

Going and seeing beyond in this context means going a step forward, putting your judgment, common sense and intuition aside and really analyzing a situation. We should be doing this for everything that happens around us, question ourselves if the things you are doing, thinking and perceiving are actually correct. This is something very close to the Cartesian Doubt.

The manifesto for Agile Data Science (we should put agile data science workflow here) leads us to this. Iterating, over and over again, rethinking the business process and needs, experimenting a lot, listening what the data has to say, understanding and encouraging the business to understand that the data's opinion must always be included in product discussions, finding a critical path to solve the problem and then organizing the team around completing it, and going further, letting the models solve the problems, of course using our expertise to help them, but not biasing them.

I need to emphasize that this is an agile framework, not that data science is being agile. This is following the words of Dave Thomas one of the creators of the Manifesto for Agile Software Development,

- You aren't an agile programmer—you're a programmer who programs with agility.

- You don't work on an agile team—your team exhibits agility.
- You don't use agile tools—you use tools that enhance your agility.

I'll add:

You are not an agile data scientist - you're a data scientist following a framework with agility.

So after studying the process proposed by Russell and Matt, I found a way of combining them, creating a system that will skyrocket your productivity as a data scientist and adding much more value. I realized that all of the steps that Russell proposed were already a part of the BSPF in some way, I'll make them all clear here.

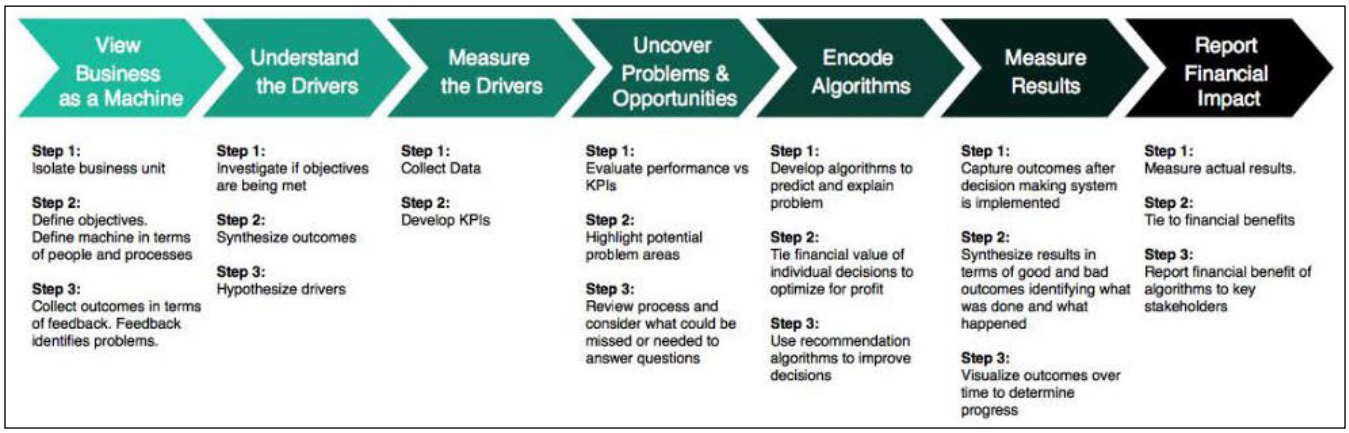
Understanding The Agile Business Science Framework (ABSF)

The BSPF is split into a top and bottom section. The top half contains details of what to investigate while the bottom half contains high level stages of the project. The two sections are integrated, meaning they work together to provide a complete program for managing a data science project in a business context.

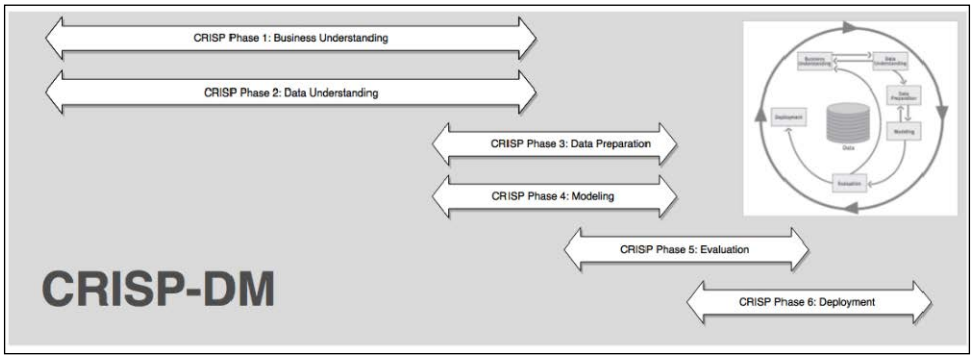
The BSPF has seven phases that are detailed with specific actions focused on understanding the problem and tying the results to Return On Investment (ROI), which is what the organization is keenly focused on:

- View The Business As A Machine
- Understand The Drivers
- Measure The Drivers
- Uncover Problems and Opportunities
- Encode Algorithms
- Measure Results
- Report Financial Impact

And in the bottom there are the six phases of CRISP-DM that are high-level steps for any data science problem:



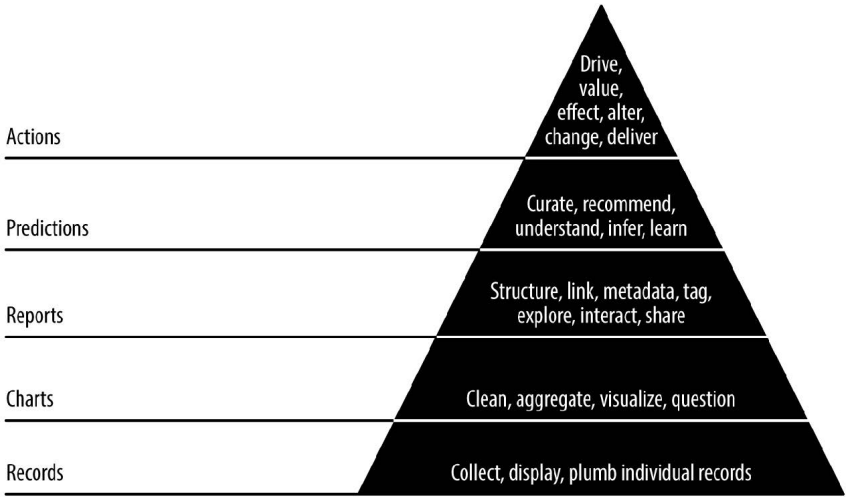
- Business Understanding
- Data Understanding
- Data Preparation
- Modeling
- Evaluation
- Deployment



If you follow this agile methodology and framework is much more likely you'll succeed in your practice.

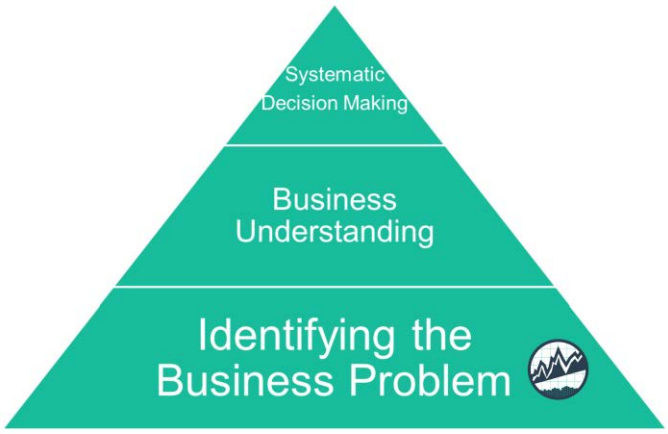
But what about some of the steps that Russell mention?

In his book, Russell talks about something called the "data-value pyramid". It expresses the increasing amount of value created when refining raw data into tables and charts, followed by reports, then predictions, all of which is intended to enable new actions or improve existing ones:



https://www.oreilly.com/ideas/a-manifesto-for-agile-data-science

But wait! Matt also created a pyramid in his methodology. The "Systematic Decision Making Pyramid":



http://www.business-science.io/business/2018/06/19/business-science-problem-framework.html

Agile Data Science Workflow & BSPF Align

If we take a closer look of both pyramids they are actually saying the same things, and have the same hierarchy.

The data-value pyramid gives structure to our work. The pyramid is something to keep in mind, not a rule to be followed. Sometimes you skip steps, sometimes you work backward, making it an interactive process. And the systematic decision making pyramid tells us that we need to understand the business. And, before we can understand the business, we need to identify the business problem to then being able to achieve systematic decision making, but it is also an interactive process, you'll have to go back and forth sometimes.

Both frameworks are the same in one way or another, they are both proven systems that comes from years of work related to data, consulting, teaching and more. I say we need to fully understand both for enabling data science to create intelligence through AI. That's a big sentence.

A Recipe For Artificial General Intelligence

The frameworks presented here are a piece of the story. The full scope of this data and ROI-driven mindset extends to the combination of big data, artificial intelligence, data science and the ABSF. The recipe to create intelligence is not that hard in a high level. This is what I propose we need to achieve it:

Artificial General Intelligence = AI + Big Data + Data Science + Agile Business Science Framework

I'm talking about Artificial General Intelligence (AGI) as the main goal of the data revolution. AGI are general-

purpose systems with intelligence comparable to that of the human mind (or maybe beyond humans). This would be the an amazing solution for solving a business problem.

We need Big Data as a Catalyst to get to AGI, because with more data, plus new ways of analyzing data, plus better software and hardware, we can create better models and better understanding. We need the current state of AI, very close to Deep Learning, Deep Reinforcement Learning and its surroundings for modeling the world, we need Data Science as the controller and science behind this problem solving machine and the Agile Business Science Framework that will enable us to adapt to changes and solve complex business problems in a systematic way.

But what about the ROI part? For this Matt points to the Expected Value Framework (EVF), a framework that connects the models you create to ROI. This framework is tied to the ABSF.

The Bottom Line

The bottom line here is that, in business, the costs associated with false positives and false negatives are rarely equal. In fact, in many cases false negatives are much more costly. A false positive for your research will lead you to believe that your hypothesis is true, when in fact it isn't. And a with false negative you get a negative result, when you should have got a positive result.

The Agile Business Science Framework combined with the EVF allow us to find the optimal threshold that maximizes the expected profit or savings of the business problem. By iteratively calculating the savings generated at different thresholds, we can see which threshold optimizes the targeting approach and will also put our assumptions in check conducting sensitivity analysis, testing the effect of model assumptions on expected profit.

Next Steps

I joined Business Science a little while ago for helping create courses and content for their University. The first course so far, Data Science For Business (DS4B 201 / HR 201) Course has a student satisfaction rating of 9.1/10, and students are learning how to apply data science to business using R code, the Business Science Problem Framework, and more. I'm creating the Python counterpart course with the Agile Data Science Framework right now so if you are interested in that please let me know!

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Performance Analysis of FMCG Sector in India

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Abstract

For the performance analysis of Fast Moving Consumer Goods (FMCG) industry, discriminatory power of financial ratios are examined by using Wilks' lambda and Multiple discriminant function analysis. For this purpose sample of eighteen FMCG companies listed with Bombay Stock Exchange is taken in to account. Market capitalization is taken as basis for selecting these companies. Data is collected for twelve years ranges from 1 April 2006 to 31 March 2017. For effective implementation of discriminant analysis, firstly average stock market returns are computed from the annual stock prices of the selected companies and average stock market returns are classified in to three groups viz. 'Market Under-Performers', 'Market Average-Performers' and 'Market Out-Performers'. It has been found that revenue from operations/share is the most important ratio and having impact to assess the company's market performance. Debt equity ratio and inventory turnover ratio having moderate impact in assessing the company's stock market performance of companies and dividend payout ratio is the ratio having less impact in assessing the company's stock market performance.

Keywords: Multiple Discriminant Analysis, FMCG, Average Stock Market Return, Financial Ratios

Introduction

Indian economy is one of the world's largest and fastest growing economy. Indian businesses are promising about the growth of rural sector. Rural sector is contributing to the growth of Fast Moving Consumer Goods (FMCG) sector. According to the government survey, FMCG is the fourth largest sector in India. FMCG market in India is estimated to grow by US$74 billion in 2018. Changing lifestyles, new economic orders, changing consumer consumption patterns are some of the important factors for driving the growth in this segment. Generation of demand from the rural sector is one of the major contributors to this sector. Government linked Indian rural sector growth with the growth of this sector. Recently rural areas contribute around 16% as against the 12% growth from urban sector. Companies are also making efforts to attract more and more rural consumer by creating products according to their market requirements. Government is also taking various initiatives in order to improve the infrastructure in the rural areas. As with the ease of access in facilities, will give multiplier effect in the FMCG sector. As far as contribution from the urban sector, demand patterns are urban consumer has been changing with the rise in income. With the increasing spending power consumer is shifting its demand to the premium products and companies also started upgrading their premium product range. Digitalization is also playing key role in growth of this sector. Internet users are the major contributors to the growth prospect. Government is also trying to make India as a digital economy. This sector is not only contributing to the growth of country GDP but also helping government in the overall development of the country.

As FMCG is one of the fastest growing sectors. So, many people seek opportunity to invest into the lap of share market. But making investment in the stock market is not always easy because of volatility in the stock market. Investors do not have in depth information about the changing market scenario; investor is able to access financial statements of the company and can execute research about company through Internet. Lack of technical analysis always left investor in to dilemma for making investment in the stock market. To overcome this dilemma, investor tries to seek information from family and friends and try to invest in the popular stock but this kind of decision proves detrimental in the long run. It

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is very difficult for the common man to make rational investment decision for investing in the stock market. There are many internal and external factors because of which investor will not able to follow a disciplined investment approach. For making rational investment decision, lot of credit rating agencies like CARE, ICRA, etc. provides information about the financial instruments, but no information is provided for equity investors. Availability of incomplete information left the investor indecisive for analyzing risk and return relationship. After analyzing all the information, if an investors had made the right investment decision, than he started to time the market and out of anxiety he ended up by panic selling. This led to drain of his hard earned money.

This research paper will analyse the financial ratios and discriminate the performance of FMCG companies on the basis of Ratios. With the help of discriminant analysis, Stock market performance of FMCG companies can be analyzed and classified as Marker Under-Performers, Market Average-Performers and Market Out-Performers. This paper is to test the discriminatory power of the ratios and differentiate companies' performance.

Review of Literature

Theoretical and empirical research suggests financial ratios possess discriminatory power and having impact on stock market performance of companies.

Maricica Moscalu and Georgeta Vintila (2012) conducted research on Business Failure Risk Analysis using Financial Ratios. Purpose of this paper is to investigate the predictive power of financial ratios for a sample of Romanian listed companies. For this purpose t test is applied and result shows financial ratios can discriminate between failed and non-failed companies especially with regard to profitability, financial position and leverage both in 2010 and 2009.

Altman I. Edward (1968), in his paper investigated the relevance of economic and financial ratios for predicting bankruptcy of sixty-six manufacturing concerns by using multiple discriminant analysis. It had been found that traditional ratios are not an analytical tool, while when ratios are combined with discriminant analysis approach than rations are considered to be important tool for discrimination company's performance. The discriminant-ratio model proved to be extremely accurate in predicting bankruptcy correctly in 94% of the initial sample with 95% of all firms in the bankrupt and non-bankrupt groups assigned to their actual group classification.

Khatri Kumar Dhanesh (2016), purposed the to develop a model for predicting corporate failure using financial ratios on the principles of discriminant model. For this purpose sample of two groups of stock broking companies/investment bankers are considered. Group 'A' companies were labeled as 'Healthy Companies' and group 'B' companies were labeled as 'Sick Companies. 20 companies for Group A and 10 companies for Group B listed with NSE for five years are identified. It has been seen that by applying the discriminant model to the financial ratios of Lehman Brothers, Bear Sterns, and Freddie Mac, would have helped in raising an alarm about the bankruptcy of these companies well in advance and acted as 'Whistle Blower.'

Ayinla S. Alayande and Adekunle Kehinde Bashiru (2015), conducted study on the usefulness of discriminant analysis for investigating on various aspects of multivariate research problem. For this purpose component analysis of the 30 ratio set used for the superior 17 and futile 13 firms in Nigeria considered both together and separately. It also developed a simple linear discriminant model for the identification of potential Nigeria bankrupt concerns which uses only accounting statement-based financial ratios as variables. The derived model appeared outperform than the previous model build concerning failed company in Nigeria. Since the model can exhibit true ex ante predictive ability for a period of about 3 years subsequent.

Taffler (1983) claimed there are only four out of eighty potential useful ratios in evaluating the financial performance and financial condition of a company. Green (1978) stated that financial ratios have long been regarded as barometers of corporate health, being used for reporting liquidity, leverage, activity and profitability and that an investor may use financial ratios to appraise a company's performance and its future prospect of success. Koh and Killough (1986) claimed it is not necessitated to have a huge number of ratios to predict business failures but desirable is a set of dominant ratios derived from a larger set of correlated ratios.

Banerjee Sougata and Pawar Sarwat (2013), the primary objective of the study is to identify the potential

customers within the target segment of a brand which will help the marketer to assess the market potentiality by identifying the consumer purchase intention. The secondary objectives include understanding the perception of the existing customers about the brand. For the study, researcher has chosen the brand Cherokee, an Arvind Retail brand of kidswear, and the primary data was collected from Mega Mart Stores in Delhi. The study is based on primary data. Data is collected through questionnaire and for that sample of 100 people as taken as sample. It has been found that discriminant analysis is the useful tool for identifying the potential customer and with the help of this analysis marketer to assess the real market positioning of a brand in terms of the customers' purchase intention. Also marketers can find the market potentiality of their brand in a new market.

Bhunia Amalendu (2011) aims to build up a model to develop the predictive abilities for company failures in a later time frame with different financial, business and operating conditions in the Indian context. A total of sixty-four private sector pharmaceutical companies were analyzed with sixteen financial ratios using multiple discriminant analysis. A strong discriminant function was constructed with seven ratios found to be significant in discriminating power and the classification results showed high predictive accuracy rates of between 86% and 96% for each of the five years prior to actual failure. This study also indicated that even with more advanced statistical tools more popularly used recently, MDA is still a very reliable and potent statistical tool.

Ben Chin-Fook Yap, David Fie-Gun Yong, and Poona Wai-Ching (2010), purposed to develop a model to improve the predictive abilities for company failures in a later time frame with different financial, business and operating conditions in the Malaysia context. A total of 64 companies listed with Bursa Malaysia for ten years were analyzed with 16 financial ratios using multiple discriminant analysis. A strong discriminant function was constructed with seven ratios found to be significant in discriminating power and the classification results showed high predictive accuracy rates of between 88% and 94% for each of the five years prior to actual failure. This study also indicated that even with more advanced statistical tools more popularly used recently, MDA is still a very reliable and potent statistical tool.

Jain Himmath (2003), the study aimed at identifying the financial ratio, which significantly discriminates between Market Under-Performers, Market Average-Performers and Market Out-Performers. Sample of 14 companies cement companies are taken for five years. Six ratios are used to study the discriminatory power of ratios. It was found that dividend payout ratio has a power to significantly discriminate the Market Under-Performers, Market Average-Performers and Market Out-Performers. The other five variables (financial ratios) failed to discriminate across Market Under-Performers, Market Average-Performers and Market Out-Performers. Fourteen companies from cement sector have been selected for five years. Chen and Shimerda (1981) claimed that there are too many (41 ratios) financial ratios to be helpful in evaluating the financial performance and financial condition of a company.

Importance of Study

The study is to find the discriminatory power of ratios and their impact on the stock market performance of FMCG sector in India. This research will help investors for taking rational investment decision and also for the government authorities for designing regulatory norms for the companies of FMCG sector. Moreover, it is also important to analyse the financial performance of the companies for the investors, shareholders, management and Government.

Research Objective

- To examine and make a comparative analysis of performance of selected FMCG companies.
- To find out financial ratios, which have major impact on company's performance in stock market.
- To assess the discriminatory power of most significant ratios.

Research Question

The paper investigates the impact of important ratios on the FMCG company's performance in the stock market. With the help of this discriminatory power of most significant ratios can be assessed and Market Under-Performers, Market Average-Performers and Market Out-Performers can be explained.

Hypotheses

H_0: A selected financial ratio does not discriminate among Market Under-Performers, Market Average-Performers and Market Out-Performers.

$H_{1:}$ At least one Selected financial ratio discriminate among Market Under-Performers, Market Average-Performers and Market Out-Performers.

Research Methodology

Period of Study

The scope of the study is time specific. This study covers period of twelve years ranging from April 1, 2006 to March 31, 2017. For this purpose Annual stock prices are taken in to account for specific period.

Data Collection

This research is based on secondary data. Secondary data is collected from CMIE PROWESS database. Financial information is collected from PROWESS database and through published sources like annual reports from Bombay Stock Exchange website and Money Control website. Other publications like journals, newspapers, magazines, company's websites helps in supplementing the information so collected.

Sample Size

Sample is selected on the basis of market capitalization. Eighteen private sector FMCG companies listed on Bombay Stock Exchange are selected as sample. For selecting sample, only those companies are selected which remain in BSE list for at least three years ranging from 2010–11 to 2012–13.

Tools of Analysis

Companies are classified in to three categories Market Under-Performers, Market Average-Performers and Market Out-Performers in the stock market and multiple discriminant function analysis is used to analyse the selected company's performance. Independent variable is used in the form of financial ratios, to find their impact on stock market performance.

Discriminant Analysis

Discriminant analysis is used in social science research which helps in finding the variables that can discriminate two or more groups. (Altman, 1968) used discriminant analysis in finance and predict corporate bankruptcy. R. A. Fisher (1936) developed the technique of discriminant analysis. This technique is helpful in studying the diff-erences between or among groups. The main purpose of discriminant analysis is to develop the linear combinations of predictor variable, which will discriminate between the categories of the depen-dent variable. With this researcher can easily exam-ine whether significant difference exist among the groups or not. Also accuracy of classification can be evaluated with the help of discriminant analysis. The significance of discriminant analysis is to determine the variables, which contributes for major portion of inters group difference. In discriminant analysis statistical value of the variables discriminant coefficient for each of the significant variables is arrived at which is used to calculate 'Z Score' for each of the observations as well as for each of the groups. 'Z Score' of each of the groups is further used to arrive at a benchmark score called 'Cut Off Point' which serves the basis for assigning new individuals to one of the groups, assuming that it belongs to one of the groups defined a priori.

This paper will analyse the performance of FMCG companies in India. Using multiple discriminant analysis the companies are divided into three groups that are Market Under-Performers, Market Average-Performers and Market Out-Performers in stock market. With the help of discriminant analysis calculating discriminate score and cutoff rate.

Procedure for using multiple discriminate analysis:

D= x+b1x1+b2x2+…..bnvn

D=Discriminant Score

'x' is the constant term, which is in the following table viz 'Canonical Discriminant Function Coefficient'.

b1b2= are the discriminant function coefficient

v1v2=are the Predictor (independent variables)

For analysis, set of variables to be used are identified and then these variables are classified in to three groups that are "Market Under-Performers, Market Average-Performers and Market Out-Performers" among the eighteen FMCG companies in India. Discriminant variable is none but Ratios are used and then by using ratios discriminant coefficients can also be derived. Ratios can be obtained from the financial statements of the sample companies for twelve years ranging from April 1, 2006 to March 31, 2017. Discriminant analysis is combined with financial ratios to construct a model, which can be used for analyzing the performance of stocks of companies selected as a sample.

Procedure for Classification of Under Stock Market Performers, Average Stock Market Performer and Out Stock Market Performers of Selected FMCG Companies in India

A simple test is done for the classification of stock market performance of selected companies. Classification is done on the basis of average stock market returns and for this unadjusted stock price is considered for calculating returns on particular stock. To invalidate the effect of uncontrollable market factors on the stock price, adjusted return is calculated in excess of stock specific return on BSE Sensex. Selected sample companies are classified in to three categorical Groups.

- For categorical group One, Market "Under-Performers", Average market return must be below 10% of benchmark Index.
- For categorical group Two, Market "Average-Performers", Average market return must be between 10% to 15% of benchmark Index.
- For categorical group Three, Market "Out-Performers", Average market return must be above 15% of benchmark Index.

Which means, selected sample companies are divided in to three categorical groups, that is "One", "Two" and "Three", companies whose average stock market returns are below 10% are classified under category "One" and called them as "under" stock market performers, companies whose average stock market return is between 10% and 15% are classified under category "Two" and named as average-performers and companies whose average stock market return is above 10% to 15% are classified under this category Three and named as Out performers. With the help of this classification, weights in the form of 1, 2 and 3 on the basis of average stock market returns are assigned to each company in the sample. The entire sample is classified in to three mutually exclusive categories.

Table 1: Categorization of Sample FMCG Sector Companies on the Basis of Average Stock Market Returns

S.No	*Company's Name*	*Average Stock Market return*	*Performance Groups*
1.	ITC	0.036576	1
2.	Nestle India	0.175633	3
3.	Dabur	0.078561	1
4.	Britannia	0.133007	2
5.	Procter and Gamble	0.217445	3
6.	Marico	-0.0469	1
7.	Colgate Palmolive	0.094251	1
8.	Godrej Consumer	0.172428	3
9.	Pidilite	0.181853	3
10.	Wipro	-0.05973	1
11.	Future consumer	0.352787	3
12.	United breweries	0.163702	3
13.	GlaxoSmithKline	0.224093	3
14.	Emami	0.147403	2
15.	Tata Global Beverages	-0.075	1
16.	United spirits	0.131517	2
17.	Jubilant Food works	0.14816	2
18.	Himalaya International	0.088413	1

Wilks' Lambda

Wilks' lambda is multivariate statistic, which is used to test the significance of the variable in discriminant function. Wilks' lambda is used for stepwise approach. It is the ratio of within-groups sum of squares to the total sum of squares. It plays the same role as F-Test plays in the one way of analysis of variance. Wilks' lambda depicts the values of two or more variables. Wilks' lambda is closed to zero, than that variable contributes to the discriminant function. It can also be derived from 1- canonical correlation. Wilks' lambda is a direct measure of the proportion of variance in the combination of dependent variables that is unaccounted for by the independent variable (the grouping

variable or factor). If a large proportion of the variance is accounted for by the independent variable then it suggests that there is an effect from the grouping variable and that they have different mean values.

Table 2: Wilks' Lambda

Step	*Number of Variables*	*Lambda*	*df1*	*df2*	**df3**	***Exact F***			
						Statistic	*df1*	*df2*	*Sig.*
1	1	.816	1	2	213	24.052	2	213.000	.000
2	2	.723	2	2	213	18.670	4	424.000	.000
3	3	.682	3	2	213	14.810	6	422.000	.000
4	4	.650	4	2	213	12.638	8	420.000	.000

Wilks' lambda shows the percent variance in dependent variables which is not explained by differences in levels of the independent variable. Wilks' lambda depicts the values of two or more variables. At each step, the variable that minimizes the overall Wilks' lambda is entered. Table 2 presents univariate ANOVA which is carried out for the ratios in the form of predictor variable. SPSS has grouped the data in to three groups that is Under, Average and Out performers. Observations are distributed in to different groups by the group statistics. The function indicates the first canonical linear discriminant function. In present study, it can be seen in Table 2, lambda shows the values of each variables in the model, df3 shows total number of observations that is 213 which is 99% of the total observations viz. 216. 213 observations are grouped in to three categories for discriminant analysis. df1 shows the number of important predictor variables are used for discriminant function and df2 values shows the numbers allocated to the predictor variables. On the other side, F-statistic is used to test significance of MANOVA and statistics shows that it is significant, as insignificant values are not considered by F-statistics.

Wilks' lambda tests the level of contribution of predictor variable to the model. The range of scale for this is o to 1, 0 means total discrimination and one means no discrimination. Smaller the Wilks' lambda, the more important is the variable to the discriminant function. Wilks' lambda is significant by the F test for all independent variable. F-statistics values are used to test the significance and in table 2 it can be seen that these four predictor variable are significant and has the discriminatory power, which helps in analyzing the stock market performance of the companies.

Summary of Canonical Discriminant Functions

Canonical discriminant function reflects the joint contribution of the variables to the function (Rencher, 1992). It does not show the effect of individual variable but it shows the influence of individual variable in presence of the other variable. So, it is linear combination that separates group of observations. Canonical correlation shows correlation between weighted linear composite and multiple predictor variable.

Eigen Value

Eigen value provides statistics of between and within group variability for the predictor variable. In simple words, Eigen value is linear mapping of distortion induced by the transformation. Eigen values are related with canonical correlations and explains the discriminating ability of function. The canonical correlation is the measure of association between the discriminant function and the categorical. Percentage of variance in categorical is explained by the square of canonical correlation coefficient. The larger the Eigen value, the more is the variance explained by that function in dependent variable.

Table 3: Eigen Values

Function	*Eigen Value*	*% of Variance*	*Cumulative %*	*Canonical Correlation*
1	.392[a]	78.8	78.8	.531
2	.106[a]	21.2	100.0	.309

Table 3 shows that first 2 canonical discriminant functions were used in the analysis. With the help of

SPSS, it can be seen that there are two functions; since there are three discriminating variables are used in the research and number of functions depend on the number of used discriminating variables. The maximum number of discriminant functions generated by the total number of groups minus one, here it can be 3-1=2 discriminating functions. With the help of function best discriminant between the groups can easily be assessed. As already stated Higher the Eigen value, better it is. Table 3, shows that function 1 Eigen value is greater than function 2 and % of variance depicts the discriminating ability of all the three groups. As there are two function and we can see function one is higher % of variance than the function 2, but cumulative % represents the current and proceeding cumulative total of the % of variance. Canonical correlations are the multiple correlations between the predictors and the discriminant function. One is considered to be perfect value for canonical correlation, Higher or closer to one considers being the best fit value for the discrimination. Here, it can be seen that value for the function 1 is higher than the function 2, but value for function 1 is 0.531 is comparatively low from the ideal value one, but higher than the function 2.

Table 4: Wilks' Lambda

Test of Function(s)	*Wilks' Lambda*	*Chi-square*	*df*	*Sig.*
1 through 2	.650	91.237	8	.000
2	.904	21.234	3	.000

Wilks' lambda is the proportion of the total variance in the discriminant scores not explained by differences among groups. Table 4 shows the significance of Wilks' lambda and significant values are 0.000 for both the function, which means that both the functions are significant. So, we can use both the functions for analysis. For better results Wilks' lambda value should be smaller and function one value is smaller than the function Two. Small Wilks' lambda occurs only when within group variability is small as compared to total variability. Chi-square value is also higher in function one as compare to function two with the eight degree of freedom. Here, we can see Wilks' lambda is 0.650 and 0.904, which means that group means differ. Also here we can conclude from Wilks' Lambda that function one is to be considered for the further analysis.

Table 5: Standardized Canonical Discriminant

Function Coefficients	*Function*	
	1	*2*
Revenue from Operations/Share (Rs.)	.938	-.321
Total Debt/Equity (X)	.435	.564
Dividend Payout Ratio (NP) (%)	-.469	.169
Inventory Turnover Ratio (X)	.007	.714

Observing the Comparative Significance of Each Predictor Variable

The standardized canonical discriminant function coefficients Table 5 indicates the significant importance of each independent variable. The interpretation of standardized coefficients is similar to multiple regressions. The standardized discriminant function coefficients should be used to assess the importance of each independent variable's unique contribution to the discriminant function. More difference among coefficients of variables depicts that there might be difference in mean among groups. With the help of coefficients, it can be easily identified that which variable bears more discriminating power than the other variable. Higher standardized discriminant coefficient means higher discriminating power, that variable possesses. If we analyse the values of function one, than revenue from operations/share is the strongest predictor variable with the highest coefficient of 0.938, which is followed by total debt equity, inventory turnover ratio and dividend payout ratio. This shows that revenue from operations/share is the most significant ratio, bearing impact on stock market performance of FMCG sector selected companies.

Table 6: Unstandardized Canonical Discriminant Coefficients

Function Coefficients	*Function*	
	1	*2*
Revenue from Operations/Share (Rs.)	.004	-.001
Total Debt/Equity (X)	.522	.677
Dividend Payout Ratio (NP) (%)	-.016	.006
Inventory Turnover Ratio (X)	.000	.035
(Constant)	-.465	-.676

Unstandardized canonical discriminant function is used to calculate Z-score. Formulating discriminant function on the basis of standardized canonical discriminant coefficients. Since function 1 coefficients are used to ranking the variables because of their highest discriminating power. Coefficients of function 1 are also used for calculating discriminant score.

Procedure for using multiple discriminate analyses:

D= x+b1v1+b2v2+…..bnvn

D=Discriminant Score

'x' is the constant term, which is in the following table viz 'Canonical Discriminant Function Coefficient'.

b1b2= are the discriminant function coefficient

v1v2=are the Predictor (Independent variables)

Where,

D = -0.465 + 0.004 (Revenue from Operations/Share) + 0.522 (Total debt/Equity) -0.16 (Dividend Payout Ratio) + 0.000 (Inventory Turnover Ratio).

It can also be seen that unstandardized canonical coefficients follows the same pattern as standardized coefficients.

On the basis of above coefficients, following table shows the ranking of significant predictor variable.

Table 7: Ranking of the Predictor Variables

Ranking of the Variable	*Predictor Variable*
1.	Revenue from Operations/Share (Rs.)
2.	Total Debt/Equity (X)
3.	Inventory Turnover Ratio (X)
4.	Dividend Payout Ratio (NP) (%)

Table 7 shows the ranking of the independent variables, according to their discriminatory power to analyse the stock market performance of the companies. This ranking is done on the basis of function one only, as function one is more significant for analysis than the function 2 (ref. Table 5 and 6).

Table 8: Structure Matrix

Function Coefficients	*Function*	
	1	*2*
Revenue from Operations/Share (Rs.)	.735*	-.361
Book Value [ExclRevalReserve]/Share (Rs.)[b]	.612*	-.286
Dividend Payout Ratio (NP) (%)	-.294*	-.113
Retention Ratios (%)[b]	.186*	.141
Return on Net Worth / Equity (%)[b]	-.122*	.116
Net Profit Margin (%)[b]	-.111*	-.026
EV/EBITDA (X)[b]	-.093*	.043
Current Ratio (X)[b]	-.063*	-.030
Earnings Yield[b]	-.043*	-.024

The standardized canonical discriminant functions disclose the pooled within-groups correlations between discriminating variables. With the help of structure matrix correlations can be compared easily and can be assessed that how closely variable is related to each function. Values of function 1 and 2 in structure matrix are computed by pooled within 'groups' correlations between discriminating variables and standardized canonical discriminant functions variables ordered by absolute size of correlation with in function. Values with * represents the values which shows the largest absolute correlation between each variable and any discriminant function.' b' denotes the variables not used in the analysis. In present research it has been seen that there were eleven predictor variables were considered and only four variables possess the discriminating power and having impact on the stock market performance of the selected sample companies. Structure matrix represents the correlations between the observed variables and the dimensions created with the unobserved discriminant functions. Usually variables correlation value 0.3 or more is considered significant. In the structure matrix, it can be easily seen revenue from operations/share, debt equity ratio plays significant role in discriminant function analysis.

Structure matrix reveals that pattern of variables in matrix and pattern of variables in canonical discriminant function is same.

Table 9: Functions at Group Centroids

Performance Group	Function	
	1	2
1.0	-.669	.208
2.0	.967	.336
3.0	.116	-.400

Table 8 represents standardized discriminant function evaluated at group means. Group centroids are called canonical observation means. The extreme point to formulate the decision rule is centroids. A function at group centriod indicates the average discriminant score for three performance groups. For classifying observations, predictive power of canonical discriminant function depends on the larger difference between the canonical group means.

Classification Statistics

Table 10: Prior Probabilities for Groups

Performance Group	Prior	Cases Used in Analysis	
		Unweighted	Weighted
1.0	.333	84	84.000
2.0	.333	48	48.000
3.0	.333	84	84.000
Total	1.000	216	216.000

The starting point of this research is the distribution of observations in to performance groups. Table 10, prior probabilities for groups shows the performance groups and number of observations used for discriminant analysis. The total number of observations used for analysis are 216. Out of 216 observations 84 observations are allocated in performance group one, 48 observations are allocated in performance group two and lastly, 84 observations are allocated in performance group three. Centriod value is calculated with the help of weighted value. As under-performers, average-performers and out-performers group are not equal, so dividing points need to be calculated.

The dividing rule:

Mean values of group centroids.

Centriod values of function 1 from performance group 1, 2 and 3 are -0.669, 0.967 and 0.116.

Mean values 0.149 and 0.5415

Table 11: Classification Function Coefficients

	Performance Group		
	1.0	2.0	3.0
Revenue from Operations/Share (Rs.)	.000	.006	.003
Total Debt/Equity (X)	.639	1.579	.637
Dividend Payout Ratio (NP) (%)	.052	.027	.036
Inventory Turnover Ratio (X)	.045	.050	.024
(Constant)	-2.574	-3.700	-2.369

It represents the Fisher's linear discriminant functions. Classification functions are called linear discriminant function for each observations. Coefficients helps in depicting the discriminatory power of the independent variables and by comparing the coefficient values it can be easily assessed that which variable plays important role in analyzing the stock market performance of the sample selected companies. After analyzing the performance group coefficients, total debt equity ratio is the most significant ratio with the highest discriminating power due to higher coefficient 0.639 of Total debt equity ratio from the Group one and this is followed by dividend payout ratio (NP), inventory turnover ratio and revenue from operations/share. If we analyse performance group 2 than total debt equity ratio coefficient of 1.579 is highest and is followed by inventory turnover ratio, dividend payout ratio (NP) and Revenue from operations/share. From the performance group 3, 0.637 is the coefficient value for Total debt equity ratio is the highest among all other variables from the respective performance group. Overall analysis of Fisher's linear discriminant function shows that total debt equity ratio in all the three performance groups plays significant role and having impact on stock market performance of FMCG companies. All these four ratios have the discriminatory power to analyse the performance of FMCG sector in India.

Table 12: Classification Results

		Performance Group	*Predicted Group Membership*			*Total*
			1.0	*2.0*	*3.0*	
Original	Count	1.0	62	3	19	84
		2.0	14	32	2	48
		3.0	30	17	37	84
	%	1.0	73.8	3.6	22.6	100.0
		2.0	29.2	66.7	4.2	100.0
		3.0	35.7	20.2	44.0	100.0

a. 60.6% of original grouped cases correctly classified.

After observation from Table 12, 60.6% Data is correctly classified in to three groups that is under-performers, average-performers and out-performers by discriminant function analysis. From the performance group one that is Market Out-Performers, there are 84 observations in total and out of these 84 observations, 62 observations are correctly classified as 'Market Under-Performers', 3 and 19 observations wrongly classified under performance group 2 and 3. Similarly, In performance group 2 that is 'Market Average-Performers', there are 48 observations in total and out of 48 observations, 32 observations are correctly classified as Market average-performers, 14 and 2 observations are wrongly classified under performance group 1 and 3. Lastly, there are 84 observations in performance group 3 that is 'Market Out-Performers' and out of these 84 observations 37 observations are correctly classified under performance group 3, 30 and 17 observations are wrongly classified under performance group 1 and 2.60. 6% correctly classified data means that model is accurate and provide adequate results, which means the model has capacity to predict the performance of the company in the stock market.

Conclusion

The research is to examine and make the comparative analysis of selected companies and to find the important set of financial ratios which bears significant impact on FMCG companies listed with Bombay Stock Exchange in India, performance in stock market. For achieving the objective of this research paper, Wilks' Lambda and multiple discriminant function analysis model is used. sample of eighteen FMCG companies listed with Bombay Stock Exchange is taken in to account. Market capitalization is taken as basis for selecting these companies. Financial data for the companies are taken from CMIE prowess and money control website and stock market return data of selected companies is collected from Bombay Stock Exchange. Data is collected for twelve years ranges from 1 April 2006 to 31 March 2017. For effective implementation of Discriminant analysis, Firstly Average stock market returns are computed from the annual stock prices of the selected companies and average stock market returns are classified in to three groups (Table 1) viz. 'Market Under-performers', 'Market Average-Performers' and 'Market Out-Performers'.

As explained earlier, paper focuses on the finding the important sets of financial ratios, so financial ratios are taken as predictor or independent variable. With the help of ratios relationship between financial ratios and stock returns can easily investigated. Group statistics shows the distribution of observations in to three performance groups. It shows the identified predictor variables in the form of ratios which are used for the discriminant analysis. Eleven ratios viz. book value, revenue on operations/share, net profit margin, total debt/equity ratio, inventory turnover ratio, return on net worth/equity, dividend payout ratio (NP), current ratio, retention ratios, earning yield ratio, EV/EBITDA are taken in the form predictor variable but only four ratios are used in analysis that are Total debt/equity ratio, inventory turnover ratio, dividend payout ratio (NP) and, revenue on operations/share. To check the statistical significance of MANOVA, F-statistic is used and Table 2 shows that F-statistics shows that it is significant, as insignificant values are not considered by F-statistics. The model shows good enough Eigen values after testing and it also shows the significance of Wilks' lambda and significant values are 0.000 for both the function, which means that both the

functions are significant. The analysis of the model shows that 60.6% of original grouped cases correctly classified. Correctly classified data means that model is accurate and provides adequate results, which means the model has capacity to predict the performance of the company in the stock market. standardized canonical discriminant function helps in providing the ranking of the predictor variables according to their significance. From the canonical coefficients, it has been observed that revenue from operations/share is the most significant variable with the highest coefficient of 0.938 and this followed by total debt/ equity ratio, inventory turnover ratio and dividend payout ratio (NP). Centriod values are used to calculate Z cut off rate viz. 0.149 and 0.542. Decision rule classification will be as under:

Predict and classify as Market Out-Performers, if discriminant function value is more than 0.149.

Predict and classify as Average Market-Performer, if discriminant function value is between 0.149 and 0.542.

Predict and classify as Under Market-Performer, if discriminant function value is less than 0.542.

This shows that 60.6% original groups are classified correctly, which indicates that a good predictive capacity of discriminant function. Discriminant model has the capacity to estimate the potential to classify the companies in Market Under-Performers, Market Average-Performers and Market Out-Performers.

In Nut shell, it has been found that on the basis of ratios comparative analysis of company's performance can be done and discriminant function analysis help in realizing the significant financial ratios, which have major impact on company's performance in stock market. Revenue from operations/share is the most important ratio and having impact to assess the company's market performance. Debt equity ratio and Inventory turnover ratio having moderate impact in assessing the company's stock market performance of companies and Dividend payout Ratio is the ratio having less impact in assessing the company's stock market performance. Discriminant analysis shows that out of eighteen sample selected companies from FMCG sector, Seven companies that are ITC, Dabur, Wipro, Marico, Tata Global Beverages, Colgate Palmolive and Himalaya International ltd. are classified in to Performance Group one that is 'Market Under- Performers'. Britannia, Emami, Jubilant Food Work and United Spirits are classified in to performance group two that is Market Average-Performers and Nestle India, Procter and Gamble, Godrej consumer Ltd, Pidilite, Future Consumer ltd, GlaxoSmithKline and United Breweries are classified in to Performance group three that is Market Out-Performers.

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Developing Interpretive Structural Model of Consumer Responsiveness Towards Advertisement

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Abstract

Consumer responsiveness is highly dynamic and volatile in nature. In past studies, there have been numerous variables identified however soon it was understood that the final implication of communication on responsiveness is consequence of interaction and connection between these elements. Marketers in present world have been facing challenges in terms of understanding the relationship between these elements. This study will focus, explore and explain how the marketing of the product can be made more effective and efficient. This study becomes more important because it categorise the critical factors thus making things easier to plan for better marketing of the product. This study explains the sequential approach of marketing with relevance of each of the factor. This study will quantify level of exposure of advertisement that compel consumer to buy product. The methodology focuses on ISM modelling to identify and summarizing relationship between various specific variables, defining the problem. This technique is best suited to deal with the complex situation and finding out their solution. In the present study, main focus would be on the different factors that are responsible for change in responsiveness of customer towards any advertisement. After review of various studies and customer opinion on the survey various factors will be identified and ISM modelling is done to predict relationship between various variables.

Keywords: Consumer Responsiveness, Structural Self-Interaction Matrix, Level Partition, Interpretive Structural Modelling, MICMAC Analysis

Introduction

In this competitive period, to get edge over competitors is not simple. With the wide utilization of innovation, firms have expanded their effort for their potential clients. There are various methodology and ideas that are being utilized for conveying reason by different means of communication. Advertising world has grown rapidly, not in numbers but in tools and techniques and has adopted various strategies. Now-a-days, advertisement plays crucial part in building brand name, attaching values that associate it with consumer as well as with certain meaningful purpose like generating loyalty among customer towards brand. Thus, it become very important to understand the basic concept involved in advertising the product. The best known among professionals is the Attention, Interest, Desire and Action (AIDA) model, which can measure the effectiveness of the advertisement. The AIDA display has been generally received in figuring advertising procedures in business. AIDA in context to advertisement indent to align consumer mindset to buy the products. Each of the phases has its own unique value and variables. All phases work in consecutive manner and the variation is led by the interaction between the variables. These variables are consumer-driven or -related that control the phase results and affects the buy intention of the consumer. Consider, the first phase 'attention' which engages consumer with product introduction, various features and utility. It can include the product demonstration as well as the product variations. The basic fundamental on which attention works is to understand the consumer needs and develop relation such that product seems to be solution of the needs. The second phase 'Interest' is developed with the extension of the relation develops in attention phase. Interest illustrates the product features to address the needs as well as other benefits in comparison to the other product in competition. These features can be either technology driven or strategic concept offerings to engage consumer with the brand and product. Further, the Desire phase is crucial because it consider the both sides, i.e., consumer expectation and socio-economics status of the

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consumer along with the features and benefits of buying product. The last phase 'Action' is based upon the fact the consumer feels that the paid amount for the product is either equivalent or less than the worth of the features of the product. This phase focuses on the buying intention for the product.

This core concept of the marketing, that consumer responsiveness is outcome led by the communication. Consumer insights lay basis for the consumer responsiveness, is basically govern by all the prior knowledge and experience gained self or the one whom they trust. Considering especially advertisement which is develop and design to be in captive in nature so that it leaves never ending influence on consumer which bring change in behaviour and attitude of consumer. Consumer insights may include any conclusion, inference, perception or certain belief derived from information after self-analysis done by customer. In the present era, understanding the consumer insight and factors affecting them are cardinal for the marketers not because this will lead to revenue generation but also help them to sustain in the market adverse and fluctuating conditions.

As per prior studies conducted, it was revealed that there are certain crucial factors associated with the advertisement that not only fulfil consumer basic need but also catches their attention to make them feel that they had made right choice and they are getting best offer. These factors are directly linked to the basic mindset of the consumer, thus makes huge impact the on the consumer insights. These factors are behind the analytical thought processes which result into formulation in consumer insight for purchasing of any product. Thus understanding these factors and their influence is foremost to develop marketing strategies.

Among these variables, the first to talk about firms association with the consumer which is totally in light of the related knowledge, trust and prior experience. The significance of trust as a complex and multi-faceted develop, and its part in encouraging commitment and offer receptivity, ought to be perceived as the aggressive centre of promoting exercises [1]. Product features and prices are choice factors utilized by advertisers to impact the product evaluation and buy practices of potential clients [2]. Purchase intention is shown to be absolutely influenced by perceived price that mediates the influence of perceived value and perceived quality [2]. Purchase intention is directly influenced by product price and features [2].

It is important to acknowledge the chance of post-purchase effects whereby data from advertising is integrated with direct expertise once use [3]. Marketing experts trust that any news scope of a promotion will expand the buyer desire for product and in addition augment the awareness [4]. At the point when individuals have enthusiasm for advertisements, they prone to focus on promotions and assemble more information about the item [4]. Prior investigations have exhibited that the meeting impacts of emotions of consumer in interceding the connections between commercial advertisement and state of mind toward promotion and product features [5]. These are the essential factors that planned to impact the buyer mentality for purchasing a specific item. There can be numerous other auxiliary variables supporting these factors specifically or in a roundabout way.

Another concern that must be taken into account is complexity of the systems and their associated problems. The complexity arises mainly due to presence of various variables and their relationship with each other. These relationships hinder the clear understanding of the system as well as their problem. Thus, it becomes difficult to deal with such situations. The methodology used to identify actual structure of the system is Interpretive Structural Modelling (ISM).

Interpretive structural modelling is a well-established methodology for identifying relationships among specific items, which define a problem or an issue. This methodology is interpretive as the judgment of the group decides whether and how the different elements are related. It is structural on the basis of mutual relationship; an overall structure is extracted from the complex set of elements. It is a modelling technique, as the specific relationships and overall structure are portrayed in a digraph model. However, the direct and indirect relationships between the factors describe the situation far more accurately than the individual factor taken into isolation. It helps to impose order and direction on the complexity of relationships among various elements of a system. Therefore, ISM develops insights into collective understandings of these relationships**.**

Review of Literature

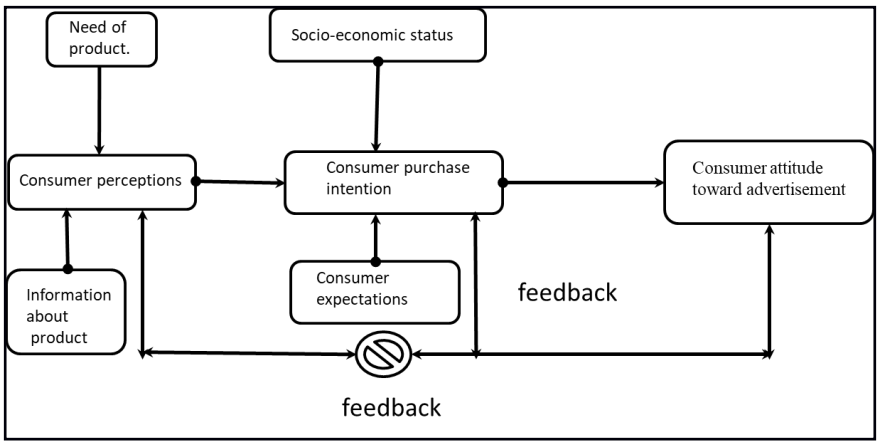
S. No.	Name of the Author(s)	Year of Publication	Title of the Paper/Journal	Tools and Techinque	Objectives	Findings	KEY INSIGHTS
1.	Keith P. Fletcher and Linda D. Peters	1997	Trust and Direct Marketing Environments: A Consumer Perspective	Analytical research e.g. Factor analysis	Trust leads to loyalty toward firm, trust make difference in the consumer buying behaviour.	Trust is important building relationship with customer.	Trust is crucial factors
2.	Tung-Zong Chang and Albert R. Wildt	1994	Price, Product Information, and Purchase Intention: An Empirical Study	ANOVA, CHI-Square fit test	Prior information and interest leads to attention which makes difference in consumer buying behaviour.	Interest, attention and value of product, retention of ad in memory effect consumer decision process.	Product details develop interest which seeks attention of the customer thus effect buying behaviour
3.	Robert E. Smith	1993	Integrating Information from Advertising and Trial: Processes and Effects on Consumer Response to Product Information	Analytical research	Brand loyalty does not get differentiate for positive and negative trial group.	Pre- and post-purchase effects reflect the consumer association with product.	Post-purchase effects reflect the experience and expectation of the customer, both of which are crucial in consumer buying behaviour.
4	Hyun Seungjin	2003	Compounding Consumer Interest Effects of Advertising Campaign Publicity on the Ability to Recall Subsequent Advertisements	Analytical research	Perceived price are influenced by objective and internal reference price, further influenced by product details. The buying intentions are influenced by consumer perception	A relationship exists between perceived price and internal reference price. perceived price and perceived quality leads to perceived value, which induces purchase intention.	The socio-economic backgrounds of the customers have direct influence on the purchase of the product based on perceived price and quality.
5.	Morris B. Holbrook and Rajeev Batra	1987	Assessing the Role of Emotions as Mediators of Consumer Responses to Advertising	Analytical research	To find out the role of evoke emotions in consumer response	Consumers are mediators to generate consumer response.	Emotion evoked to customer via information of the product feature impact decision making
6.	Shahizan Hassana, Siti Zaleha and Ahmad Nadzim	2014	Strategic Use of Social Media for Small Business Based on the AIDA Model	Qualitative research	Guideline for small business entrepreneurs on how to strategically use social media for marketing	The model can be applied in strategizing the use of social media for marketing purposes.	Variable analysis in AIDA can be used in preparation of market strategy and advertisement.

S. No.	*Name of the Author(s)*	*Year of Publication*	*Title of the Paper/Journal*	*Tools and Techinque*	*Objectives*	*Findings*	*KEY INSIGHTS*
7.	Alina Irina Ghirvu	2013	The AIDA Model for Advergames	Qualitative research	Searching for new ways to communicate, to understand consumers' purchasing behaviour by interpreting the AIDA Model in the context of online advergames.	Theoretical way focuses on identifying different connections between adver game and player interaction in the online environment. Practical way, focuses on measuring the impact of adver games on consumers	The interpersonal relationship of variables can be of 2 types direct and indirect and the both types play their significant roles.
8.	Priyanka Rawal	2013	AIDA Marketing Communication Model: Stimulating a Purchase Decision in the Minds of the Consumers through a Linear Progression of Steps	Qualitative research	An ad would be effective only if consumer accept and understand the message and persuade to buy. communication via TV has evolved to be great success	With time advertising have becomes competitive and sophisticated. Yet the basic remain intact which is to seek attention.	Every cognitive state of consumer mind is important and the decisions are based upon these phases. There is specific sequence that converts the awareness into action of buying product.
9.	Nailya Bagautdinova, Ilshat Gafurov, Nataliya Kalenskaya and Aida Novenkova	2012	The Regional Development Strategy Based on Territorial Marketing	Qualitative research	Implementation of active Organizational and economic changes in Russia's regions will lead to stabilization and subsequent growth of the national economy and social development.	Without trust, there is no investment and production development. Without the production development there is no economic growth.	Every systems functionality is based upon certain factors, to understand the complexity and system it is important to go through these variables
10.	Jiangyu Li and Haibo Yu	2013	An Innovative Marketing Model Based on AIDA: A Case from E-bank Campus-Marketing by China Construction Bank	Descriptive analysis	New model will greatly improve marketing efficiency of e-bank services from CCB at university market, and it also unfolds a new perspective in marketing of the enterprises.	Convert rate of AIDA at each stage could be improved greatly in target market.	AIDA reflect the mindset of consumer, running this model with respect to specific aim can be beneficial

S. No.	Name of the Author(s)	Year of Publication	Title of the Paper/Journal	Tools and Techinque	Objectives	Findings	KEY INSIGHTS
11.	Rajesh Attri, Nikhil Dev and Vivek Sharma	2013	Interpretive Structural Modelling (ISM) Approach: An Overview	Descriptive research	To provide the facts and worthiness of ISM	ISM laid basis to understand the complexity of systems and relationships between various variables.	ISM and framework methodology is an effective measure to inter-relationship between variables
12.	M.D Singh, R. Shankar, R. Narain and A. Agarwal	2003	An Interpretive Structural Modelling of Knowledge Management in Engineering Industries	analytical research	To justify the accountability of ISM method	The engineering industries is based on various factor the play their roles in co-ordination	Authenticate valid analytical methodology is required to understand any systems.
13.	Bambang Sukma Wijaya	2012	The Development of Hierarchy of Effects Model in Advertising	Conceptual framework (explorative research)	To study roles of various factors associated with advertisement	AISDALS Love model is evolved on the basis of AIDA model	Attention, interest, desire and action are the basic factors that govern any advertisement.
14.	Roger Crisp	1987	Persuasive Advertising, Autonomy, and the Creation of Desire	Qualitative research	To study the impact of persuasive advertising in creating desire for the product	Heavy persuasive advertising is not a sign of quality.	Persuasive advertising can be effective but only for the short time span. Value creation can be utilized as long term advertising tool.
15.	Thomas E. Barry and Daniel J. Howard	1990	A Review and Critique of the Hierarchy of Effects in Advertising	Review article	To understand just how advertising influences buyers' purchase decisions	The consecutive effects in customer's cognition are larger in number and their intensity for the implication varies	Attention, interest, desire and action are the basic factors that govern any advertisement.
16.	David Glen and Mick Clausbhul	1992	A Meaning- based Model for Advertising Experiences	Qualitative research	To understand and emphasize on the factor that decide the meaning of ad to customer.	The interpretation and connotations regarding ads vary from one consumer to another.	Consumer's need for the product is involved in generating interpretation of ads information.
17.	Hans-Christian Pfohl, Philipp Gallus and David Thomas	2011	Interpretive Structural Modelling of Supply Chain Risks	Analytical research	To study the structural analysis of potential supply chain risks	ISM was proven as a useful methodology to structure supply chain risks.	ISM was used to identify inter-relationships among supply chain risks and to classify the risks according to their driving and dependence power

S. No.	*Name of the Author(s)*	*Year of Publication*	*Title of the Paper/Journal*	*Tools and Techinque*	*Objectives*	*Findings*	*KEY INSIGHTS*
18.	John A. Bargh	2002	Losing Consciousness: Automatic Influenceson Consumer Judgment, Behaviour, and Motivation	Descriptive analysis	To study trends and developments in automatic and nonconscious research in social cognition, consider their relevance to consumer behaviour, and then consider their implications for future directions in consumer research.	Consciousness is centric to attention and interest and indirectly effect decision making	Consciousness as integral part of attention play vital role in selecting the judgment, behaviour and motivation of the consumer toward product
19.	Morris B. Holbrook and Elizabeth C. Hirschmen	1982	The Experiential Aspects of Consumptions: Consumer Fantasies, Feelings and Fun	Descriptive analysis	To study and analysis the various facts associated with consumer feeling and fantasies for the product	The consumer behaviour includes fantasies and various complexities which arise due to the interaction of the consumer with the advertisement stimulus.	Consumer behaviour is highly complex thus require an approach which can simplify this system complexities e.g. ISM
20.	Frank R. Kardes, Steven S. Posavac and Maria L. Cronley	2004	Consumer Inference: A Review of Processes, Bases, and Judgment Contexts	Descriptive analysis	To study the various kind of the inferences consumer may form as per advertisement.	From the framework 8 types of inferences are possible and a wide variety of information, ranging from specific attributes and cues to general categories and schemata, can be linked to these inferences.	The consumer decision is not based upon single information rather it depend upon the various information and interpretation.
21.	Victoria K. Wells	2014	Behavioural Psychology, Marketing and Consumer Behaviour: A Literature Review and Future Research Agenda	Review article	To understand how psychology developed and influence in marketing and consumer behaviour.	Focused on advertising to more recent approaches.	New approaches such as ISM must be used to simplify the complexities associated with consumer psychology and its interaction with other factors.

Conceptual Framework



Defining and designing the framework for the study is one tedious and time consuming step. In past, there exists large number of studies that suggests numerous factors are responsible for consumer responsiveness and alternation in buying behaviour. Although, the framework of this study kept simple and mostly covers all factors concluded via prior studies, there exist some of the factors which ought to be taken into consideration individually. This framework is based upon the feedback mechanism. Each factor has its own interaction with other factor and passes their effect on other interaction. This happens through chain effect which ultimately concludes to consumer responsiveness and change in consumer buying behaviour. There are certain factors which lay basis for the framework and are totally depended upon the personality of consumer. The back bone of the framework is the consumer insights which include mainly consumer perception, any inference and logic. A consumer insight is based upon prior experience and knowledge acquire about the product as well as its association with the manufacturer in terms of trust. Any advertisement is made to seek attention, develop interest, persuade desire and lastly leads to purchasing of the product. All of these factors are arrange themselves in the supporting and similar manner mention above. As per the marketing strategies suggests that consumer have basic need which he looks for in any advertisement but it's the advertisement development and presentation that not only fulfil his basic need but also give him extra benefits which result into attention seeking. To seek attention product specification and information is associated with the basic need along with the input from the experience as feedback. Interaction at this level will impact the interaction of factors for developing the interest. At the next level, various factors like socio- economic cause and consumer expectation and purchase intention are influencing the overall equation of the system. Their final output will impact the later stages which is attitude toward buying and overall responsiveness of the consumer. This study is trying to test this basic framework with the help of consumer insights and sample advertisement.

Research Methodology

ISM approach starts with defining the problem, an identification of variables, which are relevant to the problem or issue. Then a contextually relevant subordinate relation is chosen. Having decided the contextual relation, a Structural Self-Interaction Matrix (SSIM) is developed based on pairwise comparison of variables. After this, SSIM is converted into a Reachability Matrix (RM) and its transitivity is checked. Once transitivity embedding is complete, a matrix model is obtained. Then, the partitioning of the elements and an extraction of the structural model called ISM is derived.

Objectives of the Study

This study primarily focuses on the identification of factors affecting consumer responsiveness toward advertisement, to create ISM model for factors responsible affecting consumer responsiveness and perform MICMAC analysis for classification of factors and understand their interaction.

Identification of the Factors

Considering the initial objective of the study, the identification of the major factor involved in the system

is done with the help of consumer insights along with the literature review. Initially, approximately 15 consumers were exposed to a sample advertisement and asked to list down at least 10 factors for which they think why consumer should have particular response toward that particular advertisement. After this step, these listed factors by consumers are merge with the enlist factors obtained from the literature or prior studies. Later on this list is exposed to the same set of consumer and asked them to down size the list and enlist only those factors which comes to their priority. The final list obtain as consumer insights consist of 12 major factor which are as follows:

- Emotion of consumer
- Visualization of advertisement
- Subject/Centre point of the Advertisement
- Product specification
- Strategic planning
- Prior experience
- Quality
- Consumer expectation
- Acquired information
- Need
- Time period of an advertisement
- Environment

ISM Model Development Steps

Step 1: variables affecting the consumer responsiveness are listed out with the help of review of the literature and consumer insights.

Step 2: for the variables identified in step 1, contextual relationships is established among different variables.

Step 3: A structural Self- interaction marix (SSIM) is developed for the variables, indicating the pairwise relationship among variables.

Step 4: reachability matrix is developed from the SSIM is checked for the transitivity, which refers to the facts that the if a variable A is related to Band B is related to C, then A is necessarily related to C.

Step 5: the reachability matrix from the step 4 is partitioned into different levels.

Step 6: based upon the relationship in above mention reachability matrix, a digraph is drawn and the transitive links are removed.

Step 7: the resulted digraph is converted into an ISM.

Step 8: the ISM model developed in step 7 is reviewed to check the conceptual inconsistency and necessary modification.

Structural Self-Interaction Matrix (SSIM)

Development of SSIM is totally based upon the contextual relationship among variables. To explain the kind of the relationship between the various variables, there can be 4 kind of the relations that exists. Assumed the two variables are i and j, and then relations are as follows:

V: variable i support variable j;

A: variable j will be alleviated by variable I;

X: variable i and j will help each other to alleviate;

O: if there is no relation between variable I and variable j;

The reachability matrix was developed from SSIM by expressing the information in terms of 0and 1 in each cell of SSIM. Later, the reachability matrix is partitioned into reachability and antecedents sets for each factor, through a series of iteration these factors are grouped into various levels. Further the reachability matrix is converted into conical form, which is based upon the absence or presence of the relationships between the variables. A digraph portraying the direct and indirect relationship through arrows is then converted into ISM.

MICMAC Analysis

This analysis is based upon the driving and dependence power of the various variables. All variables are classified into 4 clusters which are autonomous variables, dependent variables, independent variable and lastly linkage variables. Autonomous variables are those which have weak driver and weak dependence power and are found to be disconnected from the system. Dependent variables are those which have weak driver power but strong dependence power. Linkage variables are those variables which has strong driving and dependence power. Lastly, independent variables are those which having strong driving power but weak dependence power.

Finding and Analysis

Initial response matrix by the 15 respondent

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	A	X	A	X	A	A	V	A	A	O	O
2		1	A	A	A	O	A	V	V	V	X	O
3			1	A	V	O	O	V	O	A	O	O
4				1	O	V	X	V	V	A	O	O
5					1	A	O	A	O	A	V	O
6						1	A	V	V	O	O	O
7							1	V	V	O	O	O
8								1	A	X	O	A
9									1	O	A	O
10										1	O	O
11											1	O
12												1

Initial Reachability Matrix

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	0	1	0	1	0	0	1	0	0	0	0
2	1	1	0	0	0	0	0	1	1	1	1	0
3	1	1	1	0	1	0	0	1	0	0	0	0
4	1	1	1	1	0	1	1	1	1	0	0	0
5	1	1	1	0	1	0	0	0	0	0	1	0
6	1	0	0	0	1	1	0	1	1	0	0	0
7	1	1	0	1	0	1	1	1	1	0	0	0
8	0	0	0	0	1	0	0	1	0	1	0	0
9	1	0	0	0	0	0	0	1	1	0	0	0
10	1	0	1	1	1	0	0	1	0	1	0	0
11	0	1	0	0	0	0	0	0	1	1	1	0
12	0	0	0	0	0	0	0	1	0	0	1	1

Reachability Matrix after Transitivity Check

	1	2	3	4	5	6	7	8	9	10	11	12	driving
1	1	1	1	0	1	0	0	1	0	1	1	0	7
2	1	1	1	1	1	0	0	1	1	1	1	0	9
3	1	1	1	0	1	0	0	1	1	1	1	0	8
4	1	1	1	1	1	1	1	1	1	1	1	0	11
5	1	1	1	0	1	1	1	1	1	1	1	0	10
6	1	0	0	0	1	1	1	1	1	1	1	0	8
7	1	1	0	1	0	1	1	1	1	1	1	0	9
8	0	0	0	0	1	0	0	1	1	1	1	0	5
9	1	0	0	0	0	0	0	1	1	1	1	0	5
10	1	0	1	1	1	0	0	1	0	1	1	0	7
11	0	1	0	0	0	0	0	0	1	0	1	0	3
12	0	0	0	0	0	0	0	1	0	0	0	1	2
dependel	9	7	6	4	8	4	4	11	9	10	11	1	

Level Partition Iteration

Iteration 1

enlabers	reachability set	Antedecents sets	intersection	level
1	1,2,3,5,8,10,11	1,2,3,4,5,6,7,9,10	1,2,3,5,10	
2	1,2,3,4,5,8,9,10,11	1,2,3,4,5,7,11	1,2,3,4,5,11	
3	1,2,3,5,8,9,10,11	1,2,3,4,5,10	1,2,3,5,10	
4	1,2,3,4,5,6,7,8,9,10,1	2,4,7,10	2,4,7,10	
5	1,2,3,5,6,7,8,9,10,11	1,2,3,4,5,6,8,10	1,2,3,5,6,8,10	
6	1,5,6,7,8,9,10,11	4,5,6,7	5,6,7	
7	1,2,4,6,7,8,9,10,11	4,5,6,7	4,6,7	
8	5,8,9,10,11	1,2,3,4,5,6,7,8,9,10,12	5,8,9,10	
9	1,8,9,10,11	2,3,4,5,6,7,8,9,11	8,9,11	
10	1,3,4,5,8,10,11	1,2,3,4,5,6,7,8,9,10	1,3,4,5,8,10	
11	2,9,11	1,2,3,4,5,6,7,8,9,10,11	2,9,11	1
12	8,12	12	12	

Iteration 2

enlabers	reachability set	Antedecents sets	intersection	level
1	1,2,3,5,8,10	1,2,3,4,5,6,7,9,10	1,2,3,5,10	
2	1,2,3,4,5,8,9,10	1,2,3,4,5,7	1,2,3,4,5	
3	1,2,3,5,8,9,10	1,2,3,4,5,10	1,2,3,5,10	
4	1,2,3,4,5,6,7,8,9,10	2,4,7,10	2,4,7,10	
5	1,2,3,5,6,7,8,9,10	1,2,3,4,5,6,8,10	1,2,3,5,6,8,10	
6	1,5,6,7,8,9,10	4,5,6,7	5,6,7	
7	1,2,4,6,7,8,9,10	4,5,6,7	4,6,7	
8	5,8,9,10	1,2,3,4,5,6,7,8,9,10,12	5,8,9,10	2
9	1,8,9,10	2,3,4,5,6,7,8,9	8,9	
10	1,3,4,5,8,10	1,2,3,4,5,6,7,8,9,10	1,3,4,5,8,10	2
12	8,12	12	12	

Iteration 3

enlabers	reachability set	Antedecents sets	intersection	level
1	1,2,3,5	1,2,3,4,5,6,7,9	1,2,3,5	3
2	1,2,3,4,5,9	1,2,3,4,5,7	1,2,3,4,5	
3	1,2,3,5,9	1,2,3,4,5	1,2,3,5	
4	1,2,3,4,5,6,7,9	2,4,7	2,4,7	
5	1,2,3,5,6,7,9	1,2,3,4,5,6	1,2,3,5,6	
6	1,5,6,7,9	4,5,6,7	5,6,7	
7	1,2,4,6,7,9	4,5,6,7	4,6,7	
9	1,9	2,3,4,5,6,7,9	9	
12	12	12	12	3

Iteration 4

enlabers	reachability set	Antedecents sets	intersection	level
2	2,3,4,5,9	2,3,4,5,7	2,3,4,5	
3	2,3,5,9	2,3,4,5	2,3,5	
4	2,3,4,5,6,7,9	2,4,7	2,4,7	
5	2,3,5,6,7,9	2,3,4,5,6	2,3,5,6	
6	5,6,7,9	4,5,6,7	5,6,7	
7	2,4,6,7,9	4,5,6,7	4,6,7	
9	9	2,3,4,5,6,7,9	9	4

Iteration 5

enlabers	reachability set	Antedecents sets	intersection	level
2	2,3,4,5	2,3,4,5,7	2,3,4,5	5
3	2,3,5	2,3,4,5	2,3,5	5
4	2,3,4,5,6,7	2,4,7	2,4,7	
5	2,3,5,6,7	2,3,4,5,6	2,3,5,6	
6	5,6,7	4,5,6,7	5,6,7	5
7	2,4,6,7	4,5,6,7	4,6,7	

Iteration 6

enlabers	reachability set	Antedecents sets	intersection	level
4	4,5,7	4,7	4,7	
5	5,7	4,5	5	
7	4,7	4,5,7	4,7	6

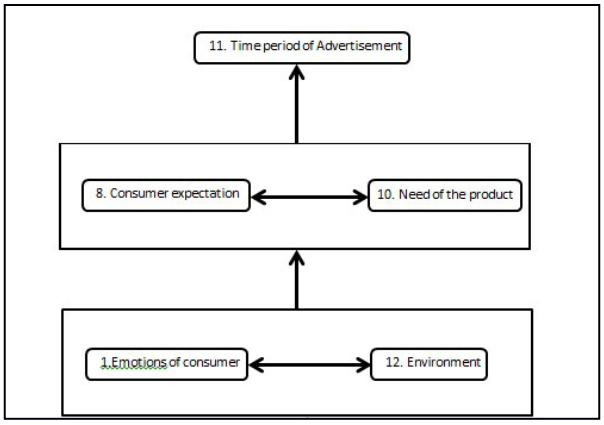
Iteration 7

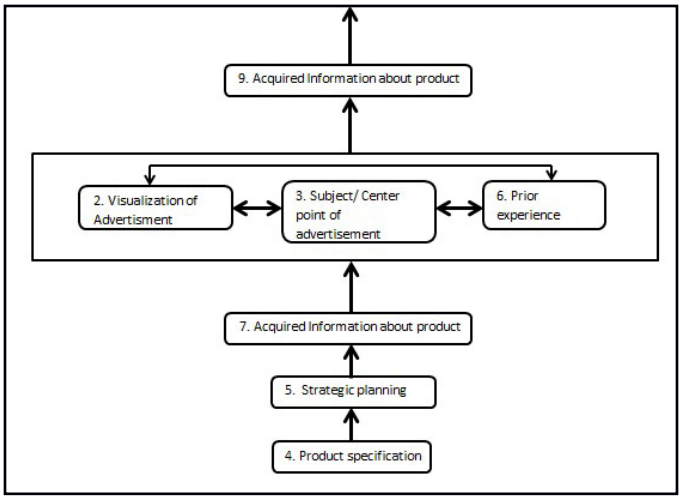
enlabers	reachability set	Antedecents sets	intersection	level
4	4,5	4	4	
5	5	4,5	5	7

Iteration 8

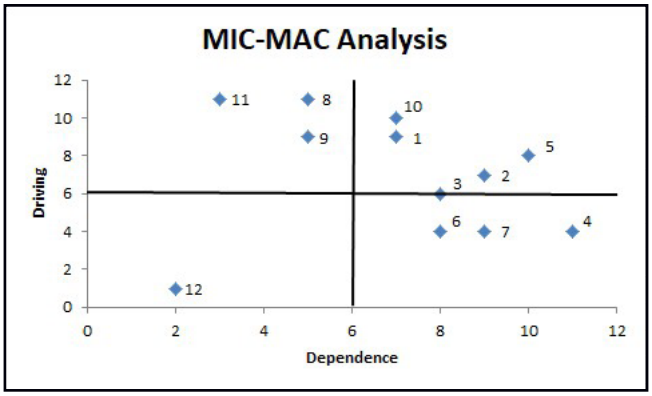
enlabers	reachability set	Antedecents sets	intersection	level
4	4	4	4	8

ISM Model for the Study





MICMAC Analysis



Interpretation and Result

This study simply makes it lucid that there are specific factors that affect consumer responsiveness toward any advertisements. These factors interact with each other in different levels and lead to their unique interpretation and power to influence consumer responsiveness. This study concludes that there exist 8 such levels where individual factors either interact on same level or support the level just above it. Through ISM it becomes easy to not only identify the various factors responsible for consumer responsiveness but also to categorise and understand their individual interaction with each other easily. The factors are categorised into 4 different categories. Among these category the factor environment comes under autonomous category while factors like

subject of the advertisement, product specification, prior experience, quality comes under dependent variable. On the other hand, factors like need, emotion of consumer, visualization of advertisement, subject of advertisement and strategic planning under the head of linkage variables. The factors like consumer expectation, time period of an advertisement, acquired information about product comes under head of independent variable.

Conclusion

Consumer responsiveness toward advertisement can be very well understood and derived in the form of structural model through ISM. The derived hierarchical relationship among various identified variable shows that the consumer responsiveness toward any advertisement is driven by acquired information and time period of advertisement, consumer expectation. The responsiveness is also influenced by certain other factors and their interaction but independent of impact of environment.

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Identifying the Best Mobile Combo Tariff Plan for Professional Students: An Application of Conjoint Analysis

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Abstract

Telecommunication network is one of the important and emerging industries in the world. India is holding the second position in terms of largest telecom network in the world. It is based on the number of telephone users. India is having 1.206 billion subscribers as on 30th September, 2017. In India, there are many telecommunication service providers. India is the second largest in number of telecom users. Every telecom customer prefers their network provider mainly depend upon various factors like network coverage, customer service, tariff packages and offers. But the utility of various factors be differing by person to person. But even there are many offers provided by various service providers but many customers are feeling dissatisfied with the same.

This study is to find out the optimum combination of Data/Voice/SMS which is preferred mostly by post graduate and under graduate students and to explore the usage of it by them. In the field of market research, conjoint analysis is one of the top most tool in that area. Basically, it deals with how the decision making process of peoples been done and what are the important factors that they are considering while selecting a products and services. conjoint analysis helps the peoples to determine various options of alternatives for their choices. And then analyzing the factors influenced for those choices or alternatives.

It is found that, better network and low cost are the main reasons for their choice of service provider. Most of the respondent's having highest importance to free minutes followed by data packs and SMS while they have least importance to price factor. The combo offer proposed from the study is for Rs. 450, 400 minutes free with 300 MB free data and 600 SMS.

Keywords: Mobile Tariff-Plans, Conjoint Analysis, Professional Students, SMS, Call, Data

Introduction

Telecommunication network is the most important sector in the world. India is having the second largest telephone users in the world (both fixed and mobile phone) with 1.206 billion subscribers as per the data's of 30 September 2017. In India, the call tariffs are very low as compared to other countries in the world. It is basically because of the increased competitions between the telecom operators in the world. According to the internet user-base, India is holding another second position in the world. As on 31 March 2016, in India there were 342.65 million internet subscribers (TRAI, Indicator Report, 2016).

Indian telecommunication industry having the major sectors like telephone, internet and television broadcast industry in India. Which is in an ongoing process involves the transformation into next generation network adopts an extensive system of modern network elements such as digital telephone exchanges, mobile switching centers, media gateways and signaling gateways at the core, which are interconnected by a wide variety of transmission systems using fiber or microwave radio relay networks. The access network helps to connects the subscriber to the core, which is basically highly diversified with different copper-pair, optic-fiber and wireless technologies. DTH,

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which is relatively a new broadcasting technology has attained very much different and important significant popularity in the television segment. The introduction of private FM has considered as the catalyst to the radio broadcasting in India. India's telecommunication in has greatly been supported by the Indian National Satellite System (INSAT) of the country, which is one among the world's largest domestic satellite systems. India is having a diversified and combined communications system, which connects each and every parts of the country by telephone, internet, radio, television and satellite (TRAI, Highlights of Telecom Subscription Data, 2012).

Telecom industry of India has undergone an accelerated market liberalization and growth since the 1990s. Now, India has become the highly competitive and fastest growing telecom industry in the world. (Dharmakumar, 2011; Kannan, 2010). The Industry has grown over twenty times in just ten years, from under 37 million subscribers in the year 2001 to over 846 million subscribers in the year 2011. According to the mobile phone user base, India is holding the second largest position in the world with 929.37+ million users according to the data's of May 2012. According to the size of the internet user-base in the world, India is having the second position with 300+ million as of June 2015. (ITU, 2011; Express).

The development of socio-economic sector of India enabled with the help of telecommunication system of the country and has played the vital role to reduce the urban-rural digital divide to some extent. It also has helped to increase the transparency of governance with the introduction of e-governance in India. At that time, the government found some modern telecommunication facilities. Which results in to the delivery of diversified education programmes, hence supported the rural segment of India (Thomas & Wolpert, 2006).

The main target of telecommunication service providers are the youth segment. Because it is a segment in which competitiveness will be higher. Also the size and demand among this segment is better than any of the other segments. Basically the members of youth segment showing the willingness to spend according to the changes irrespective of limitations. In 2013, all of the telecom companies re-launched their product offerings. Actually it is like an integrated lifestyle on the segment as opposed to the charges for call/SMS is very cheaper. During that time the important eateries was network partners. While the retail outlets providing discounts and offering that you are being a part of the network that selected. However, this better package helps the people to become loyal to a particular brand. The choices of students mainly influenced by the rates, offers and the quality of the network.

Statement of the Problem

In India there are many telecommunication service providers. India is the second largest in number of telecom users. Every telecom customer prefers their network provider mainly depend upon various factors like network coverage, customer service, tariff packages and offers. But the utility of various factors be differing by person to person. But even there are many offers provided by various service providers but many customers are feeling dissatisfied with the same. Because, majority of the service providers are failed to identify the needs and wants of the customers.

Objective

- To find out the optimum combination of Data/ Voice/SMS which are preferred mostly by post graduate and undergraduate students who are doing professional courses.

Review of Literature

The main objective of the present study is to find out the relative importance and utility of telecommunication features, students associate in making a decision. If a customer may wish to select a telecom package will have to make judgments about the preferences for various attribute combinations such as price of the package, call rates, data rates, SMS charges and so on.

(Miettila & Moller, 1990) Personal nature of wireless devices helped the success of mobile commerce. The mobile and communications industry/sector developed like anything. It's only because of the technology changes according to the needs and the wants of the customers of common peoples.

(National Telecom Policy, 1999) By the rapid growth of the telecommunications sector, the consumers and customers were increased day by day. It's suggested that

around a total of 75 million telephone users will came into the service by 2005 and 175 million of users by 2010. Indian telecom sector has already achieved 100 million lines. With over 100 million telephone connections and an annual turnover of Rs. 61,000 crores, our present tele-density is around 9.1%. The growth of Indian telecom network has been over 30% consistently during last 5 years.

(Welenius & Stern, 2001) We all know that, the main factors for production was capital and labour. But according to the present scenario, information plays a vital role in the same. Information accessing is a newly grown up sector of developing countries. Such information also been plays a role in Gross Domestic Product (GDP) in the economy.

(India G. o., 2002-2003) It is basically mentioned two very important goals of telecom sector as delivering telephony in low cost to the individuals in a largest number and delivering low cost and high speed computer networking to the firms also in a largest number. The tele-density is basically means that the number of phone lines per 100 persons of the population, has rapidly improved from 43.6 in March 2001 to 4.9 in December 2002.

Adam and Michael (2003) focus that the telecom service providers even in United States also face a sea of troubles in their course of actions. The total outlook for United States wireless carriers is challenging. They cannot grow longer by acquiring new customers in the industry; in fact, their new customers having a tendency to be migrated from other carriers. Indeed, churning will already accounted for as much as 80% of new customers in 2005. At the same time, the Average Revenue per User (ARPU) of the carrier's is falling because customers have.

Dutt and Sundaram (2004) studied that in order to boost and encourage the business communication, the new modes of communication are now being introduced and installed in various cities of the country. E-mail, Voice-mail, Cellular Mobile Phones, Radio Paging, Video, Text and Video-Conferencing now operational in many cities are helped very much to the businesses and industries. Value-added hi-tech services, access to the Internet and Introduction of the Integrated Service Digital Network are 70 being introduced in various places in the country.

(Jeanette & Salvador, 2004) Wireless substitution is producing significant traffic migration from wire line to wireless and helping to greater fierce price competition resulting in margin squeezes for both wire line voice tariffs in organization for Economic Co-operation and Development Countries have fallen by an average of 3% per year between the year of 1999 and 2003.

(Ramchandran, 2005) It analyzed the performance of Indian Telecom Industry which is based on volumes instead of margins. The Indian consumers are extremely price sensitive in nature. Various socio-demographic factors like high GDP growth, rising income levels, booming knowledge sector and growing urbanization have contributed effectively towards tremendous growth of this sector. The instrument that will make proper combination of these things together and deliver the mobile revolution to the masses will be the 3rd Generation (3G) services.

Mittal (2005) explains that the paradigm was shift in the way in which people communicate. There are more than 1.5 billion mobile phone users in the world today, by calculations it is three times greater than the number of PCOs. Today India has the sixth largest telecom network in the world from the position of 14th in 1995, and second largest among the emerging economies. It is also the world's 12th biggest market with a large pie of $6.4 billion. Actually the revolution in the telecom sector is propelling the growth of India as an economic powerhouse and by that way bridging the gap between the developed and developing economies.

(Chaturvedi & Chaturvedi, 2005) It explains that, because of the hyper competition in telecom area intensified, service providers took new initiatives to their customers. Prominent among them were loyalty rewards, celebrity endorsements, talk time schemes, discount coupons and business solutions. The youth segment and business class segment is the most important consumer segments in the cellular market. In 2005, the youth segment at the inaugural session of cellular summit, the Union Minister for Communications and Information Technology, Dayanidhi Maran had proudly stated that the Indian telecom had reached the landmark of 100 million telecom subscribers in which 50% were mobile phone users.

Whereas in African countries like Togo and Cape Verde, having the mobile coverage of 90% while India manages a merely coverage of 20%.

(Souheil & Jean-Marie, 2005) It identified the reasons behind the unexpected boom in mobile networks. According to them, cell phones are the Global System for Mobile Communication (GSM) standard requires less investment as compared to fixed lines. Besides this, a wireless infrastructure has sharing of usage, rapid profitability, more mobility. The usage of prepaid cards is the extent of 90% simplifies the management of customer base. Moreover, it is very much suitable for the way of life of people in all such conditions like rural, urban, and sub-urban subscribers.

According to (Economic Times, 2005) mobile phone market of India is set to surge ahead since urban India has a tele-density of 30 and at the same time rural India has a tele-density of 1.74. It indicates that the market is on ascent, with more than 85,000 villages has not came under the tele-connectivity services.

(India A. c., 2005), it is stated that, by 2009, 30% of the new mobile subscribers added by operators around the world will came from India. And also, by 2011, 10% of the third generation (3G) subscribers will be from India. The handset segment of India could be between US $ 13 billion and US $ 15 billion by 2016. It should offer a great opportunity for the vendors of equipment to make India a "manufacturing hub". By 2015, the infrastructure capital expenditure of India on cellular equipment will be between 10 and 20% of the investment that will be made by international operators. Also included other proposals like, setting up of hardware manufacturing cluster parks, conforming to global standards and telecom manufacturing's fiscal incentives among others.

(Chhiber, 2008) The mobile telecommunication technology is rapidly evolving in the world as the increased demand of mobile services with longer bandwidth by the peoples and new, improved and innovative services like connectivity anywhere, anytime for feature like T.V, Multimedia, Interoperability and seamless connectivity with all types of protocols and standards, while the third generation (3G) services are not to fully came up. At that time itself, started serious discussions on fourth generation (4G) services. To offer an alternative form of mobile access, WLAN hot spot have made inroads along with 3G.

Research Methodology

As a primary phase of the study, an exploratory design is conducted according to the research problem when there are few or no recent studies/reports available for references. The primary aim is on gaining familiarity with sample information for later investigation or undertaken when the problems are in a preliminary stage of research. In this, an exploratory study conducted among the students to find out their consumption pattern on telecom services.

After the exploratory study, the research design adopted is descriptive in nature. It gives detailed information about the study. Descriptive research is used to describe characteristics of a population or phenomenon being studied. It does not answer questions about how/when/why the characteristics occurred. It detailed about the various combinations of telecom services like Voice/Data/SMS formulated according to the responses from the customers. The Under graduate/Post graduate Students who are using telecom services currently were considered as the population of the study.

Sampling was done from students who are using telecom services from various service providers. Sampling was based on convenience. Convenience sampling means, a specific type of non-probability sampling method that depend on the data collection from the population who are conveniently available to be a part of the study according to the researcher.

Professional post graduate and under graduate students who are currently using telecom services were considered as the sample frame of the study. Questionnaire was prepared with the objective of collecting all relevant information required for achieving the research objectives. Opinion from experts and information from previous studies will be considered while preparing the questionnaire. A survey method was used for collecting the data. The analysis of best combination of telecom packages among students are selected for the study. Instrument development was conducted by analyzing the tariff plans of different service providers where used to develop the instrument. Attributes like data plan, call charges and SMS charges were selected for developing questionnaire.

Conjoint analysis is specialized and advanced technique in market research that gets under the phenomena of how the

peoples were making decisions and what are the factors that affecting those decisions. At the same time, which feature/ factor that is really giving values in products and services (it also known as Discrete Choice Estimation). Conjoint analysis technique will help the people to select their choices from options and then analyzing those choices. Then finding out what are the drivers or motives for those choices. In other words, finding what are the reasons for their selection of products or services.

Data Analysis and Discussion

The study first focused to create an orthogonal design by taking responses from the students. In order to identify the pattern of Call/Data/SMS usage by professional students, an exploratory study was conducted and could conclude the pattern of usage as described in Table 1.

Table 1: Pattern of Data, SMS and Voice Usage

Price	*Free Minutes*	*Data PACK*	*SMS (Nos.)*
300	400	300 MB	250
450	700	750 MB	600
600	1000	1.5 GB	1000

Source: Survey data

With this available data, there can be a total of 81 Combinations which is not practically possible to probe from the respondents. Hence the researcher is applying an advanced tool to compute the utilities, namely orthogonal design. It involves selecting a certain number of profiles resulting from all possible combinations of the levels.

Orthogonal Design is recommended because it selects suitable portion of all possible combinations of the categories of different variables under study. Orthogonal design metrics was developed using IBM SPSS software and are listed in Table 2.

Table 2: Combinations Generated from Orthogonal Design

Price	*Voice Call*	*Data Charges*	*SMS*
Rs. 600	700 Mins	1.5 GB	250 Nos.
Rs. 600	1000 Mins	300 MB	600 Nos.
Rs. 450	400 Mins	1.5 GB	600 Nos.
Rs. 450	1000 Mins	750 MB	250 Nos.
Rs. 450	700 Mins	300 MB	1000 Nos.
Rs. 300	1000 Mins	1.5 GB	1000 Nos.
Rs. 300	400 Mins	300 MB	250 Nos.
Rs. 600	400 Mins	750 MB	1000 Nos.
Rs. 300	700 Mins	750 MB	600 Nos.

Source: Survey data

The data was further collected using these combinations by using a questionnaire. The respondents were instructed to consider the nine cards of combinations and rank those in order of their preference from 1 to 9 where 1 is most preferred band 9 is least preferred.

According to the responses from the respondents, found out the utilities for each one of the attributes. Utilities mean useful features, or something useful, from the above utilities table, the highest usefulness by the respondents can be found out by the highest value of utilities estimated. From the result we know that highest utilities for attributes are (Table 3).

Price (Rs.) : 450
Free Minutes : 400 Minutes
Data Pack : 300 MB
SMS : 600 Numbers

Table 3: Derived Utilities - Conjoint Analysis

Utilities		
		Utility Estimate
Price	Rs. 300	-.148
	Rs. 450	.152
	Rs. 600	-.003
Free Minutes	400 Mins	.310
	700 Mins	-.303
	1000 Mins	-.007
Data Pack	300 MB	.242
	750 MB	-.064
	1.5 GB	-.178
SMS	250 Nos.	-.020
	600 Nos.	.212
	1000 Nos.	-.192
Constant		5.000

There are 3 levels of variables in each of the categories while each of them having different utilities (Table 4). Highest utility means that that factor has been rated by the respondents as most useful. With the highest utilities variables, we can formulate better combinations of factors. That is Rs. 450 is very useful for them. Along with 400 Free Minutes, 300 MB Data and 600 SMS.

Table 4: Importance Values

Price	17.248
Free Min	35.271
Data Pack	24.225
SMS	23.256

Among the four attributes each of them having different values and importance. Table 4 shows the importance of each factor. As per the responses from the respondents most important attribute is Free Minutes. Free minutes having a score of 35.271. The next important attribute is data pack (24.225) followed by SMS (23.256) and price (17.248). That is most of the students were conscious and focused on Call Tariff offers. Because they are using the calling offers more than data and SMS offers. The second important attribute is Data packs. As we all know that the data offers are very important in this generation. So that the students were preferring offers highlighting Call and Data offers. While they were giving minimal importance to SMS offers because by the over usage of Data offers, SMS offers are very less important in current scenario. At last the students are not bothered about the price factor of the offers. Whatever be the price of the offer, they need better offers for usage.

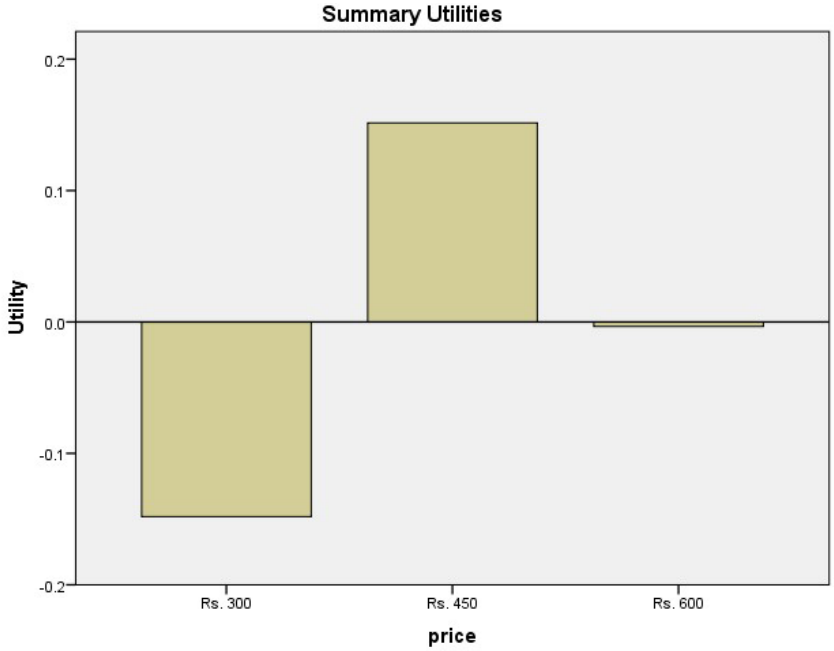

Fig. 1: Summary of Utilities - Price

Price attributes having (Fig. 1) three factors like Rs. 300, Rs. 450 and Rs. 600. Among these factors, maximum utility in the price attribute for Rs. 450. Which is the average amount of usage by majority of the students on a monthly basis. While Rs. 300 and Rs. 600 having negative utilities.

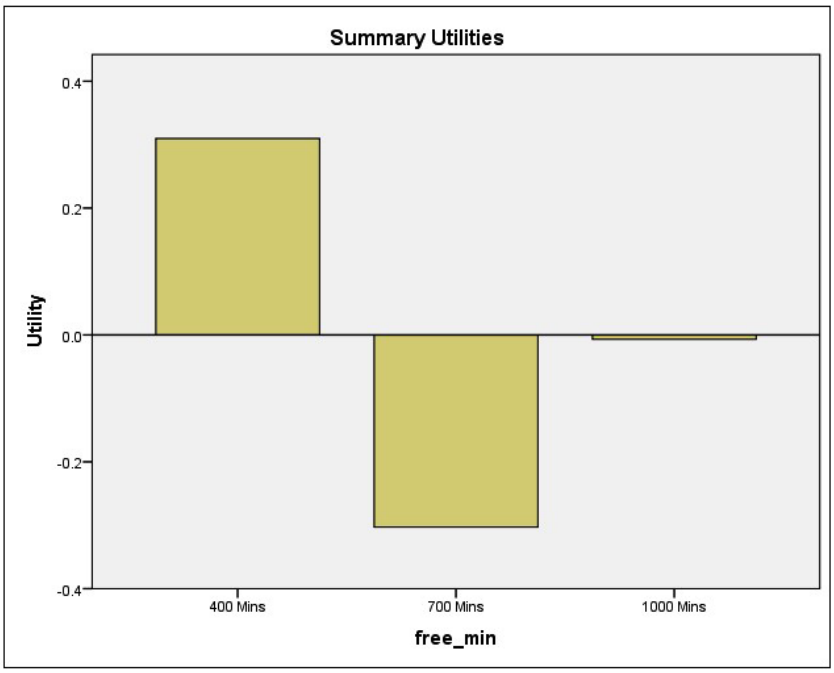

Fig. 2: Summary of Utilities - Free Minute

Free minutes attribute (Fig. 2) having three factors like 400 minutes, 700 minutes and 1,000 minutes. Among these factors, maximum utility in the free minutes attribute for 400 minutes. Which means it is the optimum quantity of talk time expected by the students per month. While 700 minutes and 1,000 minutes having negative utilities.

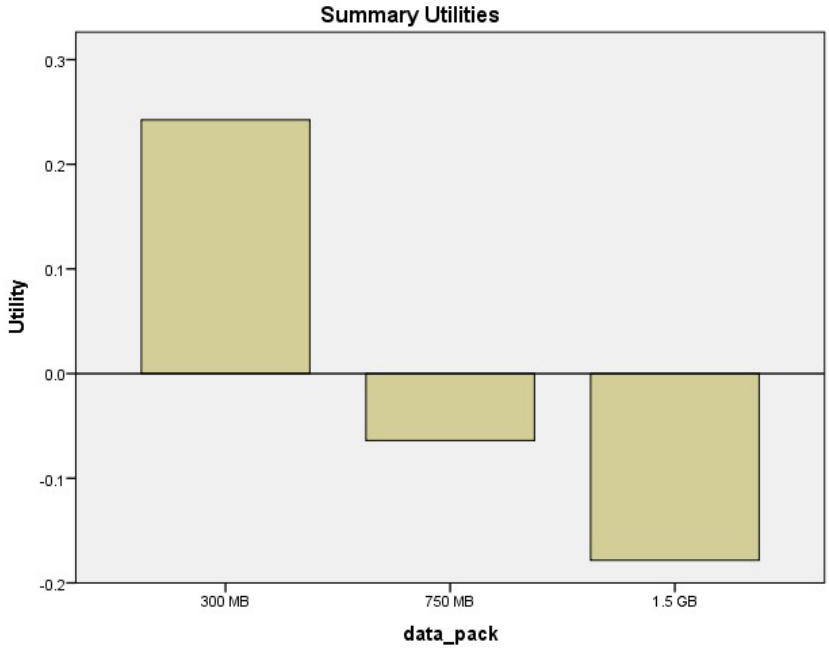

Fig. 3: Summary of Utility - Data Pack

Data pack attributes (Fig. 3) having three factors like 300 MB, 750 MB and 1.5 GB. Among the factors maximum utility in the data pack attribute for 300 MB. Which is the lowest quantity of the category. In fact the students were more focused on call tariff offers, they do not prefers the data packs which having highest volume. While 750 MB and 1.5 GB having negative utilities. Which is least preferred by the students.

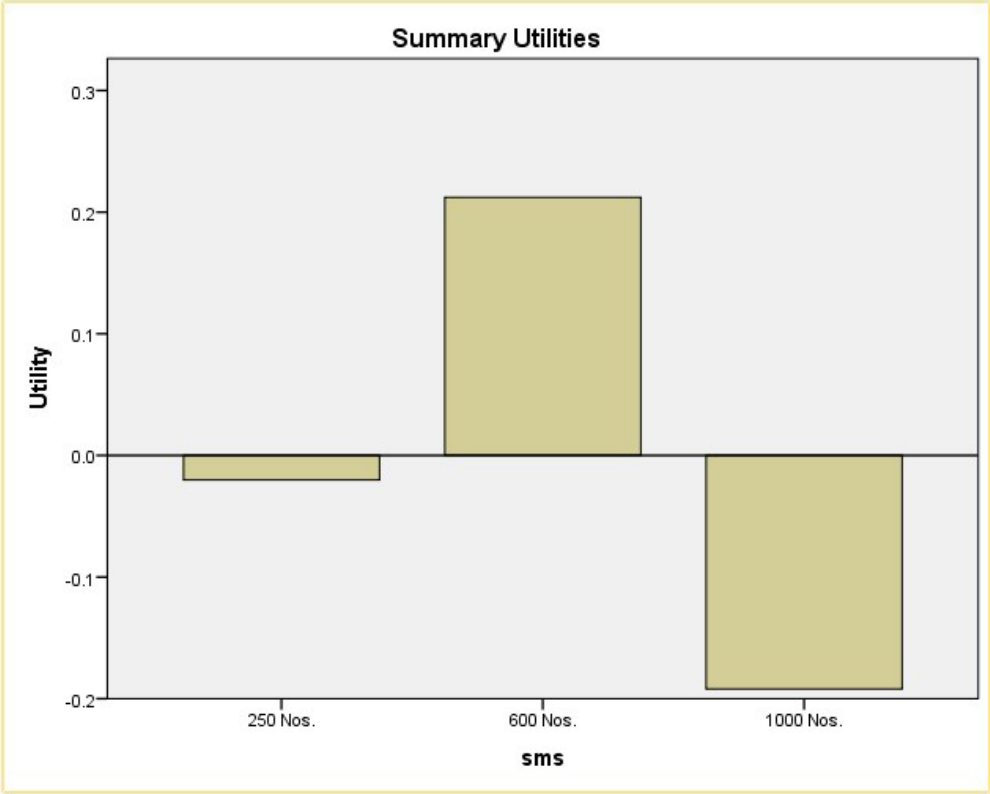

Fig. 4: Summary of Utility - SMS

SMS attributes having (Fig. 4) three factors like 250 SMS, 600 SMS and 1000 SMS. Among the factors maximum utility in the SMS attribute for 600 SMS. Respondents were maintained an optimum level of SMS in numbers. While 600 and 1000 having negative utilities

Importance Summary

There are mainly four factors that considered while choosing a telecom combo plan. They are Price, Free Minutes, Data Packs and SMS. From the summary of attributes (Fig. 5) the highest importance for the factor of free minutes. That is 35.27 while majority of the respondents were giving maximum importance to the free minutes category. It's may be because of the students were preferring calls factor in a combo offer. The data pack factor having second position in the minds of the respondents (24.22). After the free minutes factor, the students were concentrated and prefers Data packs. Factor of SMS having 23.26 and according to the respondents, price is the least important factor. Which has importance of only 17.25 because the respondents prefer combo offers with maximum benefit. They were willing to pay maximum amounts to get better combo offers.

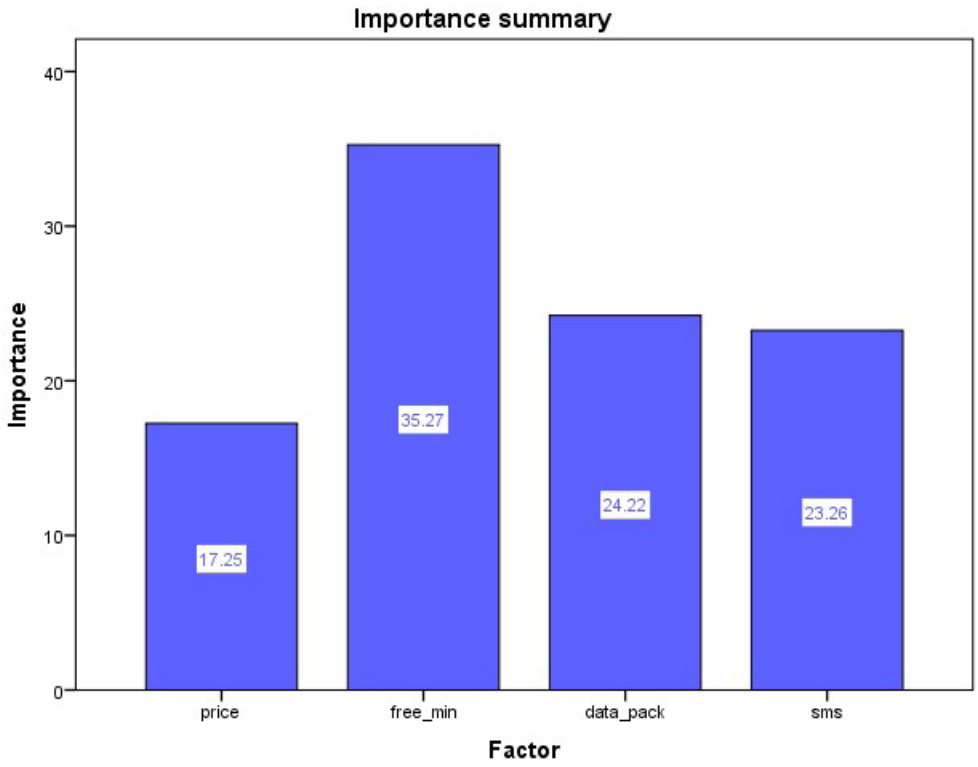

Fig. 5: Importance Summary

Findings

According to the utility, each attributes having a factor which having high utilities. From the results it is found that Rs. 450 in Price category, 400 Minutes in the free minutes, 300 MB in the data packs category and 600 SMS under the number of SMS category. The best combo offer/ combination found from the study is 400 minutes free, 300 MB data and 600 SMS free for Rs 450. According to the value of importance, Free minutes factor having highest value in the minds of the respondents followed by Data packs and SMS. But Price factor is the least important factor according to the study.

Conclusion

The study was undertaken to identify the best mobile combo plans for students. It was conducted among students of college level. It is found that, Better Network and Low Cost are the main reasons for their choice of Service Provider. Most of the respondents have preferred price of Rs. 450, Free minutes of 400, Data pack of 300 MB and Free SMS of 600. Most of the respondents having highest importance to free minutes followed by data packs and SMS while they have least importance to price factor. The combo offer proposed from the study is for Rs. 450, 400 minutes free with 300 MB free data and 600 SMS.

In order to conclude that the students who are using telecom services are mainly focused on call tariff offers. They will not give much emphasis on price factor. Even if there are many of the service providers providing combo offers, but all of them are not feasible. According to the needs and wants of the respondents the best combo plan proposed is for Rs. 450; 400 Minutes free+ 300 MB+ 600 SMS.

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Impact of Market Orientation on Performance: An Analysis of Indian SMEs Using K-Mean Clustering

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Abstract

Market orientation and its impact on business performance are for quite some time been considered by various researchers. In any case, the non-appearance of a brought together conclusion prompts the development of uncertainty at the idea of relationship exist. This investigation is an endeavor to legitimize the linkage that exists amongst performance and firms market oriented strategies. Moreover, as larger part of studies were basically centered on developed nations' large-scale firms the examination centers around developing nation small manufacturing organizations. The information was examined by utilizing cluster analysis and significance understanding is given toward the finish of the study.

Keywords: Market Orientation, SMEs Cluster Analysis, MKTOR

Introduction

Market orientation (MO) is said to be an aggressive technique proposed to make superior customer esteem and long haul benefit (Narver & Slater, 1990). The changing business condition requires the rise of customer-driven approach, which prompts the usage of MO in order to develop a culture across the organization. The beginning of this culture guarantees superior firm performance. Albeit, authentic domain of MO writing recognizes various point of views; however, majority of them are labyrinth with social and behavioral viewpoints. The social perspective was sprouted by Narver and Slater in 1990s and it imagine MO as structure of customer orientation, competitor's orientation and interfunctional coordination dimensions. Simultaneous to aforementioned view point, Kohli and Jaworski (1990) yielded intelligence point of view of market orientation, which conceptualize market orientation as organization wide information generation, dispersal, and responsiveness. Since origin, its association with firms performance (FP) regularly estimated by the quantity of analysts. Numerous investigations advocates a positive connection amongst MO and firm performance, yet researchers like Han et al. (1998), place no immediate linkage between these two constructs. Greenley (1995) contended that MO does not affect FP straightforwardly and the relationship is directed by various environmental factors. Indeed, even a market portrayed by high technological changes and low customer power, MO is not observed to be invaluable regarding better firm performance. Houston (1986), additionally contended that if the organizations are having exceptionally constrained assortment for its customers then MO does not prompt superior performance. Such equivocal result prompts the generation of predicament and brings up an issue whether MO truly influences the company's performance or not and from the viewpoint of restricted item assortment to its customer and thought of natural factors on business performance, the examination of MO on FP relationship in small-scale firm setting would be all the more fascinating on the grounds that greater part of MO researches were directed in huge scale firms have a place with the developed nations like US UK and China and almost no is thought about the developing nations SMEs. As it is well established fact that only one out of every odd SME intends to achieve the comparative performance paradigm and it really relies on the SMEs proprietor/supervisor's aims that in what ways they need to quicken their endeavor (Delmar & Wiklund, 2008). These issues make it balanced to analyze whether the SMEs with various performance paradigm have receiving market orientation or not. Salyova et al. (2015) posit a significant but weak

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correlation between small scale firm's performance and market orientation. Appiah-Adu (2008) suggests a significant relationship between MO and performance among UK small scale firms. Pelham (2000) conducted the similar study in US SMEs and supports a significant relationship. Giving due importance to the contextual perspective the fundamental aim of the investigation is to look at whether SMEs working in developing economies like Indian SMEs, are market orientated or not, in the event that they are showcase situated then whether they are performing admirably against those which are not that much market orientated.

Research Framework

Market Orientation

The existent literature severalizes two basic approaches to market orientation (MO) - *intelligence and culture based behavioral approaches*. The *intelligence approach* conceptualize market orientation as "*the organization-wide generation of market Intelligence pertaining to current and future needs of customers, the dissemination of intelligence within the organization, and responsiveness to it. Key features of this integrated view are (1) an expanded focus on the market rather than customer intelligence, (2) an emphasis on a specific form of interfunctional coordination with respect to market intelligence and (3) a focus on activities related to intelligence processing rather than the effect of these activities*" (Kohli & Jaworski, 1990).

The embarking point of market orientation according to Kohli and Jaworski (1990) is generation of market intelligence. They abstract intelligence generation as the composition of *understanding customer's verbal and non verbal needs*, *monitoring competitor's actions and other exogenic factors and their consequences on customer preferences.* Further, they added that such information should be disseminated effectively across all departments within the organization, due to the fact that it machicolates a shared platform for conjunctive actions by different departments. The intelligence generation and dissemination have no value if firm is not able to respond it, hence the third element responsiveness came into scene which includes selection of appropriate segment, designing and development, promotion and distribution to effectuate present and future needs of customers (Kohli & Jaworski, 1990).

Another collateral perspective, *culture based behavior*, defined market orientation as "*the culture that (1) places the highest priority on the profitable creation and maintenance of superior customer value while considering the interest of other key stakeholders; and (2) provides norms for behavior regarding the organizational development and responsiveness to the market information*" (Never & Slater, 1990). This approach necessitates the significance of being customer oriented, which requires a decent understanding of customer needs and preferences to deliver superior customer value. Customer orientation ensures firm's cognizant behavior about persuasion of existing and future customer needs and required actions to satisfy them. Secondly competitor orientation as defined by Narver and Slater (1990) emphasizes on firm's understanding of competitor's strength/weaknesses and their long term capabilities in order to assess their ability to satisfy needs of the customers of similar segment. Creation of value is the result of delivering increasing benefits to the customers against minimal cost and anyone in the organization can contributes in the process. The third component as posit by Narver and Slater (1990), interfunctional coordination ensures coordinated utilization of available resources to deliver superior value. This coordination is closely synchronized with customer and competitor's orientation which gives a pathway for resource utilization. Following Kohli and Jaworski (1990) and Narver and Slater (1990), conceptualization of MO, different researchers over the globe receive their methodologies. For instance Baker and Sinkula (1999), Homburg and Pflesser (2000), and Kwon and Hu (2000) receives Kohli and Jaworski (1990) approach and researchers like Hooley et al. (2000), Farrell (2000), and Sin et al. (2003) have embraced Narver and Slater (1990) approach. There are numerous different researchers who characterized market orientation in alternate points of view. We have attempted to compress these definitions as shown in table:

Table 1

Contributors	*Definition*	*MO methodology*
Kohli and Jaworski (1990)	"Market orientation is the organization wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organization wide responsiveness to it."	Market Intelligence
Narver and Slater (1990)	"Market orientation is the organization culture that most effectively and efficient creates the necessary behaviors for the creation of superior value for buyers and, thus, continuous superior value for buyers and, thus, continuous superior performance for the business."	Culturally based behaviors
Slater and Narver (1994)	"A business is market-oriented when its culture is systematically and entirely committed to the continuous creation of superior customer value. Specifically, this entails collecting and coordinating information on customers, competitors, and other significant market influencers (such as regulators and suppliers) to use in building that value. The three major components of market orientation – customer orientation, competitor focus, and cross-functional coordination - are long-term in vision and profit-driven."	Culturally based behaviors
Day (1994)	"A market driven culture supports the value of thorough market intelligence and the necessity of functionally coordinated actions directed at gaining a competitive advantage."	Culture and Market Intelligence
Deng and Dart (1994)	"Market orientation — the generation of appropriate market intelligence pertaining to current and future customer needs, and the relative abilities of competitive entities to satisfy these needs; the integration and dissemination of such intelligence across departments; and the co-ordinated design and performance of the organization's strategic response to market opportunities."	Market Intelligence
Slater and Narver (1995)	"culture that (1) places the highest priority on the profitable creation and maintenance of superior customer value while considering the interests of other key stakeholders; and (2) provides norms for behavior regarding the organizational development of and responsiveness to market information".	Culture
Hunt and Morgan (1995)	"… a market orientation is (1) the systematic gathering of information on customers and competitors, both present and potential, (2) the systematic analysis of the information for the purpose of developing market knowledge, and (3) the systematic use of such knowledge to guide strategy recognition, understanding, creation, selection, implementation, modification."	Market Intelligence
Dickson (1996)	"Market orientation describes a set of organized internal and boundary spanning processes that enable the firm to learn about, respond to, and lead changes in consumer, channel, and competitor behaviour."	Process View
Lado, Maydeu-Olivares, and Rivera (1998)	"Extent to which firms use information about their stakeholders to coordinate and implement strategic actions. Hence, our theoretical model of market orientation expands this construct's traditional definitions by integrating the distributor orientation and the environmental orientation. We believe that traditional definitions devalue the interfunctional conflict generated by restricting market orientation to the marketing function."	Market Intelligence
Cravens, Greenley, Piercy, and Slater (1998)	"The characteristics of market-driven strategies include (1) developing a shared vision about the market and how it is expected to change in the future; (2) selecting avenues for delivering superior value to customers; (3)positioning the organization and its brands in the marketplace using distinctive competencies; (4) recognizing the potential value of collaborative relationships with customers, suppliers, distribution channel members, internal functions, and even competitors; and (5) reinventing organizational designs to implement and manage future strategies."	A holistic perspective that includes value, competencies , relationship, etc.

Contributors	*Definition*	*MO methodology*
Gray, Greenley, Matear, and Matheson (1999)	"Organizational behaviours concerned with identifying customers' needs and competitors' actions, sharing market information throughout the organization, and responding to it in a co-ordinated, timely and profitable manner."	Behavioral Perspective
Baker and Sinkula (2002)	Market Orientation is the "extend to which a firm's strategic planning process is dependent on the outcome of market information acquisition, dissemination, and interpretation activities about customers, competitors, channel members and strategic partners."	Market Intelligence
Gray and Hooley (2002)	"Market orientation is the implementation of a corporate culture or philosophy which encourages behaviors aimed at gathering, disseminating and responding to information on customers, competitors and the wider environment in ways that add value for shareholders, customers and other stakeholders."	Culture perspective
Jon C. Carr and Tará Burnthorne Lopez (2007)	"MO is a process that is evidence of the firm's commitment to the marketing concept."	Process Perspective
Deshpande and Farley (1998)	"Set of cross functional processes and activities directed at creating and satisfying customer through continuous need assessment."	Activity Perspective

Basic examination of the table recognizes three principles inquire about MO viz, refinement of MO estimation develop crosswise over various settings; predecessor and results of MO; and inspecting the part of arbitrators on MO and performance relationship (Leo et al., 2003). Following the fundamental commitment of Narver and Slater (1990), and Kohli and Jaworski (1990) researchers like, Al-Hawary et al. (2013), Subramanian and Gopalakrishna (2009), Akroush (2011), Kirca, Jayachandran, and Bearden (2005), Narver, Slater, and MacLachlan, (2004), Paladino (2007) pushed MKTOR scale as the most referred to legitimate and solid scale; which gives a sound premise to depend on this scale to quantify market orientation.

Manufacturing Performance

Manufacturing performance is dependably been an easy to refute issue among researchers. Since starting the finance-related performance measures were being utilized by many researchers at broad level; however, another approach of non-financial measures is developing quickly (Gosselin, 2005). The issue is more applicable in settings like SMEs on the grounds that larger part of SMEs works in disorderly segment and it is extremely hard to locate a sound reporting arrangement of monetary measures, subsequently it is winding up exceptionally balanced to depend on subjective performance indicators rather objective financial indicators. For that reason, from the audit of writing (Sawang & Unsworth, 2011; De Toni & Tonchia, 2001; Pelham and Wilson, 1995) and input got for the specialists' we conclude following arrangement of performance indicators viz., profit objectives, sales objectives, customer retention, adaptability, employee turnover, quality, reputation against competitors, propelling of new items.

Market Orientation and Performance Relationship in SMEs

The impact of market orientation on performance has long been studied by many researchers, but many of them correspond to the large scale units situated in countries like US UK and China. From the perspective of small and medium scale firms very little is known about this relationship. Pelham (2000) posit a negative relationship between MO and size of organization. He mentioned that due to less-complex organizational structure SMEs can enjoy a considerable amount competitive advantage by utilizing and practicing market orientation practices more effectively in comparison those large scale organizations having more complex organizational structure. In contrast to the Pelham and Weinstein (1998) argued that due to scarcity of resources it would be difficult for SMEs to execute market orientation practices successfully. A growing body of literature suggests a significant impact of MO and performance.

Data and Methods

Questionnaire

Past examines has utilized diverse scales to quantify market orientation. Jaworski and Kohli (1993) created MARKOR scale concentrating on generation of market intelligence, dispersal of the information over all departments and organization responsiveness. Narver and Slater (1990) created MKTOR scale comprising customer orientation, competitor's orientation and interfunctional coordination measurements. Deshpande et al. (1993), contended that customer orientation isn't just worry with putting customer intrigue first, however notwithstanding this the firm ought to likewise consider all other partners, e.g., proprietor, administrator and employees and created DFW scale synergizing Narver and Slater (1990) and Kohli and Jaworski (1990) scales. Lado et al. (1998), censures the past researchers, for example, Narver and Slater (1990); Kohli and Jaworski (1990) for dismissing significance of distributors, environment and stake holders. They built up a nine parts hypothetical model of Market orientation and create Market Orientation Scale (MOS). Deshpande and Farley (1998) characterized market orientation as the arrangement of cross utilitarian procedures and exercises coordinated at making and fulfilling customer's needs through persistent need evaluation. They broke down the scales created by Narver Slater (1990), Kohli and Jawroski (1990) and DFW scale and created MORTN summary scale to quantify market orientation. In the present investigation market orientation is analyzed by MKTOR scale of Narver and Slater (1990) utilizing; customer orientation, competitor's orientation and interfunctional coordination measurements. The SMEs performance was estimated utilizing indictors like profit objectives, sales objectives, customer retention, adaptability, employee turnover, quality, reputation against competitors, propelling of new items. The respondents were given 1=strongly disagree, 2=disagree, 3= neither agree nor disagree, 4=agree, and 5=strongly agree response categories for all things of the scales. The underlying information about SMEs address, contact individual, and item profile was accumulated by utilizing different sources like Indian SMEs trade information base, Just dial information base, and Indian Industry Association index of various parts. We limited examining outline inside the space of Northern piece of India (including Ghaziabad, Agra, Aligarh and Firozabad regions). Multiple ways were utilized to gather data from the proprietor/directors of SMEs, which essentially incorporates online survey; offline surveys and telephonic survey. Last screening gives 388 finished responses for the further phases of data analysis. To manage common method bias, Harman's single factor test was utilized (Podsakoff and Organ, 1986). The resultant single factor was clarifying 37.234% of changes, underneath the base limit estimation of 50%. It connotes insignificant common method variance in the concern study.

Method

The analysis incorporates following steps:

- Clustering of respondents based on SMEs performance.
- Analysis of variances (ANOVA), evaluating the distinctions among groups.

Cluster analysis utilizing K-means clustering was performed. Next, ANOVA was performed and the outcome was affirmed by Tukey HSD and Sheffe' LSD post-hoc tests. Moreover, Tamhane's T2 test was additionally performed under the circumstance where equal variances are not assumed.

Result

Cluster Analysis

With K-means clustering four groups in regards to the SMEs performance were recognized. This approach separate SMEs in various classes as far as different performance paradigms. These groups with their focuses are presented in table 2. The investigation yielded as four groupings of performance viz, (1) low performance cluster (2) Moderate Performance with better new product development (NPD), (3) Moderate Performance with moderate NPD, (4) Better Performance with low NPD.

Table 2

	Cluster 1 (n=65)	*Cluster 2 (n=116)*	*Cluster 3 (n=49)*	*Cluster 4 (n=158)*	*F-value*	*Sig.*
Rapid Response Against Rivals Act	1.55	3.03	4.00	4.02	168.61	.00
Profit Goal Achieved	1.52	2.82	4.06	4.08	211.33	.00
Sales Goal Achieved	1.57	3.06	3.14	4.14	187.85	.00
Better Quality Product	1.69	2.91	3.92	3.95	134.85	.00
Better Customer Retention	1.55	2.86	3.92	4.04	185.98	.00
Good Market Reputation	1.40	3.12	3.37	4.06	182.68	.00
Employee Turnover Rate	1.62	2.91	3.49	4.01	154.38	.00
New Product Development	1.89	3.01	2.49	1.35	117.17	.00
	Poor Performance	Moderate Performance with better NPD	Moderate Performance with moderate NPD	Better Performance with low NPD		

The outcome recommends that SMEs have a place with group 1, displays poor performance in regards to all indicators of performance. From group 2 to 4, despite the fact that performance is expanding from moderate to better level however consequently new product development is continue diminishing too. The F-measurements demonstrate that cluster differs from each other most as far as profit objective accomplished and vary minimum as far as new product development.

ANOVA

Average for each of the three market orientation dimensions; customer orientation, competitor's orientation and interfunctional coordination measurement across all four clusters were analyzed using ANOVA test. The outcome (Table 3) demonstrated significantly huge difference in the distinctive measurements of market introduction between each of the four specified groups. Interfunctional coordination (IC) seemed to separate the SMEs most (F=41.72), and competitor's orientation (COMPO) slightest (F=28.22) and the customer orientation (CO) lies between these two. Table 3 shows, SMEs with better performance with low NPD and SMEs with poor performance groups displays generally better CO, COMPO and IC when contrasted with the SMEs belongs to the moderated performance cluster.

Table 3

	Cluster 1 (n=65)	*Cluster 2 (n=116)*	*Cluster 3 (n=49)*	*Cluster 4 (n=158)*	*F*	*Sig.*
CO	3.1	2.71	2.71	3.67	35.31	.000
COMPO	3.24	2.68	2.73	3.64	28.22	.000
IC	3.08	2.66	2.62	3.67	41.72	.000
	Poor Performance	Moderate Performance with better NPD	Moderate Performance with moderate NPD	Better Performance with low NPD		

In order to take closer view at the difference between each of these cluster groups, most commonly used Tukey HSD, Sheffe LSD, post hoc testes were also applied (see Table 4).

Table 4

Dependent Variable	*Cluster (I)*	*Cluster (J)*	*Mean Difference (I-J)*	*SE*	*Tukey HSD*	*LSD*
Customer Orientation	Better Performance with low NPD	Poor Performance	.62257*	.12307	.000	.000
	Better Performance with low NPD	Moderate Performance with better NPD	1.00849*	.10212	.000	.000
	Better Performance with low NPD	Moderate Performance with moderate NPD	.55251*	.13657	.000	.000
	Poor Performance	Moderate Performance with better NPD	.38592*	.12941	.016	0.003
	Poor Performance	Moderate Performance with moderate NPD	-.07007	.15801	.971	.658
	Moderate Performance with better NPD	Moderate Performance with moderate NPD	-.45599*	.14230	.008	0.001
Competitors Orientation	Better Performance with low NPD	Poor Performance	.42948*	.13510	.009	.002
	Better Performance with low NPD	Moderate Performance with better NPD	.95581*	.11210	.000	.000
	Better Performance with low NPD	Moderate Performance with moderate NPD	.50216*	.14992	.005	.001
	Poor Performance	Moderate Performance with better NPD	.52633*	.14205	.001	.000
	Poor Performance	Moderate Performance with moderate NPD	.07268	.17346	.975	.675
	Moderate Performance with better NPD	Moderate Performance with moderate NPD	-.45364*	.15621	.020	.004
Interfunctional Coordination	Better Performance with low NPD	Poor Performance	.64351*	.12234	.000	.000
	Better Performance with low NPD	Moderate Performance with better NPD	1.07831*	.10151	.000	.000
	Better Performance with low NPD	Moderate Performance with moderate NPD	.56332*	.13576	.000	.000
	Poor Performance	Moderate Performance with better NPD	.43480*	.12863	.004	.001
	Poor Performance	Moderate Performance with moderate NPD	-.08019	.15707	.957	.610
	Moderate Performance with better NPD	Moderate Performance with moderate NPD	-.51499*	.14145	.002	.000

The nearby perception of Table 4 displays that as to customer orientation, the best distinction exist between "Better Performance with low NPD" and "Moderate Performance with better NPD" gatherings (1.00849), and the smallest however huge contrast exist between, Moderate Performance with better NPD" and "Moderate Performance with moderate NPD" (-0.45599). The distinction between "Poor performance" and "Moderate Performance with moderate NPD" clusters were discovered unimportant. Among other dependent factors, comparable result was watched.

Conclusion

The essential reason for this examination was to survey SMEs fluctuating performance as for the distinctive measurements of the market orientation. The consequence of the investigation demonstrates that SMEs with better performance with low new product development has moderately high CO, COMPO and IC. It implies the significance of being market oriented. In any case, it is additionally vital to specify that SMEs gathered as of poor entertainers has likewise indicated great association with various measurements of market orientation, yet these SMEs have demonstrated generally higher new product development (these two clusters contrasts fundamentally from each other, as appeared in Table 4 Post Hoc test result). These outcomes demonstrate that market oriented SMEs performance decreases as they increment their introduction towards the advancement of new products. On the off chance that taken through and through as appeared in Table 3, SMEs assembled in various groups altogether contrast from each other regarding the dependent factors (CO, COMPO and IC) which place changing level of CO, COMPO and IC over all clusters. As dominant part of researchers has upheld the prescient impact of market orientation on performance, the after-effects of the investigation shows presence of insignificant impact of market orientation on SMEs performance, particularly in Indian setting. As SMEs which perform ineffectively, shows moderately better new product improvement when contrasted with rest of the groups. It shows that focal point of new product advancement unfavorably influences other performance parameters and subsequently in spite of the fact that SMEs were growing new item yet its disappointment may antagonistically influence the general performance. Today products and services turn out to be increasingly similar, subsequently clients are not searching for originality or uniqueness rather they are looking for such items which can function admirably for them. The result of the examination is having bifocal perspective SMEs of cluster 1 shows a sound level of MO and NPD and SMEs of group 4 likewise displays critical level of MO yet moderately lesser NPD. MO and its positive relationship advancement/originality, as of now been said by various researchers (Yu and Tsai, 2013; Slater and Narver, 1994), yet a profoundly market oriented firm which puts excessively accentuation on current clients need may disregard the dormant want of the client which at last reflects as poor performance. While then again a market oriented firm with lesser level of advancement/new product improvement, might have the capacity to better comprehend client's idle need and consequently would have the capacity to accomplish better performance. As it is obvious from the examination SMEs having a place with poor or better performance groups, have appeared better than expected level of MO (see Table 3). Such result demonstrates that Indian SMEs performance is free of Market orientation philosophy. To acquire knowledge about the relationship, various relapse was connected taking MO measurements as logical factors and performance as reliant variable. The lower estimation of R^2 (0.05) connotes the week informative energy of MO measurements against the organizations performance.

Consequently we deduced in that albeit the vast majority of tested SMEs were having MO qualities however their performance was discovered autonomous of it. So the conventional hypothesis of market orientation which set MO as the critical indicator of performance was not discovered valid for our situation.

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A Study on Pre- and Post-Analysis of Demonetization Period: Issues and Challenges

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Abstract

The principle pointed of demonetization was to address defilement, black money, fake money and fear financing. The measure impact of demonetization on consumption, production, investment and savings of the economy. Although demonetization have huge potential benefits in the medium to long term working of the economy but caused some short term disruption in the economy. This paper studies the issues and challenges faced by the common man during demonetization period and analyzed the pre- and post-period of demonetization. The investigation in this paper observed that demonetization affected different area of the economy in the month of Nov-16 and Dec-16 and the effect directed fundamentally in Jan-17 onwards. An increase in banks deposits by 15.7% and 14.9% in Nov-16 and Dec-16 respectively created large surplus liquidity conditions. These were overseen by RBI by the monetary policy. There has been a sharp increment i.e. 9.02% in the number of accounts under Pradhan Mantri Jan Dhan Yojana and the deposits in such accounts have also increased. The paper has also studied the impact of demonetization on the new gateway of electronic payment i.e. NEFT, CTS, IMPS and NACH. During Dec-16 and Jan-17 the IMPS registered the maximum y-o-y growth rate of 157.2% and 177.7% respectively.

Keywords: Demonetization, Black Money, Digitalisation, RBI, GDP

Introduction

Demonetization of currency means when face value of a coin or paper currency loses its legal tender status in the economy. It is an act of replacing old unit of currency with a new currency unit. Alternatively, we can say withdrawal of a specific currency from the market. By demonetization of currency, in the short run the cash in circulation would be substantially reduced from the economy. There would be two reasons for demonetization one being to control counterfeit notes that could be contributing to terrorism and second reason is to eliminate black money from the economy.

History of Demonetization

The process of demonetization is not new for the world. In the past many countries of the world like Soviet Union, North Korea, Libya, Zaire, Ghana, Myanmar, Nigeria, Zimbabwe, Australia, Libya, Iraq and the European Union. In February 1971, the United Kingdom and Ireland had likewise decimalized their monetary standards. In 1982, 50 cedi notes were pulled back in Ghana, in 1984 Nigeria's military government under Muhammadu Buhari had supplanted old notes with new once to kill defilement in the nation and in 1987 Myanmar's around 80% of the estimation of cash available for use was nullified by the military junta, which had come about into political agitation in the nation.

In January 1991, the past Soviet Union had pulled back extensive rubles bills with the purpose of going up against the dull money. The invalidation of 50 and 100 rubles notes had incited the invalidation of around 33% of trade accessible for use out the Soviet Union. Be that as it may, this cash change to battle with danger of dark cash neglected to give any positive outcome and the legislature could not stop the expanding high swelling.

Individuals lost their confidence in the administration of Mikhail Gorbachev lastly on December 25, 1991, this came about into the separation of Soviet Union. In 1993, the Zaire government under the autocracy of Mobutu Sese Seko had attempted the way toward pulling back

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outdated cash from the framework, which prompted unexceptional expansion in the nation following which nation confronted a common war which came about into rejection of President Mobutu in 1997.

In 1996, Australia had supplanted all paper-based notes with polymer certified receipts with the point of halting far reaching duplicating. Such polymer notes were produced by the Reserve Bank of Australia (RBA), Commonwealth Scientific and Industrial Research Organization (CSIRO) and the University of Melbourne and Australia turn out to be first nation in the word in presenting such kind of cash.

Later in 2010, North Korea, under the autocracy of Kim Jong-II had started money change in the nation to kill bootleg trades and in addition to fix government's authority over the economy. In 2012, Libya's national bank had likewise pulled back old cash notes to reestablish liquidity when huge segments of assets were not being kept in the nation's banks. Then, amid 1998–2000 the European Union (EU) attempted world's greatest exercise of formation of a solitary cash called European (Euro), which prompted demonetization of different monetary standards of the part nations.

Now and again, a few nations had given adequate occasions to its nationals and other worried to trade old monetary standards with new ones. In 2002, the European Council (EC) had supplanted countless and EU nationals were given two months time. In Philippines the administration had declared to pull back old peso notes in December 2014 beginning from January 2015 yet permitted to its clients to supplant the pulled back note up to January 2016. So also, in 2009, when the US dollar was pulled back as a Zimbabwean cash, residents were allowed a three-month window before supplanting the dollar.

In mid-2015, the State Bank of Pakistan (SBP), or, in other words bank of the nation, had reported that all old structure certified receipts would stop to be legitimate delicate from December 2015. Prior in March 2015, the SBP had coordinated all business and microfinance banks not to issue old planned certified receipts from April 1, 2015. The SBP had begun issuing new notes from the year 2005 and finished this procedure before the finish of year 2008, when every other division got new plans. It was done mostly to enhance the security and toughness of the Pakistani cash notes.

By chance, referring to India's case of demonetization, Pakistan People's Party (PPP) Senator Osman Saifullah Khan, submitted (November 11, 2016) a goals in the Senate, the Upper House, requesting that the Pakistan government pull back 1,000 and 5,000 rupee notes from dissemination in the nation to handle defilement.

In spite of expected feedback of Prime Modi's choice of demonetization of existing Rs. 500 and Rs. 1,000 by driving resistance gatherings of the nation, lion's share of the compatriots, distinction youth have favored it disregarding the hardship looked by them in trading the old cash with new notes.

Pundits expect that demonetization of notes may have some negative impacts in infrastructural and lodging undertakings and online business for the present. In any case, it would have positive outcomes likewise, for example, picking up by banks, cutting down store and loaning rates, better expense accumulation, bigger financial balances and increment in assessment distribution and GDP development. In any case, the best impact would be controls on dark cash in the nation.

Justification

On 8 November 2016, the government demonetised currency notes of two denominarions: Rs. 500 and Rs. 1000. Together, cash notes of these categories had represented over 85% of the aggregate estimation of banknotes available for use. Subsequently; it caused the trade smash out the economy for shorter period. So this paper attempted to study the issues and challenges of demonetization of Indian currency and analysis pre and post demonetization period consumption, production, investment and savings activities of the people.

Review of Literature

As per Dr. Pratap Singh and Virender Singh in paper titled "Effect of demonetization on Indian economy" reasoned that if the cash vanishes as a few hoarders might not want to be seen with their money heap, the economy would not profit. Then again if the cash discovers its way in the economy it could have a significant effect. Anyway encounters from various nations demonstrates that the move was one of the arrangement that neglected to settle an obligation troubled and inflation ridden economy.

As per Nikita Gajjar in her paper titles "Dark cash in India: Present status and future and difficulties and demonetization" demonstrates distinctive parts of dark cash and its association with approach and managerial measures in our nation. It additionally mirrors the strategy and systems that the legislature has been seeking after with regards to ongoing activities, or need to take up sooner rather than later, with the end goal to address the issue of dark cash and defilement out in the open life.

As indicated by Shweta Mehta paper titles "Demonetization: Shifting riggings from physical money to advanced money" the demonetization move could change the substance of the Indian economy. This is a stage which will have a beneficial outcome, if the progress difficulties get took care of well by the organization.

According to Arpita Mukherjee and Tanu M. Goyal article title "Less-Cash Economy: India vis-a-vis the world" comparing India with some of the other countries shows that the currency in circulation in India is higher than many developing and developed countries. In 2015 the share of cash circulation in the economy as a % of GDP of India was 12.3% as compared to 3.8% in Brazil, 5.6% in South Korea and 1.7% in Sweden.

According to Timsy Jaipuria article title "Less Cash Economy: Impact on Black Money" the article concluded that, as India decided to fight against shadow economy on Nov-16 what helped in pulling up the day to day transactions was the fact that peoples could use alternatives of cash. With the nation moving better approach for closing installments, i.e., by utilizing credit/ platinum cards, electronic wallets, portable saving money etc. what is got hit is the development of money.

According to S.Y. Quraishi article title "Demonatisation: Impacting election" concluded that the unprecedental step of demonetization may hopefully turn out to be a blessing in disguise for conducting free and fair elections.

Objectives of the Study

- To study the concept of the demonetization.
- To study the issues and challenges of demonetization.
- To study the pre and post period of demonetization on the different sector of economy.

Research Methodology

This research paper is based on secondary as well as primary data. Some selected secondary data are Central Statistical Organization (CSO), Niti Aayog and other publically available publications. Based on this secondary sources, we investigation the positive and negative effect of demonetization on the Indian economy. For data analysis the period which has been taken for this study is Oct-16 to Feb-17. The primary sources which are used for analysis are opinion of experts, economist, financial advisors and other subject experts.

Limitation of the Study

Following are the limitation of the study:

- Non availability of sufficient data and literature.
- Lack of sufficient time to analysis the impact of demonetization on economy.

Issues of Demonetization

Bribery and Corruption: In India bribery and corruption are the significant challenges. The 2015 Transparency International Corruption Perceptions index ranked India 76 out of 176 compared to its neighbors Bhutan 27th rank, Bangladesh 139th rank, Myanmar 156th rank, Nepal 130th rank, Pakistan 117th rank and Sri Lanka 84th rank. Following are the areas which are most vulnerable to corruption.

- Real estate: Peoples, for example, government officials, specialists and NRI's regularly utilize trade to purchase property out the name of their relatives or confided in workers without settling the regulatory obligation. It has been noticed that amid purchasing and offering of property the land engineers for the most part request 70% installment in line and 30% in real money.
- Tendering processes and awarding contracts: Construction exercises, for example, streets and scaffolds development work are ruled by development mafia i.e. gathering of degenerate government officers, materials providers, legislators and development

temporary workers. As indicated by World Bank report just 40% of store passed out for the poor contacts its required people groups, because of defilement all social spending contract turned out to be squander.

- Education: Corruption in instruction framework achieved an untouched high; especially when the country pictures training as a driver of growth. Vyapam trick and DMAT trick are the couple of precedents which demonstrate defilement in training framework. Numerous private schools like therapeutic, designing and other expert courses request capitation expenses
- Bureaucracy: To complete the work in an open office the general population need to pay influences. Expenses and influences are basic between states outskirts Transparency universal gauges that truckers pay every year Rs. 222 billion in bribes.
- Money Laundering: In India illegal tax avoidance is prevalently known as Hawala exchange. According to Anti Money Laundering (AML) Basel Index, out of 149 nations, India has been positioned 93rd out of 2012, 70th in 2013 and 78th in 2016. High section notes are anything but difficult to exchange starting with one place then to the next place.

Black Money: The world bank in July 2010 estimated the size of the black money for India at 20.7% of the GDP and rising to 23.2% in 2007. A black money damage country's economy. It generates inflation which adversely affects the poor and the middle classes more than the others. It reduces government revenue which could have been used for welfare and development activities. Following are the ways where black money are used.

- Election Poll: It has been noted that in 2014 Lok Sabha election different election party spend Rs. 30,000 crore of black money while the official data was Rs. 7,000–8,000 crore.
- Transfer Pricing: Some Indian corporate under-invoicing their exports and over-invoicing their imports from tax heaven countries. In this way the promoters of public limited companies transfer their unaccounted money.
- Participatory notes (PNs): High net worth investors (HNI), channelize their black money in the Indian stock market through P-notes'-notes are legally issued by FII's without KYC norms.
- Swiss Bank A/C: As per CBI in February 2012, that around US$500 billion of illegal money is stored in tax havens countries mainly in Swiss bank a/c, it's an hint of scam involving ministers.

Fake Indian Currency note: The flow of phony cash in category of Rs. 500 and Rs. 1,000 are similarly bigger when contrasted with other section notes. It is difficult to recognize the fake currency notes which are similar to genuine notes. India import its paper for printing notes from American Banknote Company (USA), Thomas De La Rue (U.K.) and Glesecke and Devrient Consortium (Germany). The fake currency generally printed by Pakistan. In Indian economy the high denomination note printed on the paper which is brought from Thomas De La Rue the U.K. based company, the same company supplied paper to Pakistan also. Thus, high denomination value note like Rs. 500 and Rs. 1000 can easily printed by Pakistan. As per RBI, in 2015–16 the total Indian currency notes in circulation was 90.26 billion out of this not more than 0.63 million i.e. 0.0007% were detected fake currency. The value of fake notes in 2015–16 was Rs. 29.64 crore, which is 0.0018% of the Rs. 16.41 lakhs crore. The estimation of phony cash available for use at some random time is Rs. 400 crore, and 250 in each million notes are phony money, as indicated by joint examination led by the Indian Statistical Institute (ISI) and National Investigation Agency (NIA) in the year 2015.

Challenges of Demonetization

A few people are against demonetization and some are looking forward with hope that something good will happen to our nation and to regular man's life. Followings are the sort of difficulties a typical man were faced:

- *Lack of Money in ATM:* Many people rely upon ATM services as it's easy to withdraw money and saves a lot of time. Due to demonetization, there were long lines in front of ATM, inspite of waiting for long hours, they were not received the money. Likewise many do not have the time to go stand in queues due to few issues like old age or awful health and so on.
- *Currency Change Not Available:* Many individuals who are getting Rs. 2000 note from banks or ATM are not ready to get the change as none of the shopekeeper is prepared to give change of Rs. 1800 on

buy of Rs. 200 so change is a major stress now a days to regular individual.

- *Usage of Online Transaction:* Use of online transaction is one of the best solution but challenge is that many individuals who are of old age do not utilize smart phone and if they use then also big ratio among them is of individuals who do not feel secure on exchanging the cash through online.
- *Medical Treatment:* The most bad hit are the individuals who are not on plastic money and need to deal with urgent medical treatment. The private clinics and chemist are not tolerating old notes nor extending credit.
- *Marriage Functions:* The individuals permitted to withdrawal of Rs 2.5 lakh in cash. Even for that amount a lot of restriction have been imposed. Many are not getting Rs 2.5 lakhs because of deficiency of cash in the bank.
- *Daily Wagers:* Unskilled workers and daily wagers are jobless as their employers need cash to pay them in cash. online transaction was not suitable for them.
- *Foreign Tourists:* Foreign tourists who have withdrawn cash after arriving to India are among the most bad hit. Rather than enjoying the holidays in India they are hurrying around in an outsider land, endeavoring to secure legal currency. The negative criticism to the tourism industry which will influence its reputation.
- *Property Prices:* With less potential purchasers in the market and less individuals having white money, the demand for the land goes down and drives down its cost. This accelerate the demand for land holding which could drive the property costs higher later on.
- *Wholesale Shopkeepers:* The trader class, is influenced given that most of wholesale shopkeepers keep liquid cash to purchase material consistently. Not every traders keep cash in a bank. Huge numbers of traders have incurred losses as a result of the liquidity drying up in the market.
- *Construction and Automobiles:* The Construction sector of the economy was affected unfavourably. This sector works with a lot of cash so, it affected badly. On the other hand the demand side, the demand for houses and buildings would show up as a demand for unnecessary items and may be postponed until the point that the economic situation get standardizes.

The Automobile sector has also been facing discouraging situation as the sales of motor vehicles significantly come down. Public is afraid of purchasing vehicles out of their own funds. Previously certain share of the cost price of the vehicle is met out of black money.

- *Investment and Employment:* To keep the economy going on, both the retailers and different operators in the economy may make supplies on credit with the expectation that in future the payments can be realized There would be a reduction in the demand for non-essential items in the economy due to uncertainty in the availability for cash. The demand from segments which approach advanced medium of trade would stay unaffected, but rest of the medium of trade would get affected. The real estate sector would be seriously affected. Investment in construction sector would also affect negatively and the employability openings in the said segment would also be limited.
- *Farmers:* It is well established reality that in our Country the Agriculture sector has been providing larger employment opportunities both directly and indirectly. The maximum transaction in this fragment of the economy are carried out through cash. With the demonetization of Rs. 500 and Rs. 1,000 notes from the economy, sale of kharif crop would be troublesome unless the crop was sold on the guarantee of payment in future. The bargaining power of the farmers was less, so the value they could receive by selling the crop got reduced substantially. On the other hand, in the sowing activity, individuals would not access the inputs required since the vast majority of the inputs are obtained from the market unless they got credit from the suppliers Further, if there are individuals who do not get credit from the informal sector.

Analysis of Pre- and Post-Demonetization Period

Table 1 clearly indicates that after November 2016 the y-o-y growth rate of major macro-economic indicators decline-money supply (M3), currency in circulation, bank credit and indirect and service tax collected by central government. The service tax collection-lead indicator for communication and other services enrolled a growth rate of 43.9% in Nov-16, however decelerated to 13.1% in Dec-16 and further to 12.1% in Jan-17.

Table 1: Sectorial Indicators (y-o-y growth %)

Periods	*Apr 16 -Oct 16*	*Oct-16*	*Nov-16*	*Dec-16*	*Jan-17*	*Feb-17*
M3	6.4	10.4	8.5	6.6	6.4	6.5
Currency in Circulation	6.9	17.2	-23.6	-39.9	-37.8	-28.2
Bank Credit	1.8	8.4	6.2	4.9	4.7	4.5
Indirect tax collections	24.7	23.4	36.5	20.2	13.9	15.3
Service tax collections by the centre	25.2	29.6	43.9	13.1	12.1	5.3

Source:RBI

Table 2 shows agricultural and industry y-o-y growth rate, within industry electricity generation was expected to have impacted least, with the share of the unorganized sector close to zero(employment). In Nov-16 and Dec-16, electricity generation shoot up by 8.9% and 6.3% respectively, which was higher than the average growth of 4.5% recorded during Apr–Oct-16. In Jan-17, it decreased to 3.9%. As compared to last three months coal production was also shoot up by 6.4% in Nov-17, 4.4% in dec-16 and 4.8% in Jan-17.

From Tables 2 and 3 it is clear that manufacturing sector was affected adversely. The decrease in the sales of fast moving consumer good and automobiles in all the month from Nov-16 to Dec-16. The table also clearly mention that compression in purchasing manager index(PMI)-manufacturing in Dec-16 for the first time in the year 2016. Export growth rate was also reduced (Tables 2 and 3). As per the information released by the society of Indian automobile manufacturing (SIAM) the auto sales shrunk by 4.7% in Jan-17 however came back to development mode by 0.9% in Feb-17. In the two-wheeler and three-wheeler segment, the effect was extreme as we can see in the Tables 2 and 3. The PMI manf index in Jan-17 and Feb-17 and export growth in Dec-16 and Jan-17 was bounced back.

A few segments in the service sector (Table 3) seemed to have been adversely impacted. For the first time after Jun-15, service PMI fell forcefully from 54.5 in Oct-16 to 46.7 and 46.8 in Nov-16 and Dec-16 respectively. In spite of change in Jan-17 to 48.7, it stayed in compression mode. In Feb-17 the index at 50.3 came back to modest expansion mode.

Production of cement one of the fundamental indicator of construction sector decelerated sharply in Nov-16 and shrunk by 8.7% and 13.3% in Dec-16 and Jan-17 respectively.

Sales of commercial vehicles (CV) – a pointer for transportation activity-shrunk by 11.6% in Nov-16, 5.1% in Dec-16 and 0.7% in Jan-17 as against normal development of 6.9% in Apr-Oct-16. In Feb-17, it expanded by 7.3%.

Sales of passenger vehicle (PV) was also decelerated to 1.8% in Nov-16 and shrunk by 1.4% in Dec-16, yet bounced back 14.4% in Jan-17 and extended by 9% in feb-17.

Table 2: Sectorial Indicators (y-o-y growth %)

Periods	*2016-17*	*Oct-16*	*Nov-16*	*Dec-16*	*Jan-17*	*Feb-17*
AGRICULTURE						
Foodgain production	8.1	N.A.	N.A.	N.A.	N.A.	N.A.
INDUSTRY	Apr-Oct 16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17
PMI manf.Index	52	54.4	52.3	49.6	50.4	50.7
IIP	-0.3	-1.9	5.7	-0.1	2.7	N.A.
(i)Mining	-0.2	-0.9	3.7	5.5	5.3	N.A.
Coal	0.7	-1.6	6.4	4.4	4.8	N.A.
Crude Oil	-3.3	-3.2	-5.4	-0.8	1.3	N.A.
Natural gas	-4	-1.4	-1.7	0	11.9	N.A.
(ii) Manufacturing	-1	-2.4	5.5	-1.7	2.3	N.A.
(iii) Electricity	4.5	1.1	8.9	6.3	3.9	N.A.

Source:RBI & CSO

One of the most important component of service sector is financial services. The normal development of deposit and credit (a key pointer for financial services) remained to a great extent unchanged after demonetization. Insurance premium, another key pointer, recorded a y-o-y increment of 72.1% in Nov-16 before moderating in Dec-16 and Jan-17.

In transportation, domestic air passenger traffic growth was robust at 22% in Nov-16 and 23.9% in Dec-16 and 25.6% in Jan-17, like the normal development in Apr-Oct-16. Domestic air cargo traffic activity shrunk by 0.6% in Nov-16, but revived to 7.5% in Dec-16 and 10.1% in Jan-16. Development in international cargo traffic and international passenger traffic registered a solid growth rate of 15.4% and 7.7% respectively in Nov-16.

Table 3: Sectorial Indicators (y-o-y growth %)

Periods	*Apr-Oct16*	*Oct-16*	*Nov-16*	*Dec-16*	*Jan-17*	*Feb-17*
SERVICES						
PMI Services	52.6	54.5	46.7	46.8	48.7	50.3
Automobile sales	15	8.1	-5.5	-18.7	-4.7	0.9
C.V. sales	6.9	11.9	-11.6	-5.1	-0.7	7.3
P.V.sales	11	4.5	1.8	-1.4	14.4	9
Three wheelers sales	11.8	4.4	-25.9	-36.2	-28.2	-21.4
Two wheelers sales	16	8.7	-5.9	-22	-7.4	0
Cargo handled	6.3	13.2	10.2	12.9	3.6	N.A.
Railway freight traffic	-1.7	-2.6	5.5	-0.1	0.3	N.A.
Tourists arrivals	10.8	10.4	9.2	13.6	16.4	N.A.
Cement production	4.8	6.2	0.5	-8.7	-13.3	N.A.
Steel production	2.7	0.3	5	5.3	3.1	N.A.
Civil aviation:domestic cargo traffic	7.5	10.6	-0.6	7.5	10.1	N.A.
Civil aviation:international cargo traffic	9.2	15.6	15.4	12.6	16	N.A.
Civil aviation:international passenger traffic	9.1	7.4	7.7	7.7	8.8	N.A.
Civil aviation:domestic passenger traffic	22.5	23.6	22	23.9	25.6	N.A.
Bank deposits growth	6.4	9.3	15.7	14.9	13.5	12.6
Insurance premium	31.1	22.4	72.1	21.1	32.1	-4.5
Merchandise exports	0.2	9	2.4	5.5	4.3	N.A.
Merchandise imports	-9.8	8.3	9.4	0.1	10.7	N.A.

Source:RBI & CSO

The Table 4 indicate growth in consumer durable segment-the fast moving consumer goods (FMCG) growth during Oct-16 and Nov-16. In consumer durable washing machine growth was robust at 116.7% in Oct-16 and contracted drastically 31.7% in Nov-16. In the same fashion other category of consumer durable segment got similar contraction in sales (Table 4).

Table 4: Growth in Consumer Durable Segment

Category	*Volume growth*		*Value growth*	
	Oct-16	Nov-16	Oct-16	Nov-16
Microwave	90.6	-53	90.7	-51.5
Refrigerators	74	-41.2	73.4	-40.3
Air conditioner	1.8	-34	4	-33.8
Washing machine	116.7	-31.7	113.1	-34.4
Flat Panel TV	94.7	-30.4	99.4	-26.6

Source:GFK-Nielson

Currency in Circulation

As per the data available with the RBI up to 97% of the demonetized bank notes have been deposited into banks which have received a total of Rs. 14.97 lakhs crores as on Dec-16 out of the Rs. 15.4 lakhs crores that was demonetized, of the 15.4 lakhs crores demonetized in the form of Rs. 500 and Rs 1000, Rs. 9.20 lakhs crores in the form of Rs. 500 and Rs. 2,000 bank notes of the new series came back on 10th Jan, 2017 two month after the demonetization.

Table 5: Currency in Circulation (In lakhs crores)

08-11-2016	15.44
18-11-2016	1.36
28-11-2016	2.49
07-12-2016	4
21-12-2016	5.93
10-01-2017	9.2
24-02-2017	11.64
28-04-2017	14.06

Source:RBI

Schedule Commercial Bank

Decline in currency in circulation on account of demonetization led to increase in bank deposits. As per Table 6 aggregate deposits of schedule commercial bank increased by Rs 6261 billion during Oct 14, 2016 to Feb 3, 2017. Bank credit extended by schedule commercial banks increased by Rs 1,168 billion.

Table 6: Schedule Commercial Banks Business (In Billion)

Particulars	*Oct 14,2016*	*Feb 3,2017*	*Variation*
Bank Deposits	99363	105624	6261
Bank Borrowings	2972.3	3200	228
Bank Credit	73622	74790	1168
Invt.in Govt securities	28852	34712	5860

Source: RBI

Pradhan Mantri Jan Dhan Yojana

Post-demonetization 278.3 million new accounts were opened under the pradhan mantra jan dhan yojana (Ref. Table 7). Deposits under PMJDY accounts increased drastically post demonetization. The aggregate balance in PMJDY deposits account jumped to Rs 746 billion as on Dec 7, 2016 from Rs 456 billion as on Nov 9, 2016, registered an increase of 63.6%. The government of India had watched this movement in PMJDY and issued a notice against the abuse of such accounts.

Table 7: Number of Accounts-PMJDY (In million)

Particular	*Nov 9,2016*	*Mar 1,2017*
Public Sector Banks	203.6	222.9
Regional Rural Banks	43.1	46.4
Private Sector Banks	8.4	9
Schedule Commercial banks	255.1	278.4

Source: www.pmjdy.gov.in

Digital Modes of Payments

After demonetization people were motivated to use cash less transaction. Table 8 mention year on year growth in % in most of the banking transaction which was done through internet banking like NEFT, CTS, IMPS and NACH during the pre and post demonetization period. After the declaration of demonetization, electronic method of payments were low in the underlying weeks as individuals were occupied in saving/trading old cash. In Dec-16, digital payment activity increased drastically. The digital payments were good in Oct-16, mainly on account of festival season. The growth rate further pick up in some components of digital payment from nov to Jan-17 (Ref. Table 8). Later on, the pace of growth moderated in Feb-17.

Table 8: Digital Mode of Payment (Y-o-Y growth in %)

Category		*Oct-16*	*Nov-16*	*Dec-16*	*Jan-17*	*Feb-17*
NEFT	Volume	16.2	23.3	39	38	34.5
	Value	37.6	38.3	40.8	60.2	49.5
CTS	Volume	-1.1	23	58.4	52.7	20.2
	Value	2.9	8.6	13	19.3	0.8
IMPS	Volume	116.7	89.6	157.2	177.7	150.4
	Value	150.7	135.9	186.6	196.7	184.2
NACH	Volume	53	30	58.3	19.8	-0.9
	Value	89.8	76.3	116.7	22.8	54.2

Source:RBI

Findings

Following were the findings of the study

- Demonetization have a positive and negative impact on the society, but it is clear that it has a negative impact on the short period due to significant changes made by the government of India through demonetization. Demonetization have also negative effect on consumption, production, savings and investment. In caseless economy it is not easy to improve these sector over the short period. GDP is also slow down for next 2 to 3 years due to demonestisation, but apart from these negative effects it has also a positive effects on Indian economy that is it is helpful to prevent fake money, corruption, black money in the economy. After 3 years the GDP growth will be faster because the parallel economy should be totally stopped.
- As per the study the impact of the demonetization on the Indian economy has been for short period. The analysis of the study period suggest that demonetization impacted various sectors of the economy for short period mainly in the month of Nov-16 and Dec-16. After that the impact got moderated in Jan-17 and Feb-17.
- The organised sector of the economy remained unaffected mostly. The impact of demonetization was depicted in the real estate and construction.
- As the currency in circulation declined during study period and deposits with the bank increased. This create huge liquidity in the banking system which was managed by the RBI through the investment in reverse repo, investment in government security and other monetary policy tools.
- There has been a drastic improvement in the use of digital modes of payments after demonetization which led to cashless economy.

Suggestion

Although demonetization has a negative and positive effect on the economy but there should be a need to take care of a improvement by implementing the following suggestions.

- Demonetization has a major negative effect on the survival of daily wages, homemakers, sex workers, common men thus government of India should generate job opportunity for the better survival of life.
- Government should promote self-employment through training, financing and subsidies.
- Government should give training to common man so that they become user friendly to caseless economy.

Conclusion

In spite of the initial hiccups and disruptions in the economy, this change will be all around acclimatized and over the long haul it will demonstrate positive for the economy. Since black money does not mean cash, squeezing out money won't influence black money. As per the study cash is only 1% of the total black wealth and doesn't affect black income generation. So, demonetization did not affect black economy at all. In any case, unorganized sector was hit hard as it work largely on money (Indian economy works 76% in real money exchange) than the organised sector. Digitization assist organised sector as contrasted with unorganized sector.

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Abbreviation

RTGS	–	Real Time Gross Settlement
NEFT	–	National Electronic Funds Transfer
CTS	–	Cheque Truncation System
IMPS	–	Immediate Payment Service
NACH	–	National Automated Clearing House
UPI	–	Unified Payments Interface
USSD	–	Unstructured Supplementary Service Data
POS	–	Point of Sale
PPI	–	Prepaid Payment Instrument

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