

INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, ECONOMICS & MANAGEMENT

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Indian Citation Index (ICI), J-Gate, India (link of the same is duly available at Inlibnet of University Grants Commission (U.G.C.)),

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**ASSESSMENT AND DEVELOPMENT PROGRAM
(A CASE STUDY OF SUDARSHAN CHEMICAL INDUSTRIES LIMITED)**

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ABSTRACT

Assessment and Development is a systematic evaluation of the present capabilities of the employees in an organization. This is organized on the principles of goals, Management by Objectives and Skills. Assessment and Development has a historical dimension and is primarily concerned with the performance of an employee. Assessment and Development gauge the skill and attitude the employee. The objective of the study is to highlight the importance of Assessment and Development Program that gives a whole new dimension to the Organizational System. The study is Descriptive in nature and Convenience sampling process was used for data collection. The inference of the data analysis indicated that there were discrepancies in successors identified based on Assessment and Development Program. Based on the findings, corrective interventions were suggested. This study implies that Assessment and Development Program has a direct impact on business by enhancing competencies and capabilities of the employees, developing leaders and building strong successors to raise the bar of business.

KEYWORDS

assessment, competencies, sustainable development.

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INTRODUCTION

Human Resource Management, in the sense of getting things done through people, is an essential part of every manager's responsibility, but many organizations find it advantageous to establish a specialist division to provide an expert service dedicated to ensuring that the human resource function is performed efficiently.

"People are our most valuable asset" is a cliché, which no member of any senior management team would disagree with. Yet, the reality for many organizations is that their people remain undervalued, under trained and underutilized.

The key features of the assessment centers are that these are multiple assessment processes. There are five main ways:

- A group of participants.
- Participate in a variety of exercises.
- Observed by a team of trained assessors.
- Evaluate each participant against a number of predetermined job related behaviors.
- Pooling shared data then make decisions.

Assessment is generally done in systematic ways which are as follows:

- The supervisors measure the skills and knowledge of employees and compare it with targets and plans.
- The supervisor analyses the factors behind work performances of employees.
- The employers are in position to guide the employees for a better performance.

For Example:

- observation (an assessor observing performance in the workplace)
- third party reports (reports from a supervisor or other qualified person verifying a person's abilities)
- questioning (an assessor asking the learner questions in written or oral form to check their knowledge of key aspects of a unit)
- A work based project (a project undertaken on the job to demonstrate competency in one or more units).

OBJECTIVES OF THE STUDY

1. To study the Assessment and Development program of SUDARSHAN Chemical Industries Ltd.
2. To study the factors considered for Assessment and Development Program.
3. To study the tools and Techniques used for the Assessment and Development Program of Supervisors.
4. Identifying the key skills and abilities that will allow Sudarshan's employees to deliver better results for their business.
5. Accurately and specifically measuring the return on Assessment and development investments.
6. To suggest the industry based upon findings of the study.

HYPOTHESIS

The study was also undertaken to test the following hypothesis:

1. An employee poses the important skills required to perform the job.
2. There is correlation between people skill and leadership skill of the respondents.

METHODOLOGY

Given the exploratory nature of this paper, the empirical data needed was acquired by way of multiple data collection techniques. Methodological triangulation facilitated the use of multiple data collection methods consisting of open-ended, face-to-face interviews and completed questionnaires by key informants. The key informants for the study were 52 employees at both supervisor and Technician level who had sufficient knowledge of the phenomenon being investigated and who were in appropriate positions to provide first-hand information.

SCOPE OF THE STUDY

The present study undertaken by the observer is focused on certain specified functional area within the regular limits and is restricted to Assessment and Development in Sudarshan Industries Ltd. within Roha.

The geographical scope of the study covers Roha. The functional scope is confined to the Assessment and Development in Sudarshan Chemical Industries. By Assessment and Development, we mean the consists of simulation exercises supplemented by various ingredients such as interviews and psychological tests. Assessment exercises are the means by which a participant has the opportunity and the chance of displaying behavior relevant to the job.

Assessment refers to the performance i.e. identification of the hidden talents and skills of a person. The person might or might not be aware of them. Assessment is a future-oriented whose main objective is to identify and evaluate the potential of the employees to assume higher positions and responsibilities in the organization hierarchy. Many organizations consider and use Assessment and Development as a part of the industrial growth processes.

The periodical scope of the study is confined to the duration of the research.

SIGNIFICANCE OF THE STUDY

The study conducted on Assessment and Development in Sudarshan Chemical Industries Ltd. Roha, being different in nature, will bring out a different understanding about the situations of Sudarshan Industries. The present research work will be useful to the Sudarshan Industries as a whole for the purpose of framing Assessment and Development Program. Also, it will be useful for creating and generating more awareness among the employees of Sudarshan Industries to know the benefits of Assessment for Development.

Assessment is a training and development activity or event, these multiple processes involving a group of participants in variety of exercises. The participants are to be observed by a team of trained assessors and management team of Sudarshan. Each participant is assessed against a number of job related behaviors and skills. Decisions are made on the basis of shared data collected for key features.

Organizations who wish to have a long term future have simply had to become more professional in identifying and developing the talents they need.

REVIEW OF LITERATURE

According to National Quality Council defines "The process of collecting evidence and making judgments on whether competency has been achieved to confirm that an individual can perform to the standard expected in the workplace, as expressed by the relevant endorsed industry/enterprise competency standards of a training package or by the learning outcomes of an accredited."¹

According to Hay Group "Assessment is simply a process designed to ensure that a person has achieved all the skills and knowledge requirements of a unit. This is not based on an exam or test (as it would have been at school). Assessment in a competency-based system involves a number of methods, usually in combination".²

Bagul (2017) states that in today's working climate demands a great deal of commitment and effort from Employees, who in turn naturally expect a great deal more from their Employers. Performance Appraisal must be seen as an intrinsic part of a Manager's responsibility and not an unwelcome and time-consuming addition to them. People need to feel they have a clear path to learn and grow in their jobs and progress in their careers. People are no longer as loyal to an employer as they once were and today are more concerned with opportunities for learning and development than any other aspect of the job. The reality is, if they can't find those opportunities with your organization, they will find them elsewhere³.

Rightly stated by John Ugoani in his research paper on Performance Appraisal and its Effect on Employees' Productivity in Charitable Organizations that, Performance appraisal is a veritable tool for organizations to evaluate and increase the quality of education and training of their workforce with a view to developing lifelong learning patterns and strategies to sustain productivity throughout longer working periods. Motivation as it relates to employee productivity is often behind the drive for performance and self-actualization, and provides opportunities for higher productivity.⁴

According to Udeze, the evaluation of performance may either be informal or formal. The informal appraisal which is based on the day-to-day working relationships of an employee and the superior provides an opportunity for the superior to judge the subordinate. This judgement is then communicated through conversation on the job or by on-the-spot examination of a particular task. A formal appraisal is through reporting the superior's observations of an employee's performance to management for necessary action⁵.

Gerbamn Employee development programs includes a variety of teaching technique, schedule, and helping learning environment that ensure employee to improve their skills and later apply on their jobs⁶

Performance evaluation is significantly important for staff motivation, attitude and behavior development, communicating and aligning individual and organizational aims, and fostering positive relationships between management and staff⁷.

As Michael Armstrong & Murlis point out, "recent developments in assessment training have treated it as a developmental process that enables managers to get to the heart of how they can manage and coach people more effectively, and that helps other staff to get the most out of their involvement. Typical approaches to performance mgmt. training are likely to focus on: concentrating initially on learning styles because people have to understand how they themselves learn and how they can help others to learn"⁸

Performance management research shows that a significant number of employees tend to have the desire to perform their jobs well as part of their individual goals as well as a demonstration of loyalty towards the organisation⁹.

RESEARCH GAP: A substantial volume of literature both at the micro and macro levels can be seen on the subject of tourism. The literature survey has helped to understand and appreciate the earlier studies conducted in the field of tourism and it has provided a broad framework for various aspects of tour, travel, tourism, developmental, recreational and hospitality already found in the tourism industry. This study also compares the growth and development of tourism from tourist's expectation point of view. But studies on importance of tourism in the study regions are almost scanty. To cover this research gap in the district of Solapur this vibrant topic has been chosen for study.

HYPOTHESIS**Hypothesis I:**

[H0]: Employees do not pose the important skills required to perform the job.

[H1]: Employees poses the important skills required to perform the job.

HYPOTHESIS TESTING

TABLE 1

t-Test: Employee Poses Important Skills	Observation
Mean	6.5
Variance	6.571
Observations	8
Hypothesized Mean Sample	52
df	7
t stat	7.17
P(T<=t) one-tail	0.000090
t Critical one-tail	1.89
P(T<=t) two-tail	0.00
t Critical two-tail	2.36

Test Statistic: $t = 1.89$

P- value = 0.000090

Rejection Region: Reject H_0 if $t > 1.894$

Decision/Conclusion:

As t Stat $7.171 > 1.894$, Reject H_0 and accept H_1 .

Hence calculated value is greater than significance value so researcher has rejected Null hypothesis [H_0] and accept alternative hypothesis [H_1].

It means that employees pose the important skills required to perform the job.

HYPOTHESIS II:

[H_0]: There is no correlation between people skill and leadership skill of the respondents.

[H_1]: There is correlation between people skill and leadership skill of the respondents.

TABLE 2

t-Test: Two-Sample values of People Skill and Leader Skill	Observation
Mean	11.66666667
Variance	31
Observations	9
Hypothesized Mean	52
df	8
t stat	6.286185571
P(T<=t) one-tail	0.00011814
t Critical one-tail	1.85
P(T<=t) two-tail	0.00
t Critical two-tail	2.30

Test Statistic: $t = 6.286$

P- value = 0.000118

Rejection Region: Reject H_0 if $t > 1.8595$

Decision/Conclusion:

Because t Stat $6.286 > 1.8595$, Reject H_0 and accept H_1 .

Hence calculated value is greater than significance value so researcher has rejected Null hypothesis [H_0] and accept alternative hypothesis [H_1].

It means there is correlation between people skill and leadership skills of the respondents.

FINDINGS

- Participants Supervisors are establishing and monitoring the goals and objectives of their jobs as exceeds the requirements.
- The performance in collaboration among employees and departments to achieve results of Supervisors are very much aware about that working skills.
- The supervisors' skills are as per requirements for Seeking and utilising opportunities for continuous learning and self-development.
- Maximum Supervisors are having skills to understanding and seeking to achieve Sudarshan mission and values.
- Maximum Supervisors are responding to changing organization for utilizing working as requirements of management.
- There are few supervisors lead to taking appropriate and timely action to overcome unexpected hurdles or obstacles to a plan or project of Sudarshan.
- Maximum numbers of the supervisors are expressing loyalty and dedication to Sudarshan in interactions with others.
- Maximum supervisors had skills to setting up and monitoring timeframes and plans regarding the project work.
- The participant supervisors have skills to understanding clear and assertive communication skills and create rapport and trust among them are as per requirement of management.
- The communication skill of Participant supervisors is good in conducting and efficient meetings.
- The maximum participants are outstanding in listening skills.
- The maximum supervisors are good in conducting regular meetings with direct reports to discuss performance and achievement of objectives.
- Supervisors having skills as per requirements to encouraging teamwork and collaboration as a method to accomplish tasks and achieve objectives.
- The people skills of participant supervisors are as per requirements of organization of recognizing and rewarding people for doing their best.
- Maximum participant's supervisors have skills in constructively receiving criticism and suggestions from others.
- The participant's supervisors have skills for leading and allocating tasks to achieve goals.
- Supervisors have skills empowering others to achieve results and hold them accountable for actions as per requirement.
- The Participants Supervisors have skills to motivating others in order to reach organizational goals.
- Supervisors have skills to influencing others in a way that results in acceptance, agreement, or behavior change.
- Supervisors are skilled for Aligning resources to meet the business needs of SUDARSHAN.
- The skills of Understanding the costs, profits, markets, and added value of the department and how those contribute to the success of SUDARSHAN, of the participated Supervisors.
- The majority of supervisors are willing to Looking at the "big picture" of SUDARSHAN's goals, rather than individual department's needs.
- Supervisors are outstanding skills for Anticipating marketplace opportunities and supports speed to market.

SUGGESTIONS

- There is need to more improvement in performance to establishing and monitoring the goals and objectives of their jobs.
- Respondents who are as per requirements of skills have to improve to level of outstanding performance in collaboration among employees and departments to achieve results.

3. The employees have to gives outstanding performance in Seeking and utilizing opportunities for continuous learning and self-development.
4. Having requirement skills of respondents is to be improving up to outstanding level of performance in understanding and seeking to achieve mission and values.
5. There should be need improvement of performance in responding to changing organization.
6. Should be increasing the skills of Taking appropriate and timely action to overcome unexpected hurdles or obstacles to a plan or project.
7. Need to improve the skills of Expressing loyalty and dedication to in interactions with others in respect of working skills.
8. There is need more improvement as per requirement of Supervisors to give performance to Setting up and monitoring timeframes and plans regarding the project work.
9. Supervisors should meet requirements at least Understanding clear and assertive communication skills and also to create rapport and trust among them.
10. There is need to meets requirement of Supervisors skills to conducting and efficient meetings, to improve communication skills.
11. Need slight improvement in Listening skills for communication.
12. Should to improve the skills for conducting regular meetings with direct reports to discuss performance and achievement of objectives.
13. Have to meets requirements of skills to Encouraging teamwork and collaboration as a method to accomplish tasks and achieve objectives.
14. Employees are needed to improve their skills of Recognizing and rewarding people for doing their best.
15. Need improve to meets the requirement of the supervisor’s skills in constructively receiving criticism and suggestions from others.
16. Because of poor performance, needs some improvement to their skills to Giving others direct, constructive feedback which can be used to achieve goals.
17. Employees need slight improvements of skills for Leading people and allocating tasks to achieve goals.
18. Employees need to meets requirements of skills to empowering others to achieve results and hold them accountable for actions.
19. Improvement of skills to motivating others in order to reach organizational goals.
20. Needs improvement of skills to influencing others in a way that results in acceptance, agreement, or behavior change.
21. Skills of aligning resources to meet the business needs have to be notified.
22. Slightly needs improvement of skills to Understanding the costs, profits, markets, and added value of the department and how those contribute to the success.
23. Looking at the "big picture" of goals, rather than individual department's needs as per meets that are poor in performance.
24. Need some improvement of skills for Anticipating marketplace opportunities and supports speed to market.

SCOPE FOR FURTHER RESEARCH

Assessment and Development program have been found to add value to the organization and are proliferating the world over. Despite being time consuming and expensive the Assessment Program is presently the strongest predictor of future job performance if designed and implemented properly. It is desirable that Assessment and Development program follows skill audit which could be carried out for measuring and recording skills of an individual or group required for various job positions in an organization. It will not only save time but will also facilitate running of an Assessment and Development Program. Considering the trends, assessment and development program have a bright future as in the globally competitive environment; the competitive edge of an organisation will depend on competency edge of its people.

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ANNEXURE

TABLE 1: SHOWING OPINION OF THE RESPONDENTS OF THEIR WORK SKILLS

Important skills to perform the job	Poor	Needs im- provement	Meets re- quirement	Exceed re- quirement	Outstanding	Total
Establishing and monitoring goals and objectives	0 (0%)	3 (5.76%)	(0%)	27 (51.92%)	22 (42.30%)	52 (100%)
Encouraging collaboration among fellow employees and departments to achieve results	0 (0%)	0 (0%)	16 (30.76%)	20 (38.46)	16 (30.76%)	52 (100%)
Seeking and utilizing opportunities for continuous learning and self-development	4 (7.69)	2 (3.84%)	13 (25%)	22 (42.3%)	11 (21.15%)	52 (100%)
Understanding and seeking to achieve mission and values	0 (0%)	0 (0%)	2 (3.84%)	8 (15.38%)	42 (80.76%)	52 (100%)
Responding to a changing organisation	0 (0%)	0 (0%)	10 (19.23%)	29 (55.76%)	13 (25%)	52 (100%)
Taking appropriate and timely action to overcome unexpected hurdles or obstacles to a plan or project	6 (11.53%)	6 (11.53%)	18 (34.61%)	18 (34.61%)	4 (7.69%)	52 (100%)
Expressing loyalty and dedication to in interactions with others	0 (0%)	0 (0%)	8 (15.38%)	29 (55.76%)	15 (28.84%)	52 (100%)
Setting up and monitoring timeframes and plans	2 (3.84%)	5 (9.61%)	2 (3.84%)	15 (28.84%)	28 (53.84%)	52 (100%)

TABLE 2: TABLE SHOWING COMMUNICATION SKILLS OF RESPONDENTS BEING ASSESSED

Important skills to perform the job	Poor	Needs improvement	Meets requirement	Exceed requirement	Outstanding	Total
Understanding clear and assertive communication skills and how they create rapport and trust	0 (0%)	0 (0%)	7 (13.46)	25 (48.07%)	20 (38.46%)	52 (100%)
Conducting effective and efficient meetings	0 (0%)	0 (0%)	8 (15.38%)	19 (36.53%)	25 ((48.07%)	52 (100%)
Listening carefully	0 (0%)	0 (0%)	0 (0%)	9 (17.30%)	43 (82.69%)	52 (100%)

TABLE 3: ASSESSMENT OF RESPONDENTS OF PEOPLE SKILLS

Important skills to perform the job	Poor	Needs improvement	Meets requirement	Exceed requirement	Outstanding	Total
Conduct regular meetings with direct reports to discuss performance and achievement of objectives	0 (0%)	0 (0%)	12 (23.07%)	27 (51.92%)	13 (25%)	52 (100%)
Encouraging teamwork and collaboration as a method to accomplish tasks and achieve objectives	3 (5.76%)	5 (9.61%)	10 (19.23%)	19 (36.53%)	15 (28.84%)	52 (100%)
Recognizing and rewarding people for doing their best	0 (0%)	6 (11.53%)	6 (11.53%)	21 (40.38%)	19 (36.53%)	52 (100%)
Constructive receiving criticism and suggestions from others	0 (0%)	0 (0%)	14 (26.92%)	11 (21.15%)	27 (51.92%)	52 (100%)

TABLE 4: LEADER SKILLS ASSESSMENT OF RESPONDENTS

Important skills to perform the job	Poor	Needs improvement	Meets requirement	Exceed requirement	Outstanding	Total
Giving others direct, constructive feedback which can be used to achieve goals	4 (7.69%)	8 (15.38%)	10 (19.23%)	6 (11.54%)	24 (46.15%)	52 (100%)
Leading people and allocating tasks to achieve goals	2 (3.85%)	2 (3.85%)	9 (17.31%)	18 (34.62%)	21 (40.38%)	52 (100%)
Empowering others to achieve results and holds them accountable for actions	0 (0%)	3 (5.77%)	14 (26.92%)	22 (42.31%)	13 (25%)	52 (100%)
Motivating others in order to reach organisational goals	0 (0%)	0 (0%)	8 (15.38%)	8 (15.38%)	36 (69.23%)	52 (100%)
Influencing others in a way that results in acceptance, agreement, or behaviour change	0 (0%)	3 (5.77%)	14 (26.92%)	11 (21.15%)	24 (46.15%)	52 (100%)

TABLE NO 5: BUSINESS SKILLS OF THE RESPONDENTS IN VARIOUS ASPECTS

Important skills to perform the job	Poor	Needs improvement	Meets requirement	Exceed requirement	Outstanding	Total
Aligning resources to meet the business needs	2 (3.84%)	2 (3.84%)	8 (15.38%)	18 (34.61%)	22 (42.30%)	52 (100%)
Understanding the costs, profits, markets and added value of the department and its contribute to the success	1 (1.92%)	3 (5.76%)	11 (21.15%)	14 (26.92%)	23 (44.23%)	52 (100%)
Looking at the 'big picture' of goals, rather than individual departments needs	1 (1.92%)	3 (5.77%)	10(19.23%)	14 (26.92%)	24 (46.15%)	52 (100%)
Anticipating marketplace opportunities and supports speed to market	2 (3.84%)	4 (7.69%)	11 (21.15%)	12 (23.07%)	23 (44.23%)	52 (100%)

INDIAN COMMODITY DERIVATIVES MARKET: THE PAST, PRESENT AND FUTURE**Dr. KIRANKUMAR R. BANNIGOL****ASST. PROFESSOR****PG DEPARTMENT OF STUDIES IN COMMERCE****KARNATAK UNIVERSITY****DHARWAD****PRAGATI HEMAREDDY RADDER****STUDENT****DEPARTMENT OF COMMERCE****KARNATAK UNIVERSITY****DHARWAD****ABSTRACT**

The Indian Commodity Derivatives markets are a good source of critical information and an indicator of market sentiments. Since, commodities are very frequently employed as input in the production of goods or/and services, uncertainty and volatility in commodity prices and raw materials makes the Indian business environment erratic, difficult to predict. With expanding growth of Indian commodity derivatives market both in domestic and international pace, there exists a need of conducting the study, which is possible only if we analyse and comprehend the existing stock of literature. The present study focuses on the review of existing literature on the basis of different sections. The study is descriptive in nature and involves review of various scholarly research articles, peer reviewed national and reputed international journals, reputed reports of commodity exchanges and government official websites from 2012 to 2021. The study will help research students and other research institutions in analysing the existing literature to do further research in this arena.

KEYWORDS

commodities, commodity derivatives, commodity exchanges, economic growth.

JEL CODE

Q02

INTRODUCTION

The opening-up of an economy to the world popularly known as the globalization, no doubt has increased the set of opportunities, along with the increased volatility in the market. This essentially makes derivative instruments attractive which made them to grow potentially in the market. In India both the financial and commodities derivatives market underwent a rapid growth. Especially commodity derivatives which were traded even in the ancient times had underwent through many obstacles such as world wars, government banning commodities derivatives trading etc., but with increasing demand for financial derivatives in India finally Indian commodity derivative market took a massive step to introduce commodity derivatives trading again in the year 2000. Many works of research have been done on Indian commodity derivatives market since then, such as evolution, growth, market efficiency, price discovery and volatility of market.

This study is undertaken to review the existing literature in Indian commodity derivatives market on the basis of sections to easily categorise the works to help the research scholars in analysing the existing literature. The remaining sections of the paper consists objectives, limitations, research methodologies, analysis of existing literature, discussions and interpretations followed by the conclusion.

OBJECTIVES

The study is conducted to review the existing literature in the Indian commodities derivatives market by categorising the same in to different sections on the basis of works of literature done. The following are objectives of the study

- 1) To study the Evolution of commodity derivatives market in India.
- 2) To observe the commodity derivatives market performance and economic growth.
- 3) To analyse the price discovery, volatility and co-movement of futures and spot prices in commodity derivatives market.
- 4) To understand the governments and stock exchanges reports; and, market efficiency.
- 5) To observe the foreign markets studies in commodity derivatives market.

RESEARCH METHODOLOGY

The present study is descriptive in nature and the secondary data has been collected from various scholarly research articles, peer reviewed journals, reputed reports of commodity exchanges and government official websites. The sample period is 2012 to 2021.

ANALYSING OF EXISTING LITERATURE**1) Evolution of commodity derivatives market in India**

- Mahantesh angadi (2020), in his paper "Futures market in india underwent a rapid growth- An overview", studied the commodity derivatives market in india and also identified the road blocks in providing interface to execute the commodity derivatives. The study is descriptive and concludes that commodity derivatives plays an important role in the price risk management. Even though many developed and developing countries uses the derivatives, in india they have been utilized in a very limited scale because of government intervention in the production, supply and distribution of many agricultural commodities and also futures and forward instruments are available on only certain commodities.
- K. Shree Jyothi and D. Srinivasa Rao (2017), studied on the topic titled "Indian Commodity Markets: A Thematic Review of Existing Literature". They aimed to study the origin, Development, role of Exchanges, risk management, performance of Indian Commodity markets and the role of regulatory mechanism in commodity trading. The study was descriptive and found that the market participants are worried about the transaction costs and liquidity. commodity markets have more potential to contribute to price stability and economic development.
- Shaik masood and t satyanarayana chary (2016), jointly studied on the topic of "Performance of commodity derivatives market in india", the main objective of the study is to analyze the growth, trends and prospects of commodity derivative market in india and test the significance of performance of the market. The study is analytical and explorative in nature and collected the data of six national commodity exchanges, namely, MCX, NCDEX,

NMCE, ICE, ACE and UCX from 2005-06 to 2012-13. The data is tested using least square method, t-test, f-test and chi square test and found that the performance of the commodity market found through the volume and value of market has been growing at average compounded growth in volume and value of futures market by 15 and 29 percent respectively. Such growth is non-linear between estimated and actual volumes and values. On the other hand, the variance between the volume and value of the market follows a reciprocal trend. The trend projection of market over a period of next ten years is linear at a growth rate of 45.65 and 58.71 percent in volume and value of market. Hence, the performance of the market is very considerable and progressive.

2) Commodity derivatives market performance and economic growth

- Ayben koy (2018), in his research paper titled "Testing multi bubbles for commodity derivative markets: a study on MCX", he investigated the presence of bubbles in metal futures in the multi commodity exchange of India limited (MCX). The sample data includes copper, lead, nickel and zinc and aluminum from 2010 to 2017 and he used sup augmented dickey fuller (SADF) test and also generalized sup augmented dickey fuller (GSADF) test to investigate presence of bubbles. In the study, the bubbles in non-precious metals futures prices are detected in MCX. But, the bubble identified in copper futures market in MCX and the speculative attacks in other commodity futures contracts in the sample are already existed in other markets also. He concluded that the presence of bubbles associated with the Indian economy does not correspond to the reality of globalized financial markets.
- Suresha b (2015), worked on the paper "Causal nexus between commodity derivatives market reforms and economic growth – evidence from indian agricultural sector". The study attempted to analyse linkages between commodity derivatives market reforms, growth of commodity derivatives trading and economic growth. The data used for the study comprises of quarterly closing trading volume of futures of agricultural commodities and agricultural sectoral GDP growth rate. The trading volume data has been obtained from NCDEX, NMCEX, and MCX from the date of inception of the contracts on agriculture commodities mainly from April 2004 to march 2013. Augmented dickey fuller (ADF), phillip perron (PP), linear regression, Anova test and Coefficients are used to study the data. He observed that there are linkages between commodity future trade volume and GDP segment wise, governments should look at these markets for reforms and there by contribute for economic development i.e., agricultural commodity futures trading influences agricultural GDP in India significantly.

3) Price discovery, volatility and co-movement of futures and spot prices in commodity derivative market :

- Gouri prava samal and susmita patra (2020), in their work named "Price discovery efficiency of futures derivatives market in india-with special reference to gold", analyzed the gold futures market efficiency to discover price and causal relationship between gold futures and spot prices in india. They used ADF test/Unit root test, Johansen's co-integration test and Granger causality test to test the data of MCX from 2016 to 2018. They found that three tests of price discovery proved that the information from futures market can be used to predict price in spot market on a future date which will help in hedging the risk because, of huge volatility in gold prices.
- Mr. P.periasamy, dr. R. Satish (2014), in the research titled "a study on commodity derivative market of selected non-agricultural products (gold, crude oil, copper) in the Chennai market- an analysis", studied and analyzed the commodity market of selected non-agricultural products, including the study of the price volatility, future price movements and the reasons for real price volatility among the selective non agricultural commodities (gold, crude oil, copper) in Chennai commodity market. The sample period is 4 years and they used simple moving average (SMA), relativity strength index (RSI), moving average convergence and divergence (MACD), exponential moving average (EMA), rate of change (ROC) to analyze the data. He concluded that investors are satisfied from the investment returns from last three years and SMA, ROC and RSI charts showed many buy and sell signals for the investors which will help them to succeed in their investment by knowing technical analysis.
- Prashanta Athma, K.P.Venu Gopala Rao (2013), jointly worked on the research article titled "Commodity derivatives in india: a study of MCX COMDEX". They worked on analyzing the co-movement, causal relationship between the futures and spot price, analyzing the ability of the markets as predictor and examining the direction of the causal relationship between the two markets using the sample of MCX COMDEX from 2005 to 2012. They used 3 day moving average, cross correlation function, augmented dickey-fuller test, multiple regression, johansen co-integration test, vector error correction, granger causality test and concluded that COMDEX shows that the average futures prices are greater than the average spot prices and spot prices are influenced by futures prices; market is efficient and COMDEX helps in hedging risk.
- Sanjay Sehgal, Dr. Namita Rajput, Rajeev Kumar Dua, (2012), in their article titled "Price discovery in Indian agricultural commodity markets", examined that whether the futures market effectively serves the price discovery function in case of agricultural commodities like chana, guar seeds, soya bean, kapas, potato agra, turmeric, black pepper, barley, maize and castor seeds. The sample period was from 2003 to 2012. The study used ADF, PP, Johansen's co-integration test and Granger causality tests. They concluded that Indian commodities market is still not perfectly competitive for some commodities. The price discovery results are encouraging given the nascent character of Indian commodity market and Strong policy support is required in commodity markets of India.

4) Governments and stock exchanges reports; Market efficiency

- Commodity insights yearbook 2021, titled "Indian commodity derivatives market- widening scope", reported that despite of covid-19 pandemic in the previous years the Indian commodity market has remained resilient and also introduced the new products such as MCX BULLEX and MCX METLDEX in 2020 and MCX ENERGDDEX on October 7, 2021. However, in the previous year owing to the pandemic there was a fall in the Indian commodity market as 6% in trading activity in the financial year 2020-21 including 2019-20 and 5 % in the average daily turnover (ADT) but, all exchanges registered an ADT of Rs. 29,021 crore in the first half of the current financial year, FY 2021-22. Trading in options contracts registered a robust growth of about 197% and trading in options posted about 90% increase in terms of ADT. The report includes the average daily turnover of Indian commodity futures market (Rs. Crore) from 2004 to 2021-22h1 and share of bullion, metals, energy and agriculture options from 2018 to 2021-22. The report also depicts the major regulatory and policy developments such as setting up of bullion exchange that is framework of setting up gold exchange in India and draft SEBI (vault managers) regulations, 2021, strengthening of warehousing and regulation through warehousing development and regulatory authority (WDRA), developing domestic physical market standards, way forward, permitting participation of banks, participation of pension funds and insurance companies and expansion of eligible foreign entities.
- Commodity insights yearbook 2020, titled "atmanirbhar bharat abhiyan and the development of agricultural commodity markets", reported the strengthening of the agricultural sector by atmanirbhar bharat abhiyan (ABA) which includes measures such as working capital facilities for farmers; enhanced procurement activities; measures to strengthen infrastructure; logistics, and capacity building; governance and administrative reforms such as amendments to Essential commodities Act; Agriculture marketing reforms; Quality standardization and price assurance; and, Additional support to allied activities; The report depicts that with the growth of substantial crop of agriculture and its allied activities, it is very important to strengthen futures and other forms of derivatives trading in all commodities vulnerable to large and erratic price fluctuations to mitigate the price risk for agribusiness, by providing the manufacturers and the bulk consumers a mechanism for covering price-risks, the futures market induces them to pay higher price to the farmers, as the need to pass on the price-risk to them is obviated.

5) Market Efficiency

- Shashi gupta, himanshu choudhary, d. R. Aggarwal, (2016), in their research paper titled "Efficiency of indian commodity market: a survey of brokers' perception", studied perception of brokers about different aspects such as trading and marking activities of brokers, different purposes for using futures and reasons for non-investment in the commodity futures by the investors, issues concerning the investors to invest in commodity derivatives, price discovery and hedging effectiveness, impact of exogenous variables on the volatility dynamics of commodity futures. They observed the purpose of using derivative and used quantitative method such as questionnaire and had received 95 responds from the brokers registered with MCX, working in the region of NCR-DELHI. They used questionnaire method using funnel sequence method, pilot study, frequency distribution, diagrammatic presentation, measure of central tendency and chi square test and concluded that the survey results shows that except energy futures all commodity futures perform price discovery and hedging effectiveness functions well because of volatility in energy futures, it is considered less effective in hedging; brokers

are assenting on the high to moderate impact of open interest, volume and time to maturity on the volatility of the commodity futures derivatives and the survey results shows that the trading is concentrated in few hands.

6) Studies of foreign markets in commodity derivatives markets:

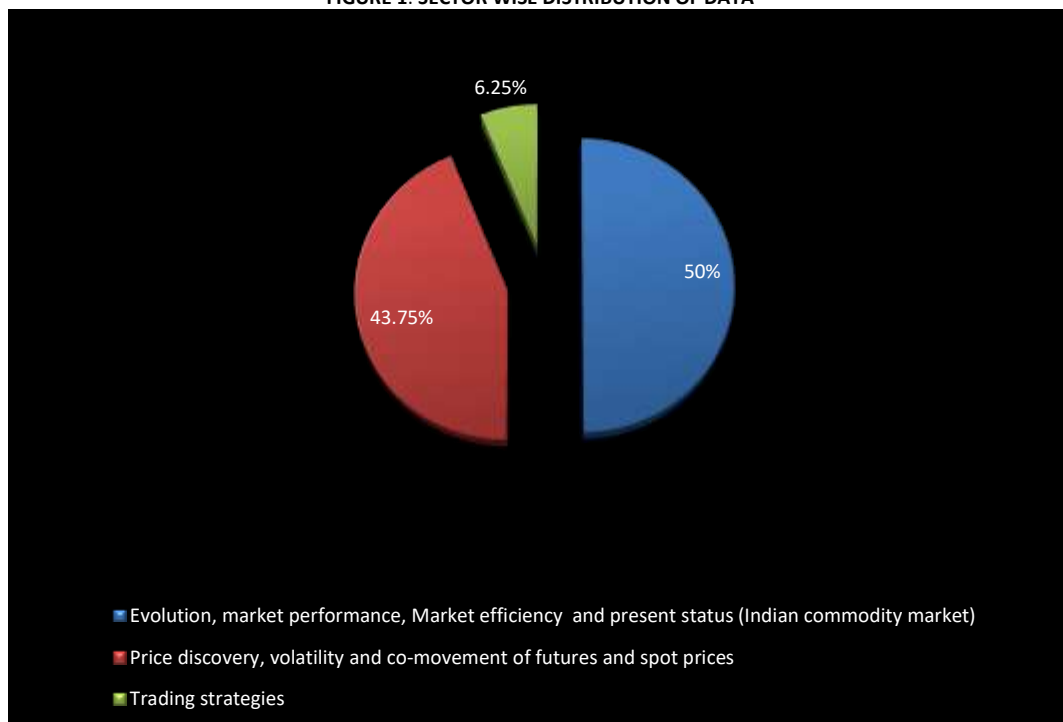
- Cosmos amoah, (2021), in his research article titled “Interconnectedness between commodity futures and spot prices: a comparative analysis between ordinary least square (OLS) and quantile regression (QR)”, worked on estimating the relationship between futures and spot prices by using ordinary least square (OLS) and quantile regression (QR). He collected daily oil prices obtained from WTI at the us energy information administration website, daily cocoa prices were obtained from the international cocoa organization’s website and daily gold prices were obtained from the London market bullion association’s website from 2001 to 2019. He evidenced that there is no systematic impact of futures commodity prices on spot commodity prices.
- Tadahiro nakajima (2019), worked on the article titled “Expectations for statistical arbitrage in energy futures markets”. This study examines whether profits can be earned by statistical arbitrage between wholesale electricity futures and natural gas futures listed on the New York mercantile exchange from 2 january 2014 to 29 december 2017 and used KPSS, Unit root test/ADF, co-integration test, and PP tests. They found that statistical arbitrage opportunities continue for a long time, because of less no. of arbitrage dealers that utilize the long-term equilibrium. daily statistical arbitrage trading provides profitability, if we can find co-integrated securities without a steep market structure change, earlier than other traders. However the study assumed that power prices and natural gas prices have a co-integration relationship, as tested and supported by previous studies, the short-term deviation from the long-term equilibrium is regarded as an arbitrage opportunity.
- Lei ji, yingchao zou, kaijian he, bangzhu zhu, (2019), jointly worked on the research article named “Carbon futures price forecasting based with ARIMA-CNN-LSTM model”, with an objective to forecast the carbon futures price using ARIMA-CNN-LSTM model. The linear data feature of carbon futures price is captured by ARIMA model and the distinctive spatial relationship features of ARIMA residual is extracted by CNN model, LSTM model is used to capture the long-term temporal dependencies of these features extracted by CNN model. They found that ARIMA-CNN-LSTM model can fits the carbon futures price better which also increases the price prediction ability of each models.
- L. Gómez-valle, z. Habibilashkary, and j. Martínez-rodríguez, (2017), worked on the research article named “The jump size distribution of the commodity spot price and its effect on futures and option prices”. The article focused on analyzing the role of the jump size distribution along with its effects on futures and option prices. They collected the data of natural gas futures price using daily natural gas data from the NYMEX in quandl platform. Natural gas spot prices were obtained from the U.S. energy information administration (EIA) from january 2004 to july 2015 and used jump-diffusion model, jump diffusion model with normal distribution and exponential distribution, diffusion model for analyzing the data. They found that normal distribution depicts lower errors for short maturities, the exponential distribution is more accurate for long maturities and in case of price natural gas options, in general, the model with the normal jump size distribution under prices these options with respect to the exponential distribution. The risk premia is negative more times with the exponential distribution than with the normal distribution.

INTERPRETATIONS AND DISCUSSIONS

Researcher name	article	section	objectives	Statistical tools	Findings
Mahantesh Angadi (2020)	Futures market in India underwent a rapid growth- an overview	Evolution	Commodity derivative market study and road blocks in execution of trading	Descriptive study	Commodity derivatives are utilized very less in India
K. Shree Jyothi and D. Srinivasa Rao (2017)	Indian Commodity Markets: A Thematic Review of Existing Literature	Evolution	status of commodity derivatives market in India	Descriptive study	price discovery and risk management is done by the commodity market
Shaik masood and T satyanarayana chary (2016)	Performance of Commodity Derivatives Market in India	Evolution	growth, trends and prospects of commodity derivative market in India and significance of market performance	analytical and explorative study	considerable and progressive market performance
Ayben koy (2018)	Testing Multi Bubbles for Commodity Derivative Markets: A Study on MCX	market performance and economic growth	Investigating the bubbles in metal futures in MCX	SADF and GSADF	no evidence on bubble is found in the sample
Suresha b (2015)	Causal Nexus between Commodity Derivatives Market Reforms and Economic Growth – Evidence from Indian Agricultural Sector	market performance and economic growth	linkages between commodity derivatives market reforms, commodity derivatives trading and economic growth.	Augmented dickey fuller (adf), phillip perron (pp), linear regression, anova test & coefficients	agricultural commodity futures trading influences agricultural GDP in India significantly
Gouri Prava Samal and Susmita Patra (2020)	Price Discovery Efficiency of Futures Derivatives Market in India-with Special Reference to Gold	Price discovery, volatility and co-movement of futures and spot prices	analyzing price discovery efficiency of Gold futures market and causal relationship between Gold futures and spot price in India	ADF Test/Unit Root Test, Johansen’s Co-integration Test and Granger Causality Test	Information from futures market can be used to predict price in spot market on a future date
Mr. P.Periasamy, Dr. R. Satish (2014)	A Study on Commodity Derivative Market of Selected Non-Agricultural Products (Gold, Crude Oil, Copper) in the Chennai Market- An Analysis	Price discovery, volatility and co-movement of futures and spot prices	Study and analyses of the commodity market of selected non-agricultural products	SMA,RSI, MACD, EMA,ROC	SMA, ROC and RSI charts showed many buy and sell signals
PRASHANTA ATHMA; K.P.VENU GOPALA RAO (2013)	COMMODITY DERIVATIVES IN INDIA: A STUDY OF MCX COMDEX	Price discovery, volatility and co-movement of futures and spot prices	Temporal relationship between the Spot and the Futures prices of the Commodity Market by analyzing the Comdex	3 Day Moving Average, Cross Correlation Function, ADF test, Multiple Regression, Johansen Co-Integration test, Vector Error Correction, Granger Causality Test	Efficient markets and COMDEX enable hedging

Sanjay Sehgal, Dr. Namita Rajput, Rajeev Kumar Dua, (2012)	Price Discovery in Indian Agricultural Commodity Markets	Price discovery, volatility and co-movement of futures and spot prices	Is futures prices are useful in price discovery mechanism of spot prices?	ADF test, PP test, Johansen's Co-Integration Test, granger causality tests	market is not perfectly competitive for some commodities
Commodity insights yearbook 2021	Indian Commodity Derivatives Market – Widening Scope	Governments and stock exchanges reports; Market efficiency	Scope of Indian derivatives market and Major Regulatory and Policy Developments	Descriptive study	Despite of covid-19 pandemic market is showing an increasing trend
COMMODITY INSIGHTS YEARBOOK 2020	Atmanirbhar Bharat Abhiyan and the Development of Agricultural Commodity Markets	Governments and stock exchanges reports; Market efficiency	Strengthening agri-sector along with futures and other derivatives trading in all commodities	Descriptive study	Atmanirbhar Bharat Abhiyan will address many un-solved issues
Shashi gupta, himanshu choudhary, d. R. Aggarwal, (2016)	Efficiency of Indian Commodity Market: A Survey of Brokers' Perception	Governments and stock exchanges reports; Market efficiency	perception of brokers about different aspects of commodity derivatives	questionnaire method using funnel sequence method, pilot study, frequency distribution, diagrammatic presentation, measure of central tendency and Chi Square test	except energy futures all commodity futures perform price discovery and hedging effectiveness functions well
Cosmos amoah, (2021)	Interconnectedness between Commodity Futures and Spot Prices: A Comparative Analysis between Ordinary Least Square (OLS) and Quantile Regression (QR)	Studies of foreign markets	interconnectedness between commodity futures and spot prices	Ordinary Least Square (OLS) and Quantile Regression (QR)	there is no systematic impact of commodity futures prices on spot prices.
Tadahiro nakajima, (2019)	Expectations for Statistical Arbitrage in Energy Futures Markets	Studies of foreign markets	possibility of profit acquisition in spark-spread trading	unit root test/ ADF Test, PP TEST, KPSS, co -integration test	statistical arbitrage opportunities continue for a long time and provides profitability
Lei ji, yingchao zou, kaijian he, bangzhu zhu, (2019)	Carbon futures price forecasting based with ARIMA-CNN-LSTM model	Studies of foreign markets	Forecasting carbon futures price using ARIMA-CNN-LSTM model	ARIMA-CNN-LSTM model	ARIMA-CNN-LSTM model fits the carbon futures price better
L. Gómez-valle, z. Habibilashkary, and j. Martínez-rodríguez, (2017)	The Jump Size Distribution of the Commodity Spot Price and Its Effect on Futures and Option Prices	Studies of foreign markets	role of the jump size distribution along with its effects on futures and option prices	jump-diffusion model, jump diffusion model with normal distribution and exponential distribution, diffusion model	normal distribution shows lower errors for short maturities and exponential distribution is quite accurate for long maturities

FIGURE 1: SECTOR WISE DISTRIBUTION OF DATA



Source: Authors calculations

The study depicts that nearly 50% studies are concentrated on the Evolution, market performance, Market efficiency and present status Indian commodity derivatives market. Price discovery, volatility and co-movement of futures and spot prices studies are about 43.75% also researched by many scholars but, Trading strategies that can lead to profitability are only 6.25% which is very less compared to other studies.

CONCLUSION

The study is conducted to analyse the existing literature on Indian commodity derivatives market on the basis of different sections. The existing literature shows that Indian commodity derivatives market is playing a vital role in the economic development mainly by the price discovery function of the derivatives market which will in turn helps in promoting the savings and investments among the investors by providing proper hedging tools. The existing literature also shows that Indian commodity derivatives market has also underwent with rapid growth, which involves setting up of commodity exchanges, regulatory frameworks from time to time and also the introduction of new products by the exchanges boosted the growth.

The trading mechanisms and trading strategies which helps each participant in the market to cover the risk needs the greater amount of attention. More research is required to be carried out in this sector. The study observes that most of the studies are concentrated on the performance, purpose and perceptions of investors whose primary motive is hedging but, the market involves other participants also such as speculators and arbitrageurs who play an important role in providing liquidity in the market and disseminating price information efficiently. So, there is a wide research scope in this area.

Moreover, there are still some other issues which remains unaddressed by the Indian commodity derivatives market. The government, policy makers, exchanges and other related regulators should take active participation in addressing the issues which will also boost the economic growth.

LIMITATIONS OF THE STUDY

- The review of literature is done from 2012 to 2021, which will limit the scope of the paper to this period.
- The study is mainly focused on the Indian commodity derivatives market

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