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"Quest" Journal of Management Research is a bi-annual publication of Chetana's Ramprasad Khandelwal Institute of Management and Research to disseminate knowledge and information in the area of finance, marketing, human resources, systems/IT, operations, general management practices, business development etc. The Journal intends to focus on theoretical, applied and interdisciplinary research in business and management studies. It provides a forum for debate and deliberations for academicians, industrialist and practitioners in the field of business and management. The views expressed in the articles and other material published in the journal do not reflect the opinions of the Institute.

From the Editors Desk:

It gives us immense pleasure to present this issue of our Research Journal, which brings together a diverse collection of scholarly contributions addressing pressing issues in finance, management, healthcare, technology, sports, and sustainability. Each paper not only advances academic thought but also provides meaningful insights for practice, policy, and future inquiry.

The issue begins with a study on the penetration of Unified Payments Interface (UPI) in the rural areas of Ratnagiri district, Maharashtra, which explores the reach of digital financial services in driving financial inclusion. With structured surveys and interviews, the study sheds light on awareness levels, usage barriers, and socioeconomic factors influencing adoption of UPI in rural India.

Shifting the focus to health and wellness, one paper highlights the importance of coaching in fitness and sports, emphasizing both physical and mental aspects of well-being. The work underscores the role of structured training and guidance in ensuring long-term health, discipline, and performance enhancement.

Corporate governance and ethics are at the forefront in a study that examines the role of Business Responsibility and Sustainability Reporting (BRSR) in reducing financial frauds in Indian companies. The research offers critical perspectives on how ethics, transparency, and sustainability frameworks can strengthen governance and prevent fraudulent practices.

The challenges of operational excellence in highly regulated industries are explored in a paper on implementing Lean Six Sigma in the pharmaceutical industry. The study provides a nuanced understanding of the barriers to Lean Six Sigma adoption, while offering valuable recommendations for enhancing productivity and profitability in the pharma sector.

Financial management research is advanced through an investigation into the threshold effect of working capital efficiency on stock returns in Indian firms. Using robust panel data techniques, the study identifies a clear threshold in cash conversion cycles, offering actionable insights for managers and investors in optimizing capital allocation.

Finally, healthcare management and capacity building are addressed in a study on nursing skill assessment, which identifies training priorities across clinical and non-clinical protocols. The analysis contributes to enhancing patient safety, compliance, and competency development in hospital settings.

Collectively, the papers published in this issue present a balanced blend of empirical evidence, conceptual insights, and practical applications. They reflect the dynamism of research at the intersection of business, management, technology, and healthcare, and are expected to spark further dialogue among scholars and practitioners.

We extend our heartfelt gratitude to all contributors for their rigorous research. We hope that the readers will find these papers both intellectually stimulating and practically relevant.

Dr. Kavita Khadse

Editor

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Study on Penetration of UPI in Rural Areas of Ratnagiri District of Maharashtra

*** Dr. Rakesh Manohar Malusare**

Abstract:
This study deals with the adoption and penetration of Unified Payments Interface (UPI) among rural residents of Ratnagiri district, Maharashtra. UPI is a revolutionary digital payment system and has played a key role to promote financial inclusion across India. Such features make its adoption problematic through hurdles that exist in rural areas and not compatible with extension of digital financial services. This research employs a mix method of data collection by way of structured survey, interviews, and focus group discussions among 300 respondents, whereby attempts are made to measure awareness of UPI and understand usage patterns and the influencing factors that drive UPI. The findings reveal that 65 percent of the respondents are aware of UPI as a concept, but only 40 percent use it either currently or at any given point in time. Major factors that drove adoption include digital literacy, possession of a smartphone, access to the internet, and trust in digital systems. Important socioeconomic factors include age, education, and occupation.
Barriers to the UPI's adoption are reported to include inadequate internet infrastructure, preference of cash transactions, and fear of digital fraud. Local institutions, mainly banks and fintech companies, play an important role in digital literacy promotion and thus improving financial inclusion. Focused awareness campaigns, practical training, and infrastructure strengthening would thus help in bridging the gap between a rural and urban digital divide. Policy recommendation would include improving digital literacy programs, increasing network connectivity, as well as public-private partnerships in creating the ground for seamless access to digital financial services. This piece of research goes a long way in providing clear and very important messages to policymakers, financial institutions, and technology providers regarding further steps to attaining greater digital financial inclusion for rural India. It could also act as a standard by addressing these issues in Ratnagiri for other similar rural areas really leading towards inclusive economic growth through models like digital payment systems such as UPI.
Keywords : *Unified Payments Interface, UPI Adoption, Rural Financial Inclusion, Digital Payments, Fintech, Financial Literacy, Digital Infrastructure, Rural Ratnagiri, Digital India, Socio-Economic Factors*

Introduction

The last one decade, it had completely turned its financial face owing to the rapid digitalization into a payment system within India and all are able to witness this is the Unified Payments Interface of new-age technology that has made a world of difference in the way people transact. Not only payment simplified from so much complexity but also it has narrowed the rural-urban financial inclusion gap. Urban areas have fully embraced UPI while rural penetration being under exploration and concerns. The study scrutinizes the UPI penetration among the rural regions of Ratnagiri district, Maharashtra, a place famous for attracting voluptuaries with its breath-taking landscapes along with its agrarian economy and vibrant socio-cultural fabric.

Thus, Ratnagiri-is situated on the west coast of India, particularly along the Konkan coast, where tradition

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and modernity converge. This district is famous for the Alphonso mango and the fishing industry, though at the same time, it is popularly subject to all kinds of rural woes in India-limited banking facilities, low digital literacy, and cash dependency transactions. In spite of these hindrances, the crown of the Indian government and financial institutions has made utmost cuts doing the effort in this way by promoting digital payments to help enable financial inclusion and development in the economy. UPI, as with a user-friendly interface and interoperability, has become the focal tool for this effort. However, the real question is how sounds has UPI touched the life of Ratnagiri's rural populace?

It as well questions into what measures UPI users are penetrated by such factors that determine its use and the barriers these rural dwellers face in adopting this form of digital payment. It materializes an extension for Ratnagiri to provide a microcosmic perspective on these challenges and opportunities regarding digital financial inclusion efforts in rural India. Through Surveys, Interviews and Data Analysis, will take the research into understanding awareness, usage and perception of UPI in rural India and explore the influence of local infrastructure, literacy and trust barriers on the user adoption of digital payments.

The study presents important policymakers, financial institutions and technology providers barriers to the UPI adoption within the rural field and guidelines to suggest actionable strategies to improve its penetration. In what India moves closer to less cash economy, all whose rights are not lived behind in this revolution must understand the dynamics of digital payment systems in these rural settings. This research is thus not only academic in its contribution to the discourse on digital finance but also carries practical implications for promoting inclusive growth in rural India.

In the subsequent chapters, the methodology of this study will be discussed then followed by presentation of findings before the impression of this study, each shedding light, in its own way, on the journey of UPI into the rural heartlands of Ratnagiri and even offering insights which could later pave the way to digitally empowered future.

Literature Review

It is in the post-digital India that the Unified Payment Interface (UPI) had its early dawn in April 2016. The readability of the current literature review synthesizes in several forms the new research on UPI, replacing it with the focus on growth, determinants or influencing factors, impacts, and specific gaps in scholarly understanding (Kumar & Chaubey, 2017; Gochhwal, 2017).

In a matter of months, UPI has grown by leaps and bounds, with many adopters vouching for it as the preferred digital payment mode in India, surpassing even the much-established previous modes such as mobile wallets (Gupta & Arora, 2020). The rapid adoption of UPI arises from melted snow of factors: contactlessness in addressing payments, ease of the entire platform-to-person transaction, and the aggressive marketing strategies of some early adopters like Google Pay, PhonePe, and Paytm (Kapur, Singh, & Gupta, 2020; Chaterji & Thomas, 2017). Its acceptance is universal, but it gains was not otherwise dwarfed by the immense groups of people residing in urban India (Rastogi, Panse, Sharma, & Bhimavarapu, 2021).

Research has primarily investigated the plethora of factors influencing adopting UPI and also continuing to use it. The predominant themes identified through using such a model and its adaptations were performance expectancy, effort expectancy, social influence, facilitating conditions, price value, perceived security risk, social benefits, and knowledge as the essential drivers of user intention, especially in the Bottom of the Pyramid (BOP) segment (Gupta, Kiran, & Sharma, 2022; Joshi, 2024). The significant influence of convenience,

technology, and rewards attractiveness on adoption in rural areas has been established (Mahesh & Bhat, 2021). Education and awareness have also been recognized as stronger elements for molding people's decisions regarding UPI (Dhamija & Dhamija, 2017).

The UPI will not only improve the efficiency of transactions but also inevitably bring it as a bridge for financial inclusion with implications for small businesses and open the worlds of the holdings of Pradhan Mantri Jan Dhan Yojana (PMJDY) accounts to a secure platform for their transaction taking place in the formal financial system (Shahid, 2022; Gochhwal, 2017). Research also shows a positive upside of the usage of UPI in terms of the financial literacy levels of the users because the convenience and accessibility of transacting electronically using these platforms enhance understanding of financial norms (Gupta & Arora, 2020; Rastogi et al., 2021). Ultimately, these are said to advance the current forward and economic health aspects of the poor. The vision of draping India in a less-cash society stringently follows demonetization efforts into this general canvas to draw the measure of success for UPI and all other digital payment systems (Lahiri, 2020; Kumar & Chaubey, 2017).

Verily, within the ever-burgeoning body of literature, there exist several limitations and unmapped areas for research. The main limitation is that while there exist many studies on digital payments, few studies focus on UPI (Kumar, Choudhary, Mishra, Kar, & Bansal, 2022). Another issue is the less exploration of the method as far as modern retail is concerned, even though more importance is attached to it (Bhardwaj & Kaushik, 2018b). The analysis done earlier on digital payments has also generally failed to consider differences in sectors, including that of retail, which is more freshly sprouting (Chaterji & Thomas, 2017). From a critical viewpoint, there is no base upon which to understand what customers and merchants think of UPI adoption, use, and so forth (Kakade & Veshne, 2017). Some studies have been critiqued for their failure to generalize findings because they were based on specific geographic areas; they dealt with cross-sectional data; and they applied non-random sampling techniques (Gupta & Arora, 2020).

Although some studies track initial adoption, it is essential to do more work on how post-adoptive behaviors manifest themselves—that is, how people continue to use and advocate for use (Shahid, 2022; Mallik & Gupta, 2021). Future studies should include a focus on UPI in the retail sector with both the user and merchant angles (Gupta, Kiran, & Sharma, 2022). Longitudinal studies can provide more nuanced insights into user behavior over time (Venkatesh, Thong, & Xu, 2012). More comprehensive comparative studies across different demographics and geographies could enhance the generalizability of the results (Tamilmani, Rana, Wamba, & Dwivedi, 2021). Studies need to be conducted to understand the barriers to UPI adoption and continued use, as well as the exact role of UPI offerings in furthering digital financial inclusion (Joshi, 2024). Future research must also be directed towards understanding user acceptance and attitudes to UPI and the regulation of the retail digital payment landscape by the RBI (Kapur, Singh, & Gupta, 2020). The existing challenges like transaction failures and security-related issues need to be resolved for UPI to realize its full potential in India and the growing global footprint (Malladi, 2021; Mahesh & Bhat, 2022).

Objective of the Study

The main objective of this investigation is to study the penetration and acceptance of Unified Payments Interface (UPI) in rural Ratnagiri district, Maharashtra. The research attempts to find out how the rural context impinges on a personal understanding of the system of digital payments and identifies the impingers of such adoption. The

following specific objectives have been prepared as the 'guiding light' for the research.

1. **To assess rural awareness of UPI in Ratnagiri district:**
   - Determine the level of awareness of rural inhabitants regarding UPI as a digital payment system.
   - Identify the main sources of knowledge about UPI (bank, government campaigns, and word of mouth).
2. **To measure the extent of adoption and usage of UPI in rural Ratnagiri:**
   - Find the percentage of rural residents who actually use UPI for transactions.
   - Determine how often a specific type of transaction (peer-to-peer payments, merchant payments, bill payments) is conducted through UPI.
3. **Identify factors that lead to the adoption of UPI by rural areas:**
   - Study how adoption in UPI would be impacted by socio-economic factors like age, education, income, and occupation.
   - Analyze the effect of digital literacy and access to smartphones in using UPI.
4. **Explore challenges and barriers to UPI adoption in rural Ratnagiri:**
   - Investigate challenges in infrastructure such as internet access and provision of banking services.
   - Understand psychological and cultural barriers such as trust towards digital systems and preference towards cash-based transactions.
5. **Study the role of local institutions and stakeholders in promoting UPI:**
   - Evaluate the role of banks, government agencies, and fintech companies to influence awareness and adoption of UPI.
   - Investigate the effectiveness of training programs and initiatives to improve skills in digital literacy.
6. **To recommend ways to improve UPI penetration in rural areas:**
   - Actionable strategies policymakers, financial institutions, and technology providers can implement to promote UPI adoption.
   - Measures to alleviate the challenges raised and improve the entire digital payment ecosystem in rural Ratnagiri.

By these objectives, the study is aimed at better understanding the factors that promote or inhibit the use of digital payment systems in rural India. Therefore, the findings will not only illuminate current UPI penetration in Ratnagiri but also provide relevant insights needed to promote financial inclusion and digital inclusion empowerment across similar rural contexts throughout the country.

3. Research Methodology

This research methodology describes the systematic procedure followed in probing into the penetration of the Unified Payments Interface (UPI) in the rural areas of the Ratnagiri district in Maharashtra. The chapter thoroughly describes the research design, data collection methods, sampling techniques, and tools of analysis for achieving the study objectives.

3.1 Research Design

This study uses a descriptive and exploratory research design to find out how the UPI was adopted and used in rural Ratnagiri. The descriptive aspect would throw light on the current state of UPI penetration, while the exploratory would highlight factors influencing its adoption and the challenges faced by rural residents. The study would largely be quantitative in nature, although it would also allow for some qualitative insights so that the whole topic

gets understood well.

3.2 Study Area

The emphasis of the investigation is on rurality in Ratnagiri district of the state of Maharashtra. Ratnagiri is a large rural district, with significant agrarian and fishing economies. This district has distinct socio-economic and cultural characteristics that offer an opportunity for examining how Indian rural areas penetrate digital payment systems.

3.3 Sampling Technique

A stratified random sampling technique was applied to draw respondents from the rural areas of Ratnagiri. Values were ascertained for strata based on geographic zones, that is, coastal, hilly, and plains areas, in order to ensure representation from diverse areas. Within each stratum, villages were taken randomly and thus drew its sample households from those villages. Sample determination took into consideration a confidence level of 95% and a margin of error of 5%, hence the sample size ends with 300 respondents.

3.4 Data Collection Methods

Data was collected through a combination of primary and secondary sources:

1. **Primary Data Collection:**
   a. Structured Surveys: A well-structured, intelligible, and comprehensive questionnaire was fielded to the rural masses to understand their awareness, usage, and perceptions concerning UPI. The questionnaire comprised both the closed-ended and open-ended types of questions.
   b. Interviews: Semi-structured interviews were held with key stakeholders like local bank officials, fintech representatives, and village leaders to glean deeper insights into the challenges and opportunities for UPI adoption.
   c. Focus Group Discussions (FGDs): FGDs were held with groups of rural residents to understand their collective experiences and attitudes toward digital payments.
4. **Secondary Data Collection:**
   a. Secondary Data: Government reports, publications of the RBI, and other publications pertaining to the fintech industry were used to supplement primary findings.
   b. There is secondary data collected for the information regarding internet penetration, banking infrastructure, and digital literacies in Ratnagiri.

3.5 Variables Examined

This study assessed the following aspects:

- Dependent Variable: UPI adoption and usage.
- Independent Variables: Socio-economic factors (age, education, income, occupation), digital literacy, access to smartphones, internet connectivity, and trust in digital systems.

3.6 Data Analysis

The collected data was analysed using both quantitative and qualitative methods:

- **Quantitative Analysis:** Statistical tools such as SPSS were used to analyze survey data. Descriptive statistics (e.g., percentages, means, and frequencies) were employed to summarize the data, while inferential statistics (e.g., chi-square tests, regression analysis) were used to identify relationships between variables.
- **Qualitative Analysis:** Interview and FGD transcripts were analyzed using thematic analysis to identify recurring themes and patterns related to UPI adoption and challenges.

4.1 Quantitative Analysis

4.1.1 The Demographic Profile of the Respondents

The study in the rural area of Ratnagiri had 300 respondents, constituting a mixed demographic. A striking 45% of the population is 18-35 years old, with 35% being 36-50 years old, a promising scenario for digital adoption.

- Gender: 40% females and 60% males constitute good gender equity.
- Education: A considerable 70% have either finished secondary or above, indicating a good potential for growing digital literacy.
- Occupation: 50% are into agriculture, 20% into fisheries, and 15% into small trading, indicating that UPI as a digital payment solution can be a boon for financial inclusion in each of these sectors.

4.1.2 Awareness of UPI

- High Awareness: 65% of the respondents have awareness of UPI as a digital payment system, indicating deep penetration into the market. Awareness occurred through banks (40%) and government campaigns (20%), implying the success of outreach activities.
- Community Approach: With 30% learning about UPI through families and friends, word-of-mouth is still a powerful motivational factor and endorsement for the trust and credibility of the platform.

4.1.3 Adoption and Usage of UPI

- Promising Adoption: 40% of respondents have adopted UPI actively for performing transactions. This trend is expected to grow at a fast pace with continuous efforts.
- Regular Usage: 50% of users use UPI once a week or more, indicating convenience and satisfaction with the system. Another 30% uses it on a monthly basis while 20% use it for occasional transactions.
- Variety of Transactions: Mostly UPI is used for P2P payments (60%) and then for merchant payments (30%) and bill payments (10%), indicating its versatility.

4.1.4 Factors That Determine the Adoption of UPI

- Digital Literacy: 70% of the UPI users have basic digital literacy, thus sufficiently laying the foundation for further growth.
- Smartphone Penetration: 80% of UPI users have smartphones, proving this population is ready for technology.
- Reliable Connectivity: 60% of users state that they have good internet, thus supporting unobtrusive digital payments.
- Trust in Digital Payments: 75% of users seem to trust the UPI and many feel that the system is credible and secure.

4.1.5 Barriers to UPI Adoption

- These barriers to UPI adoption are also soft targets for growth efforts if targeted:
- Awareness Gaps: There is still a gap, as 35% of non-users have no word of UPI. There lies an immediate opportunity for raising awareness of even a greater level.
- Infrastructure Development: When some places have reliable internet connectivity, many other people would join.
- Preference for Cash: 35% of the non-users prefer cash, thus there should go on clearing the misinformation about the merits of digital transactions.
- Fraud Concerns: With 25% stating such concerns; boosting consumer knowledge about secure usage would further inspire confidence.

4.1.6 Statistical Analysis

- Chi-Square Test: The significant association shown between digital literacy and UPI adoption ($p < 0.05$) suggests that it is indeed inductive to assume that digital literacy promotion has a positive impact on UPI adoption.
- Regression Analysis: The two identified major determinants of UPI adoption are smartphone possession and Internet connectivity ($R^2 = 0.65$), thus reiterating the issue of expanding digital infrastructure.

4.2 Qualitative Analysis

4.2.1 Insights From Interviews and FGDs Thematic Analysis

Qualitative insights further consolidate the positives on the scale of UPI adoption.

Role of Local Institutions:

- Banks and fintech companies have played an important role in UPI promotion.
- Digital India: Government campaigns have effectively raised awareness but require more follow-ups for improvements.

Community Support:

- Local youth and self-help groups are posing to be digital literacy champions who provide peer support and training.

Infrastructure Progress:

- The ongoing strengthening of internet connectivity and banking services will further assist the penetration of UPI.

Confidence Building:

- Respondents have found hands-on training and demonstrations effective in easing their fear and apprehensions.

With 65% awareness, burgeoning adoption, and clear pathways to addressing the hindrances, UPI is poised to emerge as a preferred mode of payment in rural Ratnagiri. Targeted activities in digital literacy, infrastructure development, and community support will additionally fast-track this growth.

Limitations of the Study

Although the study provides some valuable insights, it does have certain limitations:

- The findings apply to Ratnagiri district and may not be generalized to other rural contexts.
- Self-reporting had the risk of bias.
- Limited access to remote villages imposed by geographical constraints may have affected sample representation.

Recommendations

A multi-pronged approach is recommended to hone UPI adoption and awareness in rural Ratnagiri. Increasing digital literacy among targeted groups, particularly older individuals and those with low levels of education, will incubate confidence in using digital payment systems. The fruitful cooperation between banks, fintech, and local self-help-groups can engage users in hands-on demonstration sessions or workshops to address concerns and impart practical knowledge. Augmenting government campaigns with follow-through support can ensure continued awareness and create UPI usage.

Improving infrastructure, especially internet connectivity, in far-flung regions is a major catalyst in the adoption of digital payments. Inducing partnerships between public and private sectors can fast-track the expansion of networks and provision of reliable internet access. Supporting affordable smartphones with the encouragement of use through subsidy programs can vary UPI penetration.

An awareness campaign is obligatory to make people aware of safe practices during digital transactions to tackle security issues. Educating users on preventing fraud, safe payment methods, and customer support channels will help develop

trust toward digital platforms. The establishment of local support centers where users can gain assistance will further translate into confidence-building and cutting down on reluctance in terms of going digital.

Incentives could include cashbacks, discounts, and rewards for frequent UPI users. Interventions with local merchants will create an interim digital ecosystem, further normalizing cashless transactions.

Moreover, inducting peer effects-gaining trust through the leverage of satisfied users as advocates in the society-will further strengthen trust and adoption. Periodic surveys and assessments will monitor progress to ensure timely detection and resolution of barriers. These initiatives, interlinked with others preceding them, can create a staggering backup to UPI adoption in the area for greater financial inclusion and digital empowerment in rural Ratnagiri.

Conclusion

Research chronicling the acceptance level of the Unified Payments Interface (UPI) among the rural communities in Ratnagiri District in Maharashtra reveals that progress and challenges are experienced in the digital payment systems' adoption in the rural front. Although UPI has penetrated urban India, rural regions like Ratnagiri attests to slow uptake due to poor awareness, lower levels of digital literacy, infrastructures being insufficient, and the cultural preference for cash transactions. Nevertheless, the study tends to point toward a potential towards targeted intervention and collaboration.

The results have found that, whereas 65% of the respondents were aware of UPI, only 40% of them utilize the same; thus, there exists a gap between awareness and use. Digital literacy and smartphone ownership, coupled with reliable internet access, create an enabling environment for UPI adoption, but lack of trust, fears of fraud, and network connectivity issues are hindrances. Sentiments from qualitative investigations would further emphasize localized awareness campaigns, hands-on training, and improvement of infrastructure to fill these gaps.

The importance of a multi-stakeholder approach involving policymakers, financial institutions, fintech companies, and the local communities to promote UPI adoption is highlighted in this study. By tackling the challenges and taking advantage of opportunities, this rural area of Ratnagiri can be a model for mass digital financial inclusion in the country.

The penetration of UPI in rural areas transcends beyond technology. It also digs into the socio-economic angle. Provided that appropriate measures are taken, it can be a great medium for revolutionizing the lives of rural people and achieving financial inclusion while advancing towards less cash in India. These findings will lay the ground for future studies, as well as give insights into actions for various stakeholders who are committed to realizing a digitally inclusive society.

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Fitness – Important Aspect of Coaching

*** Neha Milind Sapte**
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Abstract

Sports in India can be seen since ancient times, right from the mythological stories like the Mallah Yudh or Kushti which can be seen in Shri Krishna Stories of Kans Vadh, Archery feats that Arjun performed or Chausar (board games) played during the Mahabharat times all these are heard and influenced our life since childhood. Sports have always played an important aspect in enhancing fitness of body and mind. Coaching whether in sports or as only fitness trainer both places, fitness is taken as very serious matter and it's not a child's play. Children from a young age are been put into sports so that their body grows and develops easily with increased concentration and focus in their daily lives. Similarly, teenagers and professionals in sports need proper trained, knowledgeable and appropriately guiding coaches in lives otherwise this can lead to serious injuries and even loss of life.

Fitness defines the ability to perform physical activity, and encompasses a wide range of abilities. Each sport and activity requires a specific set of skills, and so being fit for a particular sport requires a specific skill set. Being fit for one sport does not necessarily make you fit for another. Fitness usually is seen as physical fitness which is defined by experts as "one's ability to execute daily activities with optimal performance, endurance, and strength with the management of disease, fatigue, and stress and reduced sedentary behavior." Whereas, coaches very well know that it's even the mental fitness and emotional balance which can make a player, be a consistent performer. After 2020, Coronavirus worldwide outbreak, has made everyone realize the value of fitness to be taken more seriously than ever. This is even more important to India as, it's the country with the largest youth population and upcoming healthy generation can give us a better and responsible citizens of tomorrow.

This study will help us understand that, after Covid-19 Pandemic where even the 2020 Olympics had to wait a year, imagine the drastic impact on the fitness levels of all sportsman in the world. This has created the biggest challenge for coaches to safeguard the lives of younger generation in sports to be directed well for the future to avoid injuries and worse than that is fighting various depressions that sportsperson come across due to increasing competition level and expectations of world. This study becomes important as younger generation which is under high pressure of performance and easily influenced by media and internet to go for shortcut to various performance enhancing drugs, it's even more important for coaches to get this generation on right track of hard work to attain a better and fulfilling life as individuals and as star achievers for our country.

Keywords: *Fitness, Coaching, Sports, Performance enhancing drugs, Coronavirus.*

Introduction

If we see, the functions of fitness training and sports are essentially the same, i.e. both improve our health and help us achieve a fitter body, but their principles are completely different. When we talk about fitness training, normal people and fitness trainers are more focused on burning fats to achieve a leaner body with more muscles and improve body functions. Whereas, Sports training is focused on strength building, speed, agility, coordination, endurance, cognitive abilities along with stamina. Athletes or sportsperson compared to regular people go through much more intensive training and

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take very few breaks in between to reach peak performance. This is due to the techniques used in sports training and nutrition are quite different from those used in fitness training. Personal trainers who coach sportspersons or sports fitness trainers require proper formal certification as offered from reputed education or training institutes for making athletes perfect in their respective fields. The formal training given to such trainer's help them understand the athlete's different requirements and develop fitness training programs accordingly.

Sports training is a process of training an individual to become skilled in any given sport. Sports training is mostly preferred by athletes and sportspersons as it involves intense training and workouts to help them reach their peak performance and also help them to maintain this performance for a long time. It is usually assumed that sports training is only related to physical training, but that's not it. Actually, sports training includes wide array of aspects which include physical, technical, intellectual, psychological and moral preparations. All these are included in daily routine training of an athlete and they undergo exercises to build up strength, endurance and confidence to succeed in their sport. Most importantly, the training methods and techniques used depend on the kind of sport the athlete plays. For example, the gymnasts require exceptional upper body strength to allow them to perform and hence, they work on building their torso muscles as well as work on their body coordination. But, for footballers they require exercises to build toned leg muscles so that they have great agility which helps them to have quick foot work which is very important as their games requires precision footwork. This shows us that depending on the type of sport which the athlete will play his trainer will chart down his fitness program and hence a well knowledgeable and formally qualified coach is required for such diligent task.

OBJECTIVE

To study the importance of coaching in fitness training whether its sports fitness or regular fitness of normal people. The main area of focus during this study are as follows:

a. Physical fitness.

b. Mental fitness.

c. Pressure of performance.

d. Right guidance.

METHODOLOGY

Personal interviews of fitness trainers, coaches, regular people and sportsperson (of varied age groups) gave me an upfront understanding of their day to day challenges in terms of pursuing fitness training. The available online articles, research work and similar studies grant me a better understanding to the current scenario with an unbiased view to the surging problems in fitness and sporting industry.

RESULTS AND DISCUSSIONS

a) The following are the important coaching aspects during Physical fitness:

1. **The Goals of the athletes-** A trainer needs to understand what the athlete is looking for before making a training program as it's very important to know which areas the athlete wants to improve. It can include physical strength, endurance, nutrition or cognitive development. As, a trainer/coach it's their job to understand the goals of an athlete and develop a plan that gives them the required results.
2. **The kind of sports-** Sports training is heavily dependent on sport unlike regular fitness training which consist exercises more or less same with some variations depending on client's needs. A plan developed for gymnast cannot

work for a shooter. Similarly, a plan made for a cyclist cannot work for an ice-hockey player because a slight miss in their training can compromise the outcome and performance of the athlete completely. As it can decrease their chances of winning or worst which is, it can lead to injuries.

3. **Length of training and recovery time-**Sports training is quite intensive and can cause serious muscle fatigue which is why athletes require ample time to rest and let their muscles heal. If the trainer causes extensive muscle damage if the session is not properly made then it can lead to injuries. This is why there is a general rule for every workout, an equal amount of rest time is needed by muscles to heal.
4. **Age, Nutrition and health of the athlete-** Physical training depends on the age, health and nutrition provided to an athlete. It's no secret that athletes retire early mainly because the amount of physical training and endurance that their body requires can only be sustained at a young age. As age increases beyond 30 years, performance slowly declines because joints and their body can no longer take tough training and chances of serious injury increases. Nutrition helps body function properly otherwise an athlete won't be able to give their peak performance. It is estimated that, on an average, athletes require 2500 -3000 calories daily which is around 500-1000 calories more than an average person requires. Water intake needs to be maintained as well as dehydration can cause various problems in an athlete.
5. **The timeline of preparation-** In sports training every athlete always have some deadline to follow when they are in their training mode. The sports training is always in line with their upcoming performance deadline and so their training needs to be done mindfully. A shorter timeline requires intense workouts but this isn't useful for longer time as this can hamper their performance due to lack of recovery time and lead to muscle damage.
6. **The timeline of preparation -** This is the trainer's main task to decide which training pattern or style to adapt in training which is best for the athlete. There are several kinds of trainings which at times trainers mix to give the best possible combination to enhance athlete's fitness.

b) The following consists the importance of mental fitness through coaching:

Fitness does not mean only physical fitness but coaches know it the most that mental fitness plays the key role in peak performance and while winning a medal. Mental performance coaching involves training athletes to develop various mental skills such as confidence, focus, resilience and managing emotions. These set of skills help athletes at every level to perform very well under pressure, overcome obstacles and manage anxiety and stress. Mental health problems are increasing in severity and frequency. Data from U.S. National Institute of Health where a Health risk Survey shows that 18-25 aged population have most need for mental health support and services. The number of such individuals seeking mental health support has gone up significantly over the past few years and dramatically increased further due to COVID-19 pandemic.

Coaching focuses on principles of recovery, positive psychology, mindfulness and motivational interviewing to help individuals achieve goals, enact positive behavioral changes, generate solutions and utilize their own resources. Positive psychology is an important tool which the coach has that can help an individual to create happiness. Coaches combine aspects of mindfulness and promote a greater mind-body connection. Mindfulness is a practice that allows an individual to observe their

behaviors and catch their negative thought loops. As, a result, individuals understand themselves, manage their emotions and act in the right manner which fosters lasting change in their lives.

Coaches very well know what a sports person has to go through as the individual starts his sports life in early age sacrificing many things to achieve their set goals and when these goals are not met then this can lead to depression and even suicidal tendencies. It's very important to carefully handle such situation as an innocent life is involved which shouldn't lose hope just because of societal or ambition's pressure.

c) Following are points that discuss pressure of performance of sportspeople:

The term "pressure" dominates the headlines of sporting events. Whereas we face pressure in our daily lives at work, in school life, from family members and friends but it's in competitions that athletes can experience incredible high amounts of pressure. Pressure usually refers to the feeling an athlete goes through while performing in a sporting situation. Where pressure manifests itself physically into increased heat rate, breathing, increased level of adrenaline; mentally it consists positive or negative thoughts about the event and emotionally it sums up to positive feelings of anticipation, excitement or negative feelings of fear, anxiety, etc.

If we see sporting events contain no pressure in and of itself. Pressure is actually an internal experience (a feeling) that is created by the athlete. A former athlete has described pressure as "Pressure is a word that is misused in our vocabulary. When you start thinking of pressure, it's because you've started to think of failure." The fear is of what might happen or focus on the outcome, it's about either meeting our own expectations or others' that leads to building of pressure in sportspeople during competition.

All this happens mostly because athletes start early in life with sports, they constantly juggle between their school hours, home-works, tuitions, sports training sessions, workout hours, travel time, exams, assignments, projects, competitions, performance enhancement goals, etc. All their youth is harnessed in disciplined time management routine where they sacrifice a lot while their peers and friends of their age group usually enjoy. The amount of time, energy, money, hard-work, determination, passion, etc put in by their parents, coaches and they themselves create this burden of expectation that usually starts to grow within the players mind. When the competition which is drastically increasing and with modern technology and globalization sports industry is allowing more people accessibility towards various sports and government or sport clubs bringing in facilities gives larger population a chance to sports training and a chance to win medals, But the most important part that we need to understand is that the tapering effect/ pyramid effect we see in sports which is for example, in an individual sport like boxing where a boxer gets a medal after defeating several contenders round after round. Similarly, in a team event like cricket, various teams play against each other till we get the ultimate winner. So if we see its funneling effect where many players stand in the competition but after several rounds only the best one wins. This for one competition but when the individual needs to reach an international medal that athlete needs to start from grass-root level like local matches, district matches, state matches, national, selection trials for international matches, then you get an opportunity to play one international tournament. Then performing and getting a medal at an important major international match is another challenge itself, like reaching the Common Wealth Games, Asian Games, World Championship and the Olympic Games.

All this leads to athletes facing loses more than wins which slowly sometimes the experience leads to pressure building and being tensed before major tournaments. This is where an experienced

and formally trained coach can help the player manage his thoughts which will help ease his physical and mental stress and tension giving the athlete to actually perform his best when its truly needed to perform though right guidance of managing such competition pressure. An experienced coach is the one who has himself see such situations faced and dealt it first-hand only such people can develop stronger sport-man who can win medals and perform with confidence for a long time in such competitive sporting industry.

d) Following are the points listed below about the Right Guidance a coach provides with:

Coaching is an important part of athlete development and sports development in general. Coaches are expected to manage, motivate and lead hundreds of athletes across all age groups and from across all sporting disciplines. Without these coaches who apply effective leadership, past experience, knowledge and skill strategies into their jobs, there would be so many talented sports starts left un-nurtured.

Sports coaches are powerful role models and leaders for their athletes, teams and community. Coaches play a multifaceted role in the life of athletes. A coache's role goes beyond just teaching the tenets of sport, rather a coach must be able to properly manage and organize a sports program where they combine a number of elements which includes the following components:

1. **Ethics and philosophy -** Coaches embody and establish a philosophy or culture of their own, they can teach safe and ethical behavior for athletes and assistant coaches alike.
2. **Injury prevention and safety -** Coaches are trained to take care of equipment, unsafe conditions, practice and very well known to respond to emergency situations.
3. **Tactics and sports skills -** Coaches develop and understand various unique approaches to teach specific skills and strategies needed to excel at their sports.
4. **Teaching and communication -** Coaches can implement positive learning experiences which can help maximize an athletes potential in sports and life.
5. **Growth and development -** Coaches are able to gauge skill levels and competition readiness of athletes no matter their age.
6. **Administration and organization -** Coaches provide information about sports program, sports policies and goals, they communicate and facilitate the needs of an athlete in an atmosphere of compliance and accountability.
7. **Evaluation -** Coaches are able to asses and evaluate each player's sporting ability when selecting and sending the player for the competition.

The role of the coach is not just coaching where Sports coaches assist athletes in developing to their full potential. They are responsible for training athletes in a sports by analyzing their performances, instructing in relevant skills and by providing encouragement. But a coach is also responsible for the guidance of athlete in life and their chosen sport. If we go to see the role of the coach will be many consisting from instructor, assessor, friend, mentor, facilitator, chauffer, demonstrator, advisor, motivator, fact finder, organizer, counselor, planner and fountain of knowledge.

The coach will need to be able to assist players to prepare training program, assist them to develop new skills, communicate effectively, use evaluation tests which will help monitor training progress and finally predict performance.

CONCLUSION

All the above mentioned points clearly let

us know the importance of coaches and their valued guidance for a sportsperson to achieve the set goals and maintain high level performance for a longer duration of time. Coaches help drastically in maintaining every possible type of fitness that is required by the sportsperson during his sporting life and inculcating good habits which last a lifetime in the individual's life even after retiring from active sports. All these aspects also highlight that coaches should go with formal sport coaching education as self-education can often go unaccounted and the time and energy taken by trial and error method can be time consuming and for professional coaches can't waste athlete's time, energy and money as that's very unfair to them. Fitness can be managed by many different methods where use of traditional or modern equipment, styles, strategies and technologies can be used to gain advantage in this fast moving world.

Results are important but not by sacrificing the true essence of fair play in sports so it's the job of coaches to develop and keep their players on track and train them in a manner that helps them know to keep away from performance enhancement drugs. Recent news articles brought about shocking news of very young athletes of 13-15 age group being found positive in Dope test (test done to know for usage of performance enhancement drugs). This is a serious issue because Steroids, various proteins powders, health supplements, or banned drugs intake for a longer time in such young players can lead to very serious health issues, organ failures and can even lead to deaths. This is all very scary as our young generation is pillar to our country's future and a weak and unhealthy youth will not be able to give a strong and steady adults of tomorrow. Hence, it's the coaches and parents responsibility to educate and give the right direction to our young player to work hard, win but at the same time not be demotivated or find shortcuts to win or go into depression due to failure. If we work together this will surely change the sporting culture in our nation and bring the best possible glory to our country.

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The Role of Ethics and Sustainability Reporting (BRSR) in Reducing Financial Frauds in Indian Companies

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Abstract:

The growing incidence of financial frauds in Indian companies has led to speculation over the efficacy of the existing regulatory frameworks and the possible role of corporate governance in prevention. The study conducts an inquiry into the efficiency of Business Responsibility and Sustainability Reporting (BRSR) as strengthening measures towards corporate ethics-ensured efficacy for fraudulent financial statement reduction in Indian companies. The analysis's focus is beyond this conjunct; it looks at BRSR as a tool toward transparency, accountability, and ethical behaviors, especially since it is made obligatory for about the top 1000 listed companies in India. It is evident through this research that the BRSR adoptions would align ethics into a sustainability goal where Environmental, Social, and Governance (ESG) metrics are incorporated. Thus, create further transparent reporting, which serves as a good deterrent against possible fraudulent activities in line with the study analysis. The importance of ethical corporate culture and fraud prevention is also captured in the research, noting that companies that have ethical guidelines along with strong sustainability practices experience reduced instances of financial fraud. Besides analyzing India's BRSR against global sustainability frameworks, this study also points out the study's effectiveness in promoting corporate responsibility and ethical governance at its core. The study reveals that, even though BRSR is beneficial, it has its own challenges like lack of awareness, regulatory gaps, and the need of developing professional know-how in forensic accounting.

The recommendations include regulatory support, training programs, and the establishment of a robust ethical corporate culture to enhance BRSR's implementation. Future longitudinal studies assessing BRSR's financial fraud prevention influence in the long run are highly recommended in this research paper. What is more important is exploring the behavior of ethical decision-making with respect to organizations. For this study, the findings demonstrate that BRSR has the potential to contribute immensely in reducing financial fraud, assuming effective implementation and sustainable improvement in corporate governance and ethical practices.

Keywords: *Financial Fraud, Business Responsibility and Sustainability Reporting (BRSR), Corporate Ethics, Fraud Prevention, Sustainability Reporting, Ethical Corporate Culture*

Introduction

The integrity and stability of the Indian corporate sector are under severe threat from financial fraud. For instance, significant losses and erosion of investor confidence were observed dues to severe lapses in corporate governance and standards of ethics revealed through various scandals, Satyam Computers, IL&FS, and Punjab National Bank, in the recent past-Revsine et al., 2018. These incidents have brought to light a severe requirement of not just detection but also prevention mechanisms against frauds at the level of the organization.

Against this backdrop, ethical governance and sustainability reporting are emerging as critical elements in tackling financial irregularities in the eyes of ethical accountability. Ethics as a fundamental

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pillar of good financial reporting develops integrity, equity, and accountability in the organizational conduct of actions. Typical ethical deviations have manifested themselves in a series of financial manipulations, mock disclosures, and misrepresentation of performance, which further feed into a systemic fraud risk (Alexander et al., 2020). Therefore, putting in place a more ethical culture, through structured frameworks and transparent reporting, should be a critical business imperative in modernity.

In fact, the Business Responsibility and Sustainability Reporting (BRSR) framework has been developed by SEBI in 2021 in correlation with the global sustainability trends and rising demands of environmental, social, and governance (ESG) concerns by external stakeholders. The BRSR is actually an upgrade from the earlier Business Responsibility Report (BRR) and incorporates the principles of National Guidelines on the Responsible Business Conduct (NGRBC) aimed at prodding companies who would include in their results or disclosures their performance in some non-financial parameters like ethical conduct, human rights, environmental responsibility, social impact, and so forth (SEBI, 2021). Adoption of BRSR mandatory for top 1000 listed companies marks the significant transition towards standardized, comprehensive, and data-driven ESG disclosures in India.

Evidence suggests that structured sustainability disclosures are going to deter considerably financial frauds in the form of heightened accountability on the part of corporations from their management, enhanced strengthening of internal control systems, and fortified trust from stakeholders (Kim, Li, & Li, 2021). Thus, by integrating ethical principles into operational and reporting practices, BRSR can prevent the incidence of fraud much due to higher transparency and scrutiny. This paper tries to widen the scope of understanding as to how much ethics and sustainability reporting through BRSR can mitigate financial frauds in Indian corporations and how strategic leveraging of such tools can be possible for long-term benefit in corporate governance reform.

Literature Review:

Financial fraud is a significant menace in India's corporate scenario, admitting no investor confidence and organizational integrity. The banking sector, according to the Reserve Bank of India (2021), reported frauds to the tune of ₹60,389 crore during 2020-21, which is a clear indication of the enormity of the problem. Embezzlement, money laundering, and insider trading among others highlight the necessity for enforcing ethical frameworks and transparent reporting mechanisms (PwC India, 2020).

The ethical dimension of accounting and business is foundational to the prevention of fraudulent behavior; unethical behavior of corporate insiders has led to accounting scandal and the losses to its stakeholders (Duska, Duska & Ragatz, 2011). Some studies have shown that codes of conduct, ethical training, and compliance can go a long way toward curbing unethical decision-making (Kaptein, 2008). In turn, forensic accounting supplemented by ethical considerations becomes a vital instrument of detecting irregularities and ensuring accountability (Bhasin, 2016).

India's efforts toward sustainability reporting initiated with the National Voluntary Guidelines (2011), evolved into mandatory Business Responsibility Reports (BRR), and then into Business Responsibility and Sustainability Reporting (BRSR) from FY 2022-23 onward for the top 1000 listed companies (SEBI, 2021). The BRSR framework has been in alignment with international sustainability norms and UN Sustainable Development Goals, stressing transparency and ethical governance.

Sustainability reporting through frameworks like the BRSR is negatively correlated with corporate fraud. Fraud occurrences are fewer among compa-

nies with extensive CSR and sustainability disclosures, as such disclosure raises stakeholders' scrutiny and decreases information asymmetry (Chen et al., 2020). Also, by stressing the disclosures about anti-corruption practices, governance structures, and stakeholder engagement, BRSR fosters a culture of integrity.

While the positive effect of sustainability reporting on corporate ethics is apparent, challenges like disparate data quality, regulatory compliance issue, and lack of awareness among firms remain (KPMG, 2022). In spite of these challenges, literature backs the claim that well-implemented ethics and BRSR provide substantial deterrence against financial fraud.

Methodology

The study and an analytical approach concerning the variables: ethical practices, sustainability reporting, and financial fraud mitigation in Indian companies is being used in this research. The blended qualitative and quantitative research approach will then make the study sufficiently exhaustive in showing how Business Responsibility and Sustainability Reporting (BRSR) makes ethical conduct an enabling environment for reducing dimensions of corporate fraud.

Data will be obtained through several means including secondary and primary sources. The secondary data will be obtained from the corpus of regulatory reports, corporate disclosures, case studies, academic literature, and industry survey outputs provided by bodies like SEBI, the Ministry of Corporate Affairs, and large global accounting firms. These documents provide contextual insights into the journey of ethics and sustainability practices in India.

Primary data will be collected through semi-structured interviews with significant stakeholders such as forensic accountants, auditors, compliance officers, and experts in corporate governance to gain professional insights into the effectiveness of BRSR in directing unethical practices. In addition, there will be a structured survey with compliance heads of companies within the top 1000 listed Indian firms mandated to adopt BRSR. The survey will focus on ethics policies, implementation challenges, and observed impacts on fraud prevention.

The sampling strategy will ensure select companies from different sectors to maintain sectoral representativeness and diversity in the perspective. Companies are selected according to the compliance status of BRSR and availability of disclosures regarding ESG and fraud.

Data collection involves secondary and primary sources. The corpus of these secondary data would be regulatory reports, corporate disclosures, case studies, academic literature, and industry survey outputs from bodies like SEBI, the Ministry of Corporate Affairs, and big global accounting firms. These documents would provide contextual insights into the journey of ethics and sustainability practices in India.

The primary data will be collected through semi-structured interviews with major stakeholders that include forensic accountants, auditors, compliance officers, and experts in corporate governance to gain professional insights into the effectiveness of BRSR in deterring unethical practices. There will also be a structured survey with compliance heads of companies within the top 1000 listed Indian firms that have been mandated to implement BRSR. The survey shall cover aspects of ethics policy, challenges of implementation, and impact observed on fraud prevention. The sampling strategy would thus be to ensure that companies from many different sectors are selected to ensure both sector representation and richness in perspective. The companies would be selected by their BRSR compliance status as well as by whether there are available ESG- and fraud-related disclosures.

A comparative approach will be used in observing the trends in financial fraud incidence before and after the mandatory implementation of BRSR. Statistical methods like correlation and regression analysis would also be applied to establish a relationship between ESG performance scores and the number of fraud cases registered.

The Role of Ethics and BRSR in Preventing Financial Fraud

Today, it is serious that financial fraud brings a lot of threats to stability, reputation, and economic viability of an organization. India, too, faced a lot of big corporate scandals on ethical grounds, thus deepening the need for good ethics governance frameworks. To answer growing concerns about corporate responsibility, the Securities and Exchange Board of India (SEBI) framed the Business Responsibility and Sustainability Reporting (BRSR) regulation mandating the top 1000 listed companies to disclose information pertaining to their "environmental and social governance or ESG practices". Ethics being a part of this framework for sustainability that would act as a judge for determining the acceptance of behaviour as fraud.

Ethical business behaviour involves being transparent and accountable in the conduct of affairs while catering to stakeholder welfare, all of which are often sacrificed to provide for fraud. BRSR promotes these values as it requires companies to not only report financial numbers but also their ethics policies, grievance reporting mechanisms, whistleblower protection, and board oversight on ESG. BRSR further widens the reporting horizon, thereby increasing transparency for the regulator. Investors and other stakeholders are not disclosed to understand and evaluate the dynamics beyond typical financial statements.

BRSR also nurtures companies to formulate and report codes of conduct, anti-bribery practices, and internal training programs regarding ethics. Such disclosures can act for deterrence as well as diagnosis purposes. If such an institutionalization of ethics is undertaking collectively as a part of sustainability of the organization, its employees are less likely to infringe upon fraudulent behaviour that goes unchecked.

Also, it brings accountability to the corporate board and top management through sustainability metrics that demand public reporting of governance structures and integrity-building within organizations, which enhances their internal controls. These measures serve as preventive measures against fraud.

In essence, ethics and sustainability reporting through BRSR would weave a culture of compliance and ethical decision making within organizations. It provides both procedural and behavioral change reinforcement for reducing fraud. Aligning business goals with responsible conduct and societal expectations makes the BRSR-ethical transformation-from a compliance checklist to a strategic asset in fraud prevention.

Ethics and BRSR would together create a more transparent, accountable, and fraud-resilient corporate environment in India, thus giving an overall and futuristic approach toward corporate governance.

Data Analysis:

This research investigated the extent to which Business Responsibility and Sustainability Reporting (BRSR) affects ethical behavior and decreased financial scams in Indian firms. The study was conducted on both figures (quantitative data) and actual experiences (qualitative interviews), providing a balanced insight across three major areas: statistical trends, professional opinion, and industry comparisons.

1. **Quantitative Insights: BRSR Compliance vs. Fraud Cases**
   - A sample of 200 Indian firms were examined from India's top 1000 NSE-listed companies,

diversified across major industries. Conducted the comparisons of their ESG (Environmental, Social, Governance) scores—measurements of how strictly they adhere to sustainable and responsible business practices—with specific instances of financial fraud cases reported to SEBI and the Ministry of Corporate Affairs between 2018 and 2023. This time frame enabled to examine trends both prior to and post-mandatory BRSR implementation.

- Statistical measures such as correlation and regression analysis were employed. Surprisingly, we noticed a positive correlation between good ESG scores and fewer fraud cases. In other words, companies that were more serious about BRSR had fewer fraud cases. The Pearson correlation coefficient was -0.47 (which is statistically significant), indicating that as companies showed better ESG performance, fraud risk declined. Regression analysis indicated that for each rise in ESG score, fraud risk went down by approximately 15%, even after we controlled for industry type and company size.
- These statistics reinforce the notion that transparent reporting and ethical business practices are not only good in theory—on the ground, they indeed have an effect of lowering corporate fraud.

2. Expert Insights: What the Experts Have to Say

- The researcher spoke to 20 experts, such as auditors, compliance officers, and sustainability specialists, to learn about BRSR in action. Their answers were sorted into common themes with qualitative analysis software.
- Three compelling messages emerged:

1. **Ethical Leadership Makes a Difference:** In firms whose top executives endorsed BRSR personally, there were more robust fraud controls and improved ethical behavior.
2. **More Openness, Less Fraud:** BRSR facilitated better whistleblower mechanisms and internal controls, making fraud more difficult to conceal.
3. **Box-Ticking Problem:** A few companies implemented BRSR merely to tick the box, without genuinely adopting ethical transformation. This made their disclosure less credible and lessened BRSR's impact.

These observations teach us that rules alone are insufficient—actual influence relies on serious commitment.

3. Sectoral Comparison: Not All Industries Are Equal

We contrasted BRSR performance in five industries: banking, IT, pharmaceuticals, manufacturing, and real estate. Banking and IT companies took the lead with more robust ESG scores and fewer instances of fraud. Manufacturing and real estate companies struggled to adopt BRSR, and most were still under regulatory radar for financial misconduct.

This segment of the analysis indicates that although BRSR is beneficial, its success is largely subject to how ready and willing various sectors are willing to embrace it entirely. Organizations with strong corporate governance mechanisms and regulatory guidance reap the greatest benefits from BRSR-fostered ethics.

Overall, the evidence indicates an evident correlation between responsible business reporting and reduced fraud risk—yet the true secret is the extent to which companies wholeheartedly adopt ethical behavior beyond compliance.

Challenges in Implementing Ethics and BRSR for Fraud Prevention

While the introduction of ethical practices and the Business Responsibility and Sustainability Reporting (BRSR) paradigm may greatly contribute to minimizing financial fraud in the Indian corporate world, effective application is full of challenges. These challenges emerge at the organizational level as well as at the systemic level, thereby limiting the transformative opportunities for ethics and sustainability reporting.

One of the first challenges is the lack of sincere commitment toward ethical practices by top management. Many companies treat ethical codes and sustainability disclosures merely as compliance formalities rather than as strategic governance tools. This engagement becomes a shallow act whereby companies engage in performative reporting, focusing more on the optics and less on the substance of BRSR, thereby undermining its potential in preventing and deterring fraud.

Another challenge was the inadequacy of internal controls and data governance infrastructure. Implementing BRSR needs robust processes for collecting, verifying, and reporting non-financial data, more so concerning governance, whistle-blowing mechanisms, and ethics training. Many firms, especially in the emerging sectors or with very limited resources, face difficulties in building this capability; thus, any disclosures that do come out end up being incomplete or not credible.

Another hurdle complicating the implementation of BRSR is the absence of standardized interpretations of ESG metrics, and subjectivity deeply embedded therein. Free-play between considerations of governance failures and ethical compliance is, therefore, exploited by companies when presenting ESG-related disclosures—unlike in the case of financial data governed by strict accounting standards. While presenting an opportunity for discretionary interpretation, all this ambiguity weakens the framework in identifying and escalating instances of potential fraud risks.

Cultural and behavioral impediments, too, obstruct any serious investigation into many of the issues. In many corporate environments, especially family businesses, a hierarchically organized power structure discourages whistleblowing and open discussions regarding ethical concerns. And without a supportive culture, even the best-documented BRSR will stand marginalized.

In the areas still weak on enforcement regulations, while the Securities and Exchange Board of India (SEBI) makes BRSR mandatory for the top 1,000 listed companies, the lack of punishing provisions or provision for a third-party audit reduces the social pressure towards improved ethical governance practice.

The ethics and BRSR may reduce fraud but they are severely constrained by systemic inertia, resource limitations, cultural resistance, and lack of regulatory support. To address these issues, a multi-prong strategy would be necessary: strengthen governance system; raise regulatory scrutiny; develop technical guidance; and culture integrity at all organizational levels.

Discussion

Effectiveness of BRSR in Curbing Financial Fraud

Now that the Business Responsibility and Sustainability Reporting (BRSR) framework is being implemented by SEBI, a sudden change will be observed in Indian corporate governance and transparency. Early evidence indicates that the BRSR may have some role in the fight against financial frauds by highlighting ethical accountability and improving stakeholder disclosures. A comparative analysis of some fraud cases reported before BRSR implementation and after proposes a slight decrease

in major financial irregularities, particularly among the high ESG (Environmental, Social, and Governance) scoring companies that are also transparent in ethical practices. So, while this denting down in financial irregularities has been minor so far, it tells us that under BRSR, structured disclosures on governance practices prevent fraudulent behavour.

Insights from Ethical and Transparent Companies

Companies that treat BRSR not just as compliance but as the basis for realignment of corporate life have invariably strengthened their ethical foundations. These companies avow ethics training, whistleblowing tools, and sustainability and corporate strategy alignment. Industries like IT, FMCG, and banking illustrate how ethics and sustainability reporting together create an alert and accountable workforce capable of minimizing opportunities for financial misconduct.

Corporate Culture and the Prevention of Fraud by Ethics

The internal culture of a company requires serious attention in the fight against fraud. Ethics-based organizations engender openness, accountability, and purpose among employees. The BRSR makes corporations accountable to their investors and society through governance disclosures and stakeholder-centric approach, fostering such value systems. The need to disclose policies regarding ethics, whistleblower mechanisms, and resolutions for conflicts of interest strengthens avenues of ethical behaviour.

Comparison with Global Practices

When viewed in comparison to international social responsibility frameworks, including Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), and EU Corporate Sustainable Reporting Directive (CSRD), BRSR clearly agrees with the principles of sustainability but is in transition through its enforcement. BRSR relies on self-disclosure and therefore is susceptible to underreported or greenwashing as distinguished from the European market's mandatory external assurance. Nevertheless, by integrating both financial and non-financial disclosures, BRSR represents a step ahead towards integrated reporting in India.

BRSR has given a new life into ethical governance and the mitigation of frauds. Improving, standardizing and enforcing the framework further may create a magnifying impact in the years to come.

Summary of Key Findings

This research examined the effectiveness of ethical practices as well as the BRSR in curtailing financial fraud in companies in India. The findings indicated that in imposing structured disclosures in regard to governance, ethical conduct, and social responsibilities upon the companies, BRSR provides a meaningful contribution toward corporate transparency and accountability. The BRSR provisions, by placing emphasis on ethical behavior, stakeholder engagement, and sustainability, have thus facilitated the strengthening of corporate governance mechanisms within several firms, thereby concomitantly reducing their propensity toward fraudulent acts.

The study shows that great ethical commitment and sustainable reporting practices among companies are associated with fewer instances of financial fraud after the BRSR. When ethics are integrated into corporate culture by means of appropriate reporting frameworks, such as the BRSR, which promote better risk management, they also enhance investors' and other stakeholders' trust. This study further establishes that ethics and sustainability are not peripheral but rather are firmly established as the two actors of financial integrity within the ambit of contemporary corporate governance.

Strengthening BRSR implementation is the key recommendation from this study. Regulatory bodies like SEBI need to adopt a more robust monitoring mechanism and kindly schedule fre-

quent training programs for corporate executives, compliance officers, and auditors to ensure effective implementation. This way, third-party audits of BRSR disclosures are incentivized and thereby render BRSR disclosures more transparent. Simultaneously, companies should focus on building ethical leadership and institutionalizing ethics training to generate an internal environment to promote sustainable and fraud-resistant practices.

From the angle of research, it is well warranted that longitudinal studies can be carried out to study the long-term impact of BRSR on fraud incidence in different sectors and sizes of companies. Another possible avenue of research can focus on the behavioral and psychological variables impacting ethical decision-making in Indian corporate scenarios. Knowing these deeper reasons will help create better interventions that reduce fraudulent behavior and strengthen ethical norms.

The merging of ethics with sustainability reporting through BRSR signifies a path-breaking change in corporate governance in India. If implemented earnestly with regulatory and cultural changes backing it, BRSR can become a potent weapon in our ongoing war against financial fraud.

Conclusion:

This study examined the interaction between ethical practices, BRSR, and anti-fraudulent measures in Indian firms using statistical data analysis and qualitative commentary from industry specialists. The results provide strong support for the conjecture that stringent ethical standards and socially responsible business disclosures, particularly under the BRSR framework, have a key impact in curbing fraudulent acts and enhancing corporate governance.

One revelation was the reported inverse correlation between ESG performance (including BRSR compliance) and the number of instances of financial fraud. Firms that intensively practiced the tenets of BRSR—board-level ESG governance, openness in dealings with stakeholders, and tracking of sustainability goals—had lower instances of fraud, regulatory intervention, or financial misstatements. The results of the regression also indicated that a gain in ESG score was associated with a significant decrease in fraud risk, even after controlling for controls such as firm size and industry.

Through qualitative interviews, it became apparent that ethics is not merely a matter of having policies but also of creating an internal culture of responsibility and integrity. Experts repeatedly underscored the role of leadership commitment, protection for whistleblowers, and the strength of internal audit as prime enablers of ethical conduct. BRSR has had a catalytic effect in putting many of these practices into place by integrating them into formal reporting frameworks.

However, the study also revealed critical implementation challenges. While compliance rates have improved due to SEBI's mandate, some companies view BRSR merely as a regulatory requirement rather than a meaningful tool for change. There is a risk of "checklist compliance," where firms report on paper without making real improvements in ethical governance. This gap between disclosure and practice poses a challenge to the long-term credibility of sustainability reporting in India. Sectoral analysis confirmed uneven adoption and influence. Financial services and IT companies, which historically possess stronger regulatory oversight and governance mechanisms, demonstrated more integrated BRSR and fewer fraud cases. Manufacturing and real estate firms, on the other hand, encountered more implementation challenges, sometimes as a result of legacy systems, scarce resources, or weaker internal controls.

Drawing on these findings, the report sets out two main recommendations. Firstly, regulators and industry associations ought to reinforce assistance with BRSR adoption—via straightfor-

ward guidelines, sectoral toolkits, and compulsory compliance officer training. Secondly, businesses should be incentivized to be more than compliant by enshrining ethics throughout the corporation, not merely in sustainability or risk functions.

Lastly, this study adds to the general knowledge of how sustainability reporting can go hand in hand with ethical governance to limit corporate fraud. It emphasizes that BRSR is not just a reporting requirement but also a structure which, if approached seriously, can shift organizational conduct and minimize ethical deficiencies.

Future studies must include longitudinal studies in order to determine the long-term effect of BRSR on a longer term. Behavioral research on how corporate executives take moral decisions while under reporting pressure may throw more light on underlying systemic issues and provide solutions in promoting integrity-based business cultures.

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Challenges for The Pharmaceutical Industry in Implementing Lean Six Sigma

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Abstract:

Lean Six Sigma methodology is the combination of two different methodologies viz Lean and Six Sigma. Lean methodology particularly focuses on elimination of waste whereas Six Sigma focuses on elimination of variability. Primary focus of Lean is enhancing process flow, reduce cost, improve customer satisfaction by identifying and removing inefficiencies and optimising resources required for end-to-end operations. Primary focus of Six Sigma is enhancing process control with the help of data driven techniques to achieve perfection in the product quality, reduce variability in product specification. Lean and six sigma, both are complementary to each other. If company implement only lean then you may not control product quality due to variation. Similarly, if company implement only Six Sigma, then company produce quality goods but may not be cost effective with shorter process cycle time and lead time.

Human beings consume medicinal products directly, coming out from Pharmaceutical Industry. Patients consume medicines with blind faith on the Pharma industry. Development, manufacturing, and packing is the complex scientific processes which most of the people don't understand. Hence on behalf of people, government regulate the pharmaceutical industry with Food and Drug Administration (FDA) to safeguard public health and ensure the safety, efficacy, and quality of medicines. Thus, pharmaceutical industry operates in highly regulated, complex as well cost competitive environment where compliance, product quality and safety are highly critical. Hence, despite clear benefits by implementation of LSS, pharmaceutical industry is reluctant to introduce this methodology and faces significant challenges. The purpose of this paper is to reasons for all possible challenges for adaptation of Lean Six Sigma in the pharmaceutical industry. The paper aims to contribute to suggestion to pharmaceutical firms to adopt LSS for enhanced productivity and profitability.

Keywords: *Lean, Six Sigma, Lean Six Sigma, pharmaceutical industry, process control, product quality, challenges, productivity, and profitability.*

Introduction

Earlier major Pharma products were branded and patented across the globe and dominated by Multinational Pharmaceutical companies. Moreover, there were less players (Pharmaceutical companies) in the world. Most of the companies are from USA (United States of America) and EU (European Union). Hence Pharmaceutical Multinational companies (MNCs) enjoying monopoly in the marketplace. Thus, profit margin was very high on most of the products. So MNCs never felt need for any cost cutting exercise for their operations. In recent times many drugs went off-patented and then become generic drug which leads to many companies started manufacturing same drugs. This leads to significant price drop of off-patented drugs.

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Thus, profit margin is reduced significantly for MNCs. So, this scenario forced MNCs and generic companies to implement Lean Six Sigma Program in their organisations.

In general, pharmaceutical companies face the greatest challenge to maintain highest standards of quality due to regulatory monitoring. Moreover, lead time is too high for Pharma industry. It takes minimum 3 months to 12 months for customer to receive their order after placing it. Implementation of Lean Six Sigma is helpful in various industries to achieve their goals effectively. Though Pharmaceutical industry has unique challenges in implementation of Lean Six Sigma (LSS) principles, the outcomes are equally effective. The purpose of this paper is to identify and examine those challenges and come up with effective deployment of LSS in the Pharmaceutical sector.

Literature Review

George, M. L. (2002) in the book "Lean Six Sigma: Combining Six Sigma Quality with Lean Speed" described how Lean Six Sigma has proven as a powerful methodology to smooth running processes, cost reduction, and help in improving customer satisfaction. The book mentions a strategic and operational structure to improve quality (Six Sigma) and increase production speed (Lean) which will result in improvements in defect reduction, production cycle time, and cost. The author emphasizes that Lean focuses on eliminating non-value-added activities (waste), while Six Sigma has focus on reducing process variation and improving quality.

By integrating the two, organizations can achieve rapid process improvement while sustaining long-term quality control, overcoming the limitations of using either approach in isolation. The book provides a conceptual framework for understanding the synergy between speed and quality. Provides strategic direction for LSS deployment in regulated, quality-sensitive sectors like pharma. Offers insights into measurable business impact, aligning with research objectives on productivity and profitability.

Antony, J. (2011) in the research paper titled "Six Sigma vs Lean: Some perspectives from leading academics and practitioners" mentioned that in the pharmaceutical industry, where compliance with Good Manufacturing Practices (GMP) is mandatory, the benefits of LSS can be substantial. Author pointed out challenges in LSS implementation that the Lack of senior management support, poor project selection, insufficient training, and resistance to change are highlighted as major barriers. There is also concern about over-reliance on tools without understanding the philosophical foundation of Lean and Six Sigma.

This article highlights the importance of organizational context, leadership, and cultural compatibility for successful placement of LSS program. In case of pharmaceutical industry where quality, compliances, turnaround time pressure etc are very high, incorporating dual methodology of Lean and Six Sigma can be appropriate to improve both productivity and profitability. This thesis is well aligned with the very idea.

Antony (2006) expressed that Six Sigma provides a structured approach based on data for quality improvement in the research titled "Six sigma for service processes" .

Antony identifies several challenges including lack of process standardization, limited use of statistical tools by service employees, difficulty in quantifying service quality, and employee resistance due to fear of monitoring or role change. The study offers a practical roadmap for overcoming contextual barriers and supports the notion that Six Sigma, when appropriately modified, can deliver substantial productivity and quality gains even in complex, people-driven service environments.

This article lays a theoretical foundation for exploring Lean Six Sigma implementation beyond the shop floor, aligning directly with research objectives focused on improving productivity and profitability through process re-engineering in both manufacturing and service divisions of the pharmaceutical industry.

Womack & Jones (1996) in the book "Lean Thinking: Banish Waste and Create Wealth in Your Corporation "explained how Lean focuses on reducing non-value-added activities.

Building on the foundational principles of the Toyota Production System (TPS), the authors derive Lean methodology into a five-step approach that has become the cornerstone of Lean implementation across various industries. The five steps are Value, Value stream, Flow, Pull and Perfection. The central thesis of the book is that organizations can achieve substantial productivity gains, cost reduction, and customer satisfaction by identifying and removing non-value-added activities (waste), aligning processes with customer value, and fostering a culture of continuous improvement. The book categorizes waste into seven types (muda): overproduction, waiting, transport, overprocessing, inventory, motion, and defects. The authors advocate that Lean is not merely a toolkit but a management philosophy that must be adopted organization-wide, with strong leadership commitment and employee engagement. The author stresses that sustainable Lean transformation involves cultural change, requiring organizations to challenge traditional thinking, empower frontline employees, and measure success by long-term value creation rather than short-term gains.

Snee (2010) in the research titled "Lean Six Sigma–getting better all the time" pointed out that when applied together as Lean Six Sigma, the methodology can help pharmaceutical firms reduce cycle times, lower inventory levels, and improve product quality. Author offers a robust strategic and systems-level perspective on Lean Six Sigma, moving beyond technical tools to emphasize cultural, organizational, and leadership dynamics. This broader lens is especially valuable in research exploring LSS in highly regulated, knowledge-intensive industries like pharmaceuticals, where successful implementation hinges on more than process redesign—it requires alignment with regulatory frameworks, compliance standards, and cross-functional integration.

The article's focus on continuous improvement as a mindset supports the theoretical foundation for evaluating how Lean Six Sigma can drive long-term productivity and profitability in pharmaceutical firms. Moreover, the identification of critical success factors and infrastructure offers a useful basis for constructing a research framework or implementation model for empirical study.

Chakravorty's (2010) critique offers a real-world, practitioner-grounded counterbalance to the more optimistic narratives often presented in academic and industry literature on Lean Six Sigma. While many studies emphasize methodological rigor, tools, and success stories, this article serves as a reminder of the organizational and behavioral complexities that can undermine LSS initiatives. Provides a pragmatic lens to evaluate why LSS implementations often fall short of expectations. The book provides a pragmatic lens to evaluate why LSS implementations often fall short of expectations. Offers empirical insights into failure patterns that can inform case study analysis or survey design. Reinforces the argument that organizational readiness, culture, and leadership are as critical as methodology. It also supports the development of implementation frameworks that go beyond tool deployment to include behavioural change management, strategic alignment, and leadership accountability.

Taner et al. (2007) In this comprehensive article, examine the application of Six Sigma methodologies within the healthcare industry, presenting a critical overview of its benefits, challenges, and outcomes. As healthcare institutions increasingly adopt

quality management tools from the manufacturing sector, this paper serves as a valuable resource by systematically reviewing the scope, implementation areas, and impact of Six Sigma in various healthcare settings. The paper highlights that while Six Sigma offers a structured path to process improvement, its success is contingent on leadership commitment, cultural alignment, and capacity building—elements that are equally critical in the pharmaceutical sector. The study also reinforces the need for sector-specific adaptations, a key consideration in implementing LSS in pharma. Moreover, the recognition of integration with Lean principles anticipates the evolution of Lean Six Sigma (LSS) as a more holistic approach, aligning with the central focus of this thesis on enhancing productivity and profitability through comprehensive operational improvement programs.

The authors note several barriers to implementation viz. Resistance to change from healthcare professionals, Limited understanding of statistical tools, Lack of training and leadership support, Cultural differences between clinical and managerial mindsets. These challenges underscore the need for customization, communication, and interdepartmental collaboration during Six Sigma deployment in healthcare.

Despite these challenges, companies like Pfizer and Johnson & Johnson have reported success with LSS initiatives, demonstrating the potential value of the approach.

3. Successful Examples of Implementation

Pfizer implemented Lean Six Sigma to reduce product cycle time by 25% at one of its major manufacturing units. The company emphasized cross-functional collaboration and continuous improvement. - Johnson & Johnson utilized LSS to streamline packaging operations, resulting in cost savings and reduced defects. The company established a dedicated team for LSS training and deployment.

Dr. Reddy's Laboratories (India) adopted LSS to improve yield in manufacturing and reduce waste. The initiative led to better resource utilization and enhanced regulatory compliance.

Over the period, Operational Excellence team made significant progress in monitoring operational efficiency with the help of digitalisation. Team implemented lean six sigma concepts like lights off operations, automation in manufacturing by implementing MES (Manufacturing Execution System).

4. Challenges in Implementing Lean Six Sigma in Pharma Industry

Key challenges in Implementing Lean Six Sigma in Pharmaceutical Industry are listed below

4.1 Regulatory Compliance

Pharma companies operate under strict regulatory standards like GMP, FDA guidelines, and WHO requirements. Any change in the process must be validated and documented, which can delay LSS implementation.

4.2 Cultural Resistance

Employees in the pharma sector are often resistant to change due to a deep-rooted culture of compliance and caution. Lack of understanding and fear of job loss are common reasons for this resistance.

4.3 Lack of LSS Knowledge

Many employees and managers lack proper training in Lean Six Sigma tools and techniques. Without sufficient knowledge, it becomes difficult to lead and sustain process improvement projects.

4.4 Data Integrity Issues

LSS relies heavily on accurate data for decision-making. In pharma companies, data may be incomplete, inconsistent, or not digitized, posing a significant barrier. Lots of data is available during execution of the process but there is very low analysis of data.

4.5 High Initial Investment

Training employees, hiring experts, and restructuring processes for LSS require significant upfront investment. Smaller firms may find it difficult to allocate these resources.

4.6 Integration with Existing Systems

Most pharma firms already have quality systems like ISO or GMP in place. Integrating LSS with these frameworks without conflict requires strategic alignment.

4.7 Fear of Regulatory Consequences Any deviation or change, even for improvement, may trigger regulatory audits. This fear discourages innovation and continuous improvement.

All the important challenges are explored in the following are section.

4.1 Regulatory Compliance Challenges in the Pharmaceutical Industry

Pharmaceutical companies have regulatory compliances like GMP, WHO specifications and FDA guidelines from various countries. Each change in the process require validation and documentation in the form of change control. Therefore, implementation of Lean Six Sigma gets delayed and or not prioritised.

The pharmaceutical industry must follow strict rules and supervision of national and international regulatory bodies such as:

- Food and Drug Administration (FDA) – USA
- European Medicines Agency (EMA) – EU
- Central Drugs Standard Control Organization (CDSCO) – India
- World Health Organization (WHO) – Global standards
- Good Manufacturing Practices (GMP) – universally required

These frameworks ensure product safety, efficacy, and quality—but they also introduce rigid systems and documentation processes that can make continuous improvement efforts more complex.

4.1.1 Process Validation Requirements

Sometimes the change in Production process is crucial for Lean Six Sigma effectiveness. Formal Process Validation includes:

- Documenting the intended change
- Proving through data that the change does not negatively impact product quality
- Receiving formal approval from FDA before implementation

Validation process is expensive and long – drawn which makes the LSS lead to lag behind and infeasible entirely. Most of the time involvement of more than two functions / department is required for evaluation, approval and execution of change proposed by LSS program.

4.1.2 Risk of Regulatory Penalties

For the safety of the patient, regulatory agencies exercise scrutiny of even small / minor change with respect to patient safety. If agencies noticed deviation from validated process during their scrutiny during audits, then various types of penalties are imposed on the pharma companies. As the extreme case, regulatory agencies banned selling products in their country if such deviation noticed during their scrutiny. Regulatory agencies may penalised pharma country leading to:

- Product recalls
- Warning letters (e.g., FDA 483s)
- Import bans or license suspensions

As a result, companies tend to be risk-averse and resistant to Lean improvements, even when clearly beneficial.

4.1.3 Change Control Procedures

Any change in current process at the manufacturing site, which may be major or minor must be routed through change control process defined by the quality system. The change control process may include following:

- Risk assessment

- Cross-functional approvals
- Regulatory impact analysis

This process may look like bureaucracy for non - pharma professionals and it is really time consuming. This process slows down the speed of experimentation and faster implementation of projects intended by LSS.

4.1.4 Lack of Regulatory Guidance on LSS

Many regulatory agencies and even pharma professionals perceive that LSS program is not for the pharmaceutical industry. LSS (Lean Six Sigma) applicable only to automobile, engineering and FMCG companies. Hence, there is no clear-cut guidelines for using LSS (Lean Six Sigma) in the pharmaceutical operations by various regulatory agencies. This leads to confusion and uncertainty among the pharma companies for implementation of LSS program and projects. Lack of regulatory framework by various regulatory agencies makes it difficult to create a roadmap for implementation of LSS in pharma industry.

4.1.5 Cross-Border Compliance Variations

Many countries in the world are having their own regulatory agency and does not recognise regulatory agencies of other countries. If a pharma company catering same product to many countries, then that global pharmaceutical firms need to comply with multiple regulatory agencies in respective countries. There is no single or common regulatory body in the world that regulate entire Pharma industry of the world. Hence process changes need to be approved separately in dividual country regulatory agency. This results in:

- Duplicated efforts
- Conflicting standards
- Compromised LSS scalability across geographies

4.2 Resistance for Change in the Pharmaceutical Industry

Recent in past pharma industry experience loss of jobs due to failure to regulatory compliance or for any adverse comments in audits by regulatory agencies. Hence fear of loss of jobs in pharma employees are often create resistance to change. Employees of the pharma sector perceive any change in current process may lead to compliance issues in opinion of regulatory agencies.

Moreover, Employees of the pharma sector never experience changes in the process many years. For example, many manufacturing processes are going on for more than 20 years without any change. Such environment has created resistance for change and mindset among the employees of the pharma sector which is one of the greatest challenges for implanting LSS in pharma industry. This hinders the adoption of process improvement initiatives by employees and management.

4.2.1 Conservative and Compliance-Oriented Mindset

As per Good Manufacturing Practice (GMP), all manufacturing processes in pharma industry are govern by Standard Operating Procedure (SOP) and with formats for documentations. All employees expected to work within the framework of SOP and documentation practices as part of employment conditions. Lean Six Sigma, by design, encourages rapid experimentations, process changes and continuous improvement which may feel threatening to employees and managers.

Van Trieste (2015) expressed that employees are reluctant most of the time to alter validated processes due to fear of regulatory consequences in the research titled “Enabling Operational Excellence in a Regulated Environment”.

4.2.2 Cultural Resistance to Change

LSS initiatives typically involve changing estab-

lished workflows, reassigning roles, or introducing new measurement and control systems. Employees may view these changes as disruptive, particularly when they are not involved in decision-making or when change management strategies are poorly executed.

Chakravorty (2010) noted that resistance to change was a major reason why many process improvement projects in healthcare and pharma fail to achieve long-term success.

4.2.3 Lack of Cross-Functional Collaboration

Pharmaceutical firms are often structured in functional silos—production, quality assurance, regulatory, R&D, etc. These departments may have conflicting priorities. For example, while production may want to increase efficiency through LSS, quality assurance may be more concerned about maintaining documentation consistency. This lack of cross-functional alignment creates resistance to collaborative improvement efforts.

Antony (2011) emphasizes the need for alignment between departments to implement Lean Six Sigma effectively.

4.2.4 Conflicting Functional KPIs

Pharmaceutical firms organised in various functions viz, production, quality assurance, quality control, regulatory, R&D, etc. These departments may have conflicting department KPIs and every function tries to achieve its KPI. In this process department work in silos to achieve its own KPIs and do not collaborate with other departments. Production focuses on achieving monthly and annual production target as part of KPI while Quality function is less concern about it as it is not its KPI.

4.2.5 Fear of Job Redundancy

A major objective of LSS is to eliminate non-value-added activities and reduce waste, which sometimes leads to fears among employees that process optimization might result in job losses. This perception can lead to passive or active resistance from staff, especially from lower and middle management levels.

According to Jeyaraman and Kee (2010), job security concerns among employees were a notable barrier to Lean adoption in regulated industries.

4.2.6 Leadership Gaps and Poor Communication

Top management support is crucial for cultural transformation, yet many pharma organizations lack leaders who are trained or committed to LSS principles. When LSS is seen as a "side project" rather than a strategic priority, it fails to gain organizational buy-in.

George (2002) pointed out that sustainable Lean Six Sigma transformation requires strong leadership that actively engages teams and communicates the vision of improvement.

4.2.7 Inadequate Training and Skill Gaps

Employees in the pharmaceutical sector may not be familiar with Lean or Six Sigma tools such as DMAIC, fishbone diagrams, or process mapping. Without effective training and education, there is likely to be misunderstanding and resistance to the use of these tools.

Snee (2010) emphasized that one of the biggest cultural barriers to LSS is the lack of awareness and understanding across all organizational levels.

4.3 Lack of Lean Six Sigma Knowledge in the Pharmaceutical Industry

The successful implementation of Lean Six Sigma (LSS) depends significantly on the knowledge, skills, and awareness of its methodologies across the organization. In the pharmaceutical industry, however, there is a considerable gap in LSS literacy, especially outside the manufacturing domain. This lack of expertise is a major barrier to the widespread adoption and sustainability of LSS programs.

Many employees and managers lack proper training in Lean Six Sigma tools and techniques. Without sufficient knowledge, it becomes difficult to lead

and sustain process improvement projects.

4.3.1 Limited Awareness and Understanding

Many pharmaceutical professionals—especially those in quality assurance, regulatory affairs, and R & D—are more familiar with compliance frameworks like GMP, ICH guidelines, and ISO standards than with Lean and Six Sigma tools such as DMAIC, value stream mapping, or statistical process control (SPC). As a result, employees may not fully understand the purpose or benefits of LSS initiatives. Moreover, many pharma professionals have the opinion that tools are fancy and can be applicable only to automobile and engineering companies and to Pharma operations.

According to Antony (2011), the lack of awareness about LSS among operational staff limits the organization's ability to identify and eliminate process inefficiencies.

4.3.2 Inadequate Training Programs

Most pharmaceutical companies do not invest sufficiently in structured LSS training programs. Even when training is provided, it may be limited to a small group of project leaders or Six Sigma belts (e.g., Green Belts or Black Belts), while most of the workforce remains untrained or undertrained.

Snee (2010) emphasized that organizations often underestimate the extent of training required to achieve measurable success from LSS initiatives.

4.3.3 Misalignment Between Technical and Process Improvement Teams

In pharma firms, process engineers, validation specialists, and quality managers typically work in silos. Without a shared language or understanding of LSS concepts, cross-functional collaboration becomes difficult. This disconnect hinders the ability to identify root causes of problems, design of experiments (DoEs), or use data to drive decision-making.

Jeyaraman and Kee (2010) found that insufficient knowledge transfer between departments weakened LSS project execution and delayed benefits.

4.3.4 Complexity of Statistical Tools

Six Sigma requires the use of data-driven tools such as hypothesis testing, regression analysis, control charts, and process capability indices. These tools are often perceived as too complex or irrelevant by employees with non-statistical backgrounds, leading to resistance or improper use.

George (2002) noted that many early LSS failures were due to overemphasis on tools and statistics without adequate training and support.

4.3.5 Lack of Executive-Level Competency

Not only frontline staff but also many middle and senior managers in pharmaceutical companies are unfamiliar with LSS. When leadership lacks knowledge or appreciation of LSS, there is insufficient support, funding, and strategic alignment, leading to poor outcomes.

Antony and Laureani (2009) stressed the importance of leadership competency in driving LSS culture across the organization.

4.3.6 Absence of Pharma Industry-Specific LSS Curriculum

Standard LSS training often uses automotive manufacturing case studies, which may not resonate with pharma professionals. The absence of customized training materials that reflect pharmaceutical regulations, quality systems, and terminology reduces the practical value of learning.

Van Trieste (2015) argued that operational excellence programs in pharma need to be tailored to the specific regulatory and operational context of the industry.

4.4 Data Integrity Issues

LSS relies heavily on accurate data for decision-making. In pharma companies, data may be incomplete, inconsistent, or not digitized, posing a significant barrier.

In the pharmaceutical industry, data integrity refers to the completeness, consistency, accuracy, and reliability of data throughout its lifecycle. Regulatory authorities such as the U.S. FDA, MHRA (UK), EMA (Europe), and CDSCO (India) consider data integrity a cornerstone of Good Manufacturing Practices (GMP). As Lean Six Sigma (LSS) relies heavily on data for process analysis, control, and continuous improvement, any compromise in data quality can severely undermine both regulatory compliance and the success of LSS projects.

4.4.1 ALCOA+ Principles

Regulators require adherence to ALCOA+ principles, which state that data must be:

- Attributable
- Legible
- Contemporaneous
- Original
- Accurate

Along with: Complete, Consistent, Enduring, and Available

Lean Six Sigma depends on trustworthy data to identify process inefficiencies and defects. If data does not meet ALCOA+ standards, the analysis and solutions derived from LSS tools (like DMAIC, FMEA, SPC) can be misleading or noncompliant.

MHRA (2018) guidelines stress that breaches in data integrity can lead to regulatory action, including warning letters and import alerts.

4.4.2. Manual and Paper-Based Systems

Many pharmaceutical facilities still rely heavily on manual data recording and paper-based documentation, increasing the risk of:

- Transcription errors
- Backdated entries
- Missing records
- Unverified changes

This makes it difficult to guarantee data accuracy, a foundational requirement for both regulatory compliance and LSS implementation.

According to ISPE (2019), paper-based records are more susceptible to errors and intentional manipulation, jeopardizing data quality.

4.4.3. Lack of Standardized Data Collection Procedures

In LSS, uniform data is required across departments to compare processes, identify bottlenecks, and measure performance. However, in pharma companies, departments often use different templates, standards, or software, making it hard to integrate or interpret data consistently.

George (2002) emphasized the importance of standardized data streams in enabling effective Lean Six Sigma analysis.

4.4.4. Poor Data Governance and Accountability

LSS success depends on root cause analysis, which requires confidence in historical and real- time data. In some pharma firms, there is a lack of clear accountability regarding data entry, review, and approval. Without formal data governance policies, the reliability of input data becomes questionable.

Laureani & Antony (2012) found that weak data controls reduce the effectiveness of Six Sigma tools and lead to flawed improvement strategies.

4.4.5. Electronic Systems and Audit Trails

With the rise of computerized systems like LIMS (Laboratory Information Management System), ERP (Enterprise Resource Planning), and MES (Manufacturing Execution Systems), maintaining secure, timestamped audit trails is essential. Failure to implement proper electronic controls can violate data integrity regulations and expose the company to compliance risks.

Snee (2010) notes that while automation aids data consistency, it must be supported by system validation and access controls to ensure integrity.

4.4.6. Fear of Data Misuse and Manipulation

In a performance-driven culture where LSS projects aim to reduce variation and defects, employees may

feel pressure to present "perfect" data. This can result in intentional data manipulation, especially in environments lacking robust internal audits or ethical training.

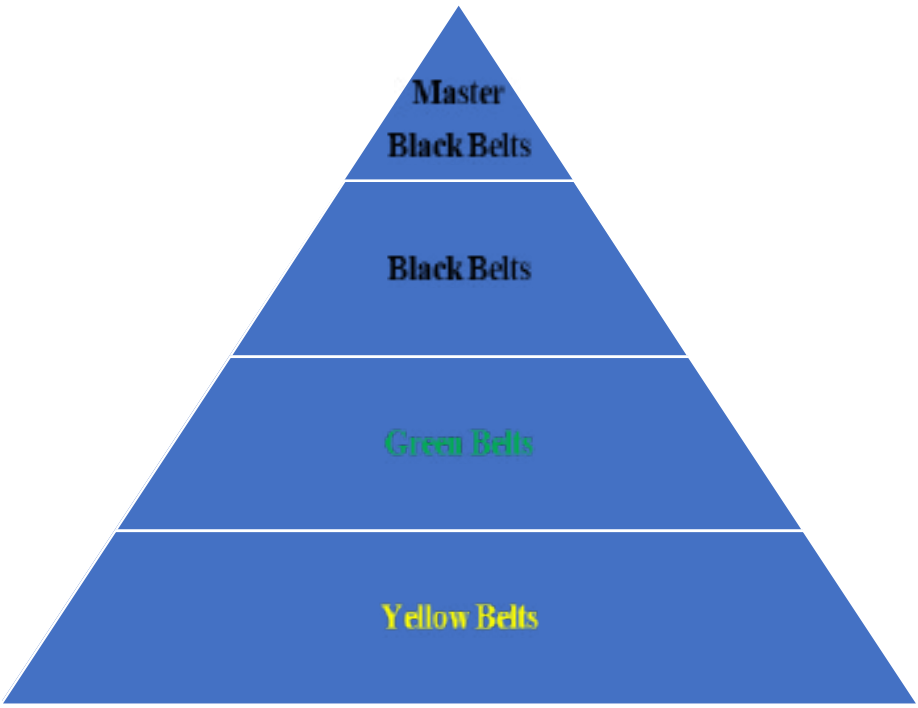
Chakravorty (2010) warns that misuse of data weakens continuous improvement programs and can lead to regulatory violations, in the research titled "Where process-improvement projects go wrong".

4.5 High Initial Investment for Implementation of Lean Six Sigma in the Pharmaceutical Industry

Need good amount of investment for Implementation of Lean Six Sigma in any company and that is also applicable to the Pharmaceutical Industry. You need to invest in hiring experts, training material, identifying employees for training and separate them from their job responsibility for certain time. Also need to restructure organisation to align with LSS requirement. This may require additional human resources for restructuring organisation.

Apart from this financial and investment in infrastructure is also required to start with LSS program. Small to mid-size companies may find it difficult to allocate so much of resources and upfront investment in LSS program implementation in initial phases. Moreover, it takes 6 months to one year to start getting benefits from LSS program. As we all know, LSS program gives short term as well as long term benefits to the organisations viz. cost reduction, cycle time reduction, west reduction, improvement in quality and improvement in overall efficiency of the organisation but this initiative often required cost to sustain the initiatives. This cost factor often limiting small and mid-sized organisations to implement LSS in their organisations.

4.5.1. Cost of Training and Certification



There are predominantly 4 levels of Lean Six Sigma. The first and lowest level is yellow belt followed by green belt which is then followed by black belt. Master black belt is the top most level of the LSS. Training needs and hence investment in training increases as we move from bottom to top level of the pyramid. As pharmaceutical industry processes are complex and regulated companies need customised training in accordance with GMP and regulatory requirement. This will further increase cost on training.

Antony et al. (2007), mentioned that training costs constitute a large portion of initial investment in LSS and are necessary for effective project execution in his book "Six Sigma in small- and medium-sized UK manufacturing enterprises"

4.5.2. Hiring Experts and Consultants

Since LSS expertise is often lacking internally—especially in pharma firms that are new to process improvement—companies frequently hire external consultants. These experts guide the initial deployment, run pilot projects, and provide mentoring. The fees for LSS consultants, particularly those with industry-specific experience, are often high.

George (2002) highlights that external consulting can be critical in early LSS stages but is also a cost-intensive activity.

4.5.3. Investment in Data Collection and Analysis Tools

LSS is a data-driven methodology. Accurate measurement, control, and improvement require investment in:

- Statistical software (e.g., Minitab)
- Quality management systems (QMS)
- Process monitoring systems (e.g., SCADA)
- Data integration platforms (e.g., LIMS, ERP)

Pharmaceutical companies may need to upgrade existing systems or digitize manual processes, which involves considerable cost.

Snee (2010) notes that digital infrastructure is often a hidden cost in LSS programs, especially in data-intensive industries like pharma.

4.5.4. Project Time and Opportunity Cost

Implementing LSS projects requires significant employee time and focus, diverting resources from routine production or regulatory tasks. This opportunity cost—especially in highly regulated, batch-driven environments—is substantial.

As per recent pharma industry trend, LSS resources are hired from automobile sector or FMCG sectors. Changes in the processes are not so easy in pharma industry as compare to automobile or FMCG industry. Moreover, they are lacking completely regulatory implications of the process changes. Hence project timelines goes haywire and realisation of benefits becomes dream.

Chakravorty (2010) argues that dedicating staff to LSS projects can temporarily reduce operational output, impacting short-term profitability.

4.5.5. Pilot Projects and Experimentation

Initial LSS deployment typically begins with pilot projects. These require time, resources, and often custom modifications to equipment, SOPs, or processes—all of which involve upfront capital expenditure.

Taner et al. (2007) observed that small-scale pilots often serve as test beds for LSS, but they incur significant early costs that companies must be prepared to absorb.

4.5.6. Change Management Programs

Effective LSS implementation often requires cultural change, which in turn requires investment in internal communications, workshops, leadership development, and change management consulting. These soft-cost investments, though less visible, are essential for long-term success.

Antony and Laureani (2009) highlight the importance of leadership alignment and internal communication strategies—both of which carry budget im-

plications.

4.6 Integration with Existing Systems

Most pharma firms already have quality systems like ISO or GMP in place. Integrating LSS with these frameworks without conflict requires strategic alignment.

LSS is one more 'new tool' with its own system. Introducing it into various pre-existing structures like GMP (Good Manufacturing Practices), QMS (Quality Management Systems), ISO standards, ERP (Enterprise Resource Planning) platforms is truly challenging. It is even more important to blend LSS with other structures seamlessly for effective and functional system altogether.

4.6.1. Coexistence with GMP and Regulatory Protocols

Good Manufacturing Practices emphasizes on strict documentation, validation, and control procedures. LSS encourages simplification and reduction in process variation and waste. Sometimes this becomes cause of conflicts between GMP and LSS. Regulatory protocols are required to be followed even if they result in redundancy. Therefore, it is noted by Snee (2010) that process improvement initiatives must align with compliance frameworks to be successfully implemented in regulated industries like pharma.

4.6.2. Fragmented Data Across Systems

Data needed for LSS projects is often spread across multiple platforms—such as Laboratory Information Management Systems (LIMS), Manufacturing Execution Systems (MES), and ERP systems. These platforms may not be fully integrated, making it difficult to gather real- time, accurate data for DMAIC analysis or process monitoring.

George (2002) emphasized the need for integrated data systems for effective Lean Six Sigma decision-making.

4.6.3. Legacy IT Infrastructure

Many pharmaceutical firms still rely on legacy IT systems that are not designed for the advanced data analytics and automation capabilities required by LSS tools. Updating these systems is expensive, risky, and time-consuming, often resulting in hesitation to adopt process improvement methodologies.

Antony et al. (2007) found that outdated infrastructure is a significant constraint in deploying LSS, especially in traditionally structured industries.

4.6.4. Resistance from Quality and Validation Teams

Quality assurance and validation departments are usually cautious about any process changes that might affect validated systems and documented protocols. This creates a tension between the LSS approach to continuous improvement and the static nature of validated environments, where even small adjustments require re-validation and risk assessment.

You cannot send the batches under validations to the customer till entire analysis of the batches are completed. This affects (reduce) available shelf life of the products in the market.

Sometimes you need to take trials for the proposed changes. That time you cannot sell those trail batches in the market. This led to loss of revenue for the manufacturing site or company.

Taner et al. (2007) argue that integration challenges are worsened by conservative attitudes within QA teams, driven by the fear of non-compliance.

4.6.5. Misalignment of Metrics and KPIs

LSS projects often introduce new performance metrics—such as defect per million opportunities (DPMO), sigma level, or takt time—which may not align with existing quality or production KPIs (Key Performance Indicators). This misalignment can confuse teams and make it difficult to assess success across systems.

Laureani and Antony (2012) point out the necessity for aligning LSS KPIs with strategic organizational goals and existing operational dashboards.

4.6.6. Duplication of Efforts and Parallel Systems

In many cases, LSS efforts run parallel to existing quality improvement or compliance initiatives, leading to duplication of documentation, audits, and reporting. Employees may see LSS as an "extra burden" rather than a supportive framework.

In other scenario tech transfer department or production function runs their own improvement program as a part of internal improvement target. Hence you can see more than one improvement programs are going on at the site. This creates conflict within functions for prioritising projects and later for taking credit of success of projects.

Jeyaraman and Kee (2010) stress that without proper integration, LSS may be perceived as isolated or redundant, reducing engagement and impact.

4.7 Fear of Regulatory Consequences While Implementing Lean Six Sigma in the Pharmaceutical Industry

Any deviation or change, even for improvement, may trigger regulatory audits. This fear discourages innovation and continuous improvement.

In the highly regulated environment of the pharmaceutical industry, Lean Six Sigma (LSS) initiatives—despite their potential for improving quality and efficiency—are often met with reluctance due to fear of regulatory repercussions. These fears stem from the industry's dependency on strict adherence to validated processes, documentation protocols, and inspection readiness, which can be disrupted, or perceived to be compromised, by continuous improvement efforts.

4.7.1. Risk of Non-Compliance and Deviations

Lean Six Sigma encourages modification of existing processes to eliminate waste, reduce variation, and improve quality. However, even minor changes to validated processes can result in regulatory deviations that require investigation, documentation, and potential notification to regulatory bodies such as the FDA, EMA, or CDSCO.

Van Trieste (2015) emphasizes that in regulated settings, the cost of deviation from a validated process—intentional or not—can trigger compliance issues and formal audits.

4.7.2. Regulatory Inspections and Audit Pressure

Pharmaceutical facilities are regularly inspected by health authorities to ensure compliance with Good Manufacturing Practices (GMP). Any process changes made as part of LSS projects are likely to be scrutinized during audits, leading to anxiety among staff. The fear of inspection findings, warning letters, or 483 observations often leads companies to resist change, even when it could lead to improvement.

Chakravorty (2010) observed that fear of negative audit outcomes discourages companies from experimenting with improvement initiatives.

4.7.3. Extensive Validation Requirements

Regulatory bodies require any changes to pharmaceutical processes to be validated, documented, and proper scientific justification for any change. This includes revalidating affected equipment, updating SOPs, and training personnel. The burden of validation can delay or discourage Lean Six Sigma projects, especially when the regulatory requirements are perceived as too rigid.

Snee (2010) noted that validation concerns often lead to hesitation in applying LSS principles in tightly controlled pharmaceutical environments.

4.7.4. Lack of Regulatory Clarity on LSS

Many regulatory authorities do not provide explicit guidelines on the use of Lean Six Sigma in pharmaceutical operations. This lack of guidance results in uncertainty about compliance boundaries, leading

companies to adopt a conservative approach and avoid implementing process changes without absolute assurance of regulatory acceptance.

Antony et al. (2007) reported that the absence of formal regulatory recognition for Lean Six Sigma can lead to risk-averse decision-making.

4.7.5. Perceived Threat to Inspection Readiness

Inspection readiness is always a top priority in pharma. When organizations are unsure about how LSS changes will be perceived during audits, they may suppress process optimization, fearing it could appear non-compliant or result in questions about data integrity or process consistency. In any pharma company, process improvement under LSS program is the last priority for the site / company.

Laureani and Antony (2012) stated that organizations often view change as a threat to stability, particularly when external inspections are frequent.

Conclusion

While Lean Six Sigma can offer significant benefits to the pharmaceutical industry—such as improved quality, reduced waste, reduce cost and increased efficiency—the heavy burden of regulatory compliance often stands in the way. To succeed, companies must carefully balance continuous improvement with regulatory obligations. A collaborative approach involving quality assurance, regulatory affairs and process excellence teams is essential to overcome these challenges.

Overcoming cultural resistance in the pharmaceutical industry requires a structured change management approach, top leadership commitment, proper training, and inclusive communication strategies. Employees must be engaged early in the process and assured that Lean Six Sigma is not about downsizing but about enhancing value, quality, and patient safety.

As pharmaceutical industry is governed by strict regulations by various countries across the world, need to develop and opt for tailored training program. Understanding fundamental principles of LSS along with its tools is very important for successful implementation of LSS program. Hence pharma companies may have to invest more for tailor made training program. Initially LSS training can be started with the help of external resources but the focus of the top management should be to develop internal expertise at all level of organisation. This will help to reduce dependency on external trainer or resources for training and will help internal resource help to sustain the program for longer period in the organisation.

In case of small size pharma companies who works on tight margins, they can plan the implementation program in phase manner as the initial cost of the training is high. Small companies can start with low-cost pilot projects and aim to develop internal LSS internal resources gradually over the period to scale up in future. This will help to overcome barrier of high investment to start implementation LSS Program.

As pharma sector is highly regulated, top management need to put extra efforts to inculcate Lean Six Sigma principles into established GMP and ERP system of the organisation. Need to develop digital and IT infrastructure to support the LSS initiatives. Moreover, strategic alignment and organisation metric need to be harmonised as per LSS requirement. LSS recommend flat organisation structure whereas many pharma companies exercise hierarchical structure. Another important aspect is to give weightage for implementation of LSS across all levels and functions of organisation in KPI (Key Performance Indicator).

In recent past, USFDA is recommending LSS tools to pharma industry for quality evaluation and risk assessment. This will support implementation of LSS in pharma sector. Pharma professionals perceive that LSS program is useful only for Produc-

tion / manufacturing function and to other functions. This is a myth and principles of LSS are applicable to all functions and helps to improve performance of the all functions. Any management is looking for overall improvement and not only in one function. Hence LSS implementation should be the part of every function and should be part of performance management. To overcome powerful barrier of regulatory consequences, functions like Quality Assurance and Regulatory Assessment should be involve in LSS implementation right from beginning as well as in identification and evaluation of projects. All the improvement projects should be routed through change control process to make changes permanent. This will help to ensure that LSS program and continuous improvement does not compromise quality and regulatory requirement. This will also help to get support from regulatory authorities across the world.

Finally aim of the top management should be to create culture of continuous improvement in the organisation.

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Revealing A Threshold Effect Of Working Capital Efficiency On Stock Returns - Evidence From NSE Listed Indian Firms

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Abstract:

Purpose

This study investigates how working capital management efficiency, measured through the cash conversion cycle, impacts the stock market performance of Indian firms. To seek to identify whether a universal threshold exists in cash conversion cycle levels beyond which excess stock returns or adversely affected, thereby classifying conflicting evidence on the optimality of working capital investment in emerging markets.

Design/Methodology/Approach

Drawing on panel data from 500 non-financial firms across 10 industries listed on the national stock exchange of India from 2015 to 2025, the study employs dynamic panel data estimation (Arellano-Bond GMM) to address autocorrelation and endogeneity concerns. A threshold regression approach is used on CCC-decile portfolios to pinpoint the CCC level where its relationships with excess stock return change, followed by validations at the firm level.

Findings

The analysis reveals a distinct threshold in the cash conversion cycle spectrum, approximately 88 days above which firms experience a significant decline in risk-adjusted excess returns. Conversely, CCC levels below this threshold do not materially enhance returns. This indicates a symmetric relationship where excessive capital tied up in operations beyond a point diminishes the threshold value, while more aggressive working capital reduction offers limited market rewards.

Research Limitations/Implications

The findings are based on Indian listed firms and may not directly generalise to other emerging economies with different instruments of choice or supply chain dynamics. The future research could extend this framework to multicountry studies or incorporate the monetary magnitude of working capital tied up.

Practical Implications

Financial managers can leverage these insights to avoid excessive investment in working capital beyond the identified threshold, therefore preserving the funds for alternative value-generating opportunities. Investor may incorporate the CCC threshold into their screening criteria to identify firms at risk of underperforming due to inefficient capital allocation.

Social Implications

By promoting more efficient capital use among firms, the study indirectly supports broader economic productivity, aiding capital availability for new ventures and fostering sustainable growth in emerging markets.

Originality/Value

This paper provides the first large-scale empirical validation of a universal CCC threshold for Indian firms, moving beyond linear or quadratic assumptions to highlight a symmetric, piecewise relationship. It offers a nuanced understanding of how working capital efficiency ties into stock performance in a developing economy context.

Keywords : *Working Capital Efficiency, Cash Conversion Cycle, Stock Market Performance, Dynamic Panel GMM, NSE, Stock Returns, Emerging Markets.*

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Introduction

Working capital management remains a fundamental pillar of corporate financial decision-making, directly influencing both liquidity and long-term valuation of firms. For businesses operating in emerging economies like India, managing the cash conversion cycle CCC, the time taken to convert investment in inventory and receivable bank into cash, carries added importance given structural inefficiencies, supply chain risk and various credit practices. While substantial literature from developed markets suggests that tighter control over CCC generally an ounce firm's profitability and market value, evidence from emerging economies is less consistent and often context-dependent.

Indian firms, navigating diverse operational challenges and sector-specific norms, may face distinct trade-offs when managing working capital. Some prior studies in India have found little support for universal optimal CCC, implying that firms dynamically adjust their working capital to align with industry pressures and growth opportunities. Others argue that managers target certain working capital levels to signal operational prudence or to safeguard against uncertainty. However, most empirical research tends to impose a linear or quadratic framework, potentially over-simplifying the true nature of the relationship.

This study seeks to advance to debate by exploring whether a symmetric, threshold-driven association exist between working capital efficiency and stock market performance. Using an extensive panel of 500 non-financial firms across 10 major industries listed on the National Stock Exchange of India from 2015 to 2025. Authors examine how variations in CCC influence firms' risk-adjusted access returns. Unlike the conventional approach that tests for simple linear or concave patterns, our analysis allows for distinct effects above and below the data-driven threshold, providing richer insights into how the market rewards or penalises different working capital strategies.

Understanding these dynamics holds significant implications. For financial managers, identifying whether there is there exists a tipping point beyond which additional investment in working capital erodes shareholders' value can sharpen liquidity management practices. For investors, designing such a pattern helps in incorporating operational efficiency metrics in equity screening and evaluation. In doing so, this study contributes to a more nuanced view of working capital's role in shaping market perceptions, particularly in the context of an emerging economy.

Review of Literature

Working capital management has long occupied a critical place in corporate finance literature, primarily due to its direct implication for both equity maintenance and shareholder wealth maximisation. Early empirical studies established that firms optimising their working capital policies could release trapped cash, reduce financing costs, and enhance profitability. For instance, Deloof (2003), analysing Belgian Firms, demonstrated that shorter cash conversion cycle (CCC) was strongly associated with improved gross operating profitability, laying foundational support for viewing CCC as a proxy for working capital efficiency.

Subsequent work by Lazaridis and Tryfonidis (2006) reinforces this idea in the Greek context, showing that maximising the time taken to convert inventory and receivables into cash generally improves firm value. Their study underscores how effective management of receivables, inventory and payable collectively shortens the cash conversion cycle and boosts financial performance. These early findings spurred an extension body of research across diverse geographies, attempting to validate the positive linkage between CCC optimisation and firm outcomes.

As the literature evolved, scholars began recognising that the relationship might not be universally linear or constantly robust across settings, especially in emerging markets. Garica-Teruel and Martinez-Solano (2020) observed that SMEs in Spain benefited more from aggressive working capital management than larger firms. Suggesting heterogeneity by farm size. Similarly, Aktas, Croci and Petmezas (2015) documented that firms reducing working capital beyond a certain point might compromise operational resilience, indicating a trade-off between liquidity efficiency and a buffer against demand fluctuations.

In emerging markets, where institutional and market fictions of fun differ markedly from developed economies, the narrative becomes even more intricate. Banos-Caballero et al. (2014), examining UK SMEs, introduced a notion of non-monitoring relationship, proposing that an optimal working capital level exists, beyond which additional investment negatively impacts firm value. Extending this line of enquiry to developing economies, Singhania and Mehta 2017 analyse Indian manufacturing firms and found that the sensitivity of profitability to CCC varied substantially across industries, implying the absence of a "one size fits all" optimal working capital strategy.

Recent empirical evidence continues to challenge the conventional linear or even quadratic assumptions. For instance, Nguyen et al. (2023) investigated listed Vietnamese firms and found a threshold effect: CCC reductions improved firm value only up to a certain point, beyond which further reductions led to inventory shortfalls and strained supplier relationships, ultimately harming profitability. Similarly, Ali and Awan (2024) documented that in Pakistani Firms, working capital investment beyond an identified benchmark resulted in diminishing marginal returns, highlighting the asymmetry in how markets interpret varying levels of liquidity investment.

The Indian context itself reveals a mixed pattern. Chatterjee and Ghosh Twenty20 noted that while tighter working capital policies generally enhance accounting profitability, their impact on stock market returns appeared muted, possibly due to investor perception of higher operational risk from lean inventory. In contrast, Joshi and Shah (2018) found that aggressive CCC management improved market best measures like Tobin's Q, through effects varied notably across sectors such as textiles and consumer goods versus capital-intensive industries.

Another dimension gaining attention in recent studies is the role of macroeconomics and supply chain uncertainties in shaping the CCC performance link. Sharma and Kumar (2022) argued that Indian firms deliberately maintain longer CCCs to buffer against erratic supply chain and demand shocks, especially in sectors with high seasonality. This strategic slack, while potentially raising carrying cost, provides operational flexibility that markets might not penalized until crossing a critical threshold. Their work explains why it is crucial to test not only for linear or quadratic patterns but also for possible asymmetries.

Further complicating the landscape, recent behavioural finance perspectives proposed that investor responses to working capital policies could be non-uniform. According to Basak et al. (2024), investors may interpret excessively high CCC as a signal that managers live in inefficiency or weak bargaining power with customers and suppliers, thereby discounting valuations. Conversely, or overly tight CCC might raise concern about underinvestment in inventory, rising stockouts and lost sales, which also gets penalized by the market.

Despite this rich and evolving literature, most empirical studies on Indian firms have largely relied on a framework that imposes uniform original effects across the entire spectrum of CCC. A few studies explicitly test for a gym shift or structural breaks that could mark distinct zones of working capital

effectiveness. As a result, whether there exists a clear threshold beyond which additional investment in working capital starts eroding shareholder value remains an open question.

Addressing this gap, the present study draws on a robust panel of 500 non-financial firms spanning 10 key industries listed on the NSE over the decade from 2015 to 2025. By employing threshold regression models alongside dynamic panel estimators, the author aims to capture potential asymmetries in the CCC–stock written relationship, moving beyond simplistic linear or inverted-U hypotheses.. This approach not only defines theoretical understanding of how working capital management interfaces with market valuation in an emerging economy but also equips financial managers and investors with more nuanced decision-making benchmarks.

Research Objectives

The primary objective of this study is to explore how working capital efficiency, as measured by the cash conversion cycle (CCC), influences the stock market performance of Indian firms. By focusing on a large panel of firms across 10 diverse industries listed on the National Stock Exchange from 2015 to 2025, this research aims to determine whether variations in CCC significantly affect the risk-adjusted excess return. The study also seeks to identify if there is a specific threshold level of CCC beyond which the relationship with stock performance fundamentally changes. A key focus is to uncover whether this relationship is asymmetric, whether firms with CCC levels exceeding the threshold experience a different impact on their stock performance compared to those below it.

To achieve a comprehensive analysis, the study uses threshold regression models on design–sorted portfolios, alongside dynamic panel estimation at the firm level, to verify the persistence and robustness of any identified threshold effects. Recognising that working capital practice can differ markedly across industries due to operational cycles and supply chain characteristics, the research further investigates whether the CCC performance linkage holds uniformly across 10 industries represented in the sample.

Beyond theoretical contribution, this study also strives to provide practical benchmarks for financial managers in emerging market settings like India, offering guidance on maintaining working capital levels that balance operational needs without eroding shareholders' value. Lastly, by clarifying how the market interprets variations in working capital efficiency, the research offers investors an enhanced lens for incorporating CCC metrics into equity screening and valuation methods, ultimately supporting more informed investment decisions in the Indian context.

Theoretical Framework

The theoretical foundation of the study is rooted in the broader principle of corporate finance that links liquidity management, operational efficiency and firm valuation. According to traditional trade-off theories (Myers & Majluf, 1984; Kim, Mauer & Sherman, 1998), firms seek to balance the benefits of holding liquid assets, such as flexibility to meet unexpected obligations and seize investment opportunities, against the cost of tying up capital that could otherwise be deployed in higher building projects. The cash conversion cycle by capturing the duration over which cash is tied up in inventory and disable net of payable, serves as a crucial operational metrics that reflect how effectively a firm manages this trade-off.

The agency theory provides another lens to understand the relevance of working capital efficiency. Jensen and Meckling (1976) stated that managers may not always act in the best interest of shareholders, potentially overinvesting in working capital to build operational slack or safeguard personal reputation, even when such conservatism may not

maximise the firm value. This implies that excessively high CCC levels could signal managerial enrichment or inefficiency, prompting investors to discount future cash flows.

Conversely, extremely low CCC, while improving immediately quiddity, might compromise operational stability by underfunding inventory or pressuring supplier relationships. This risk resonates with the pecking order theory (Myers, 1984), which suggests that firms prefer internal financing, so overly minimising working capital might indicate a constrained ability to buffer against operational volatility, potentially raising perceived business risk.
Recent behavioural finance perspective also – this theoretical discussion. Invested me interpreting working capital practice through cognitive heuristics, penalising deviation from what they perceive as industry norms. Basek et al. (2024) argue that substantial departures, either overly conservative or aggressive, can trigger adverse market reactions due to perceived operational imbalance or liquidity strength, especially in environments with information asymmetry.

Building on these foundations, the study theorised that the relationship between CCC and stock market performance is unlikely to be uniformly linear. Instead, it is posited that there exists a threshold level of CCC and an operational sweet spot beyond which the market valuation of a firm changes meaningfully. Firms maintaining CCC below this level are expected to be viewed favourably for their efficient capital use without sacrificing operational continuity. However, once the CCC crosses this threshold, investors may begin to see it as a sign of excessive capital tied up in day-to-day operations, reducing funds available for growth initiatives or debt reduction, thereby negatively affecting stock returns.

The framework also anticipates a symmetry in how the market responds to deviations above and below the identified threshold. Positive deviation or expected to penalise more sharply, as the reflects inefficient use of working capital resources. Negative deviation, while generally perceived favourably, may offer diminishing marginal benefits, as overly lean operation could expose the firm to supply chain disruption and meet customer demand.

By applying this theoretical perspective to a robust dataset of find it firms spanning 10 industries on the NSE over a decade, the study integrates classical corporate finance theories with contemporary behavioural insights. Its position, CCC, is not merely as an operational metric but also a strategy indicator that the market scrutinises closely, rewarding firms that strike a prudent balance while finalising those that veer too far in either direction. In doing so, the framework provides a strong conceptual foundation for testing the threshold effect and asymmetry in the working capital–stock written relationship within the Indian capital market context.

Data & Methodology

1. Data Source and Sample Selection

- This study is grounded in an extensive panel dataset comprising 500 non-financial, non-banking firms listed on the national stock exchange of India, spanning the years 2015 to 2025. The firm was selected to represent 10 distinct industry groups, ensuring broad coverage of India's corporate sector while excluding entities such as banks and financial institutions, whose working capital structure differs fundamentally due to regulatory and business model considerations.
- Annual financial statements, including details necessary to compute the cash conversion cycle, firm size leverage, sales growth and profitability, were sourced from a recognised corporate database like ProwessIQ, supplemented by publicly available reports. Monthly stock prices and market index data were retrieved from the NSE archives to estimate

excess stock returns. After cleaning for outliers and ensuring consistent data across key variables, the final balanced panel consisted of approximately. 5500 firm-year observations over the 11-period.

2. Variable Construction

2.1. Dependent Variable: The primary focus of the study is on the stock performance of the firms, captured through a sophisticated measure of risk-adjusted excess return known as ALPHA. Specifically, ALPHA is derived from a single index market model, where the monthly stock return of each firm is regressed against the return of a broad-based NSE benchmark index. The intercept (ALPHA) from this regression serves as the firm's abnormal return, reflecting how much the stock outperforms relative to what would be predicted by its systematic exposure to overall market movements. This approach closely aligns with Jensen's ALPHA (Jensen, 1968), widely used in asset pricing studies to isolate managerial or operational performance factors beyond mere market risk compensation. By focusing on this adjusted return, the study ensures that observed impacts of working capital efficiency are not confounded by general market trends or macroeconomic cycles. The resulting ALPHA is annualised to maintain consistency with firm-level accounting data and to smooth out short-term volatility.

2.2. Explanatory Variable: At the core of this research is the analysis of working capital efficiency, operationalised through a Cash Conversion Cycle (CCC). CCC represent the average firm in days a firm takes to convert cash invested in inventory and receivables back into cash flows from operations, after accounting for the period it enjoys credit from suppliers. Mathematically, it is computed as

CCC = Days Inventory Outstanding (DIO) + Days Sales Outstanding (DSO) – Days Payables Outstanding (DPO).

- Days Inventory Outstanding (DIO): It indicates how long, on average, inventory remains within the firm before being sold.
- Days Sales Outstanding (DSO): It measures the average number of days taken to collect payment from customers after a sale.
- Days Payables Outstanding (DPO): It captures the average period the firm takes to pay its suppliers.

By combining these components, CCC offers a comprehensive view of the liquidity tied up in daily operations. A lower CCC generally signals faster Cash Conversion, indicating operational efficiency. However, as explored in this study, excessively shortening CCC may lead to inventory shortage or strained supplier relationships, while a higher CCC implies more funds blocked in operations, potentially limiting investments in strategic projects or debt reduction. The unique aspect of this research lies in investigating whether there exists a critical threshold of CCC, beyond which its impact on ALPHA changes significantly, revealing a potentially asymmetric relationship between working capital efficiency and stock returns.

2.3. Control Variable: To robustly isolate the effect of CCC on stock market performance, several firm-specific control variables are incorporated. These controls are carefully selected based on prior empirical literature to account for alternative drivers of stock return.

• Profitability (PRO) : Profitability is mea-

sured by the ratio of (Sales - Cost of Sales) to Total Assets, offering a clean indicator of how effectively a firm turns its assets into gross profits. Forms with higher operational profitability are generally rewarded by the market through superior stock returns, as profitability is a direct driver of cash flows and future growth potential.

- Sales Growth (SALESGR): Sales growth is computed as the annual change in sales revenue relative to the previous year. It captures the firm's ability to expand its business and is a proxy for growth prospects. Investors typically view higher sales growth favourably, anticipating continued expansion and improved earnings power.
- Firm Size (SIZE): Size is included in the form of the natural logarithm of total assets. Larger firms often benefit from economies of scale, more stable cash flows, and better access to capital markets. However, they might also grow at a slower rate compared to smaller firms, affecting stock return dynamics.
- Leverage (LEV): Financial Leverage, measured as Total Debt / Total Equity. This variable controls for capital structure effects, acknowledging that higher leverage can amplify return in good times but also increases financial risk, potentially impacting how investors price the stock.

Together, these variables create a robust and medical framework. By modelling ALPHA as a function of CCC and controlling for profitability, growth, size and leverage, the study effectively disentangles the specific influence of working capital efficiency from other critical determinants of firm performance. The structure not only allows for precise estimation of the direct effect but also facilitates the investigation of how deviations in CCC, especially beyond identified threshold levels, shape investor perception and ultimately influence stock market outcomes for NSE-listed firms over the 2015 to 2025 period.

3. Empirical Strategy

3.1 Dynamic Panel Estimation: To rigorously examine the direct impact of working capital efficiency on stock performance at the individual firm level, the study employs a panel data estimation framework. Specifically, the author models the firm's risk-adjusted excess return ALPHA as a function of its like stock performance, the cash conversion cycle, and the said control variables capturing profitability, sales growth, firm size and leverage. Given the persistence inherent in stock returns and to mitigate autocorrelation and potential endogeneity, the study employed a dynamic panel data framework using the Arellano-Bond generalised method of moments (GMM) estimator. This technique models current stock returns as a function of their lagged values along with CCC and other firm characteristics, while instrumenting lagged dependent variables to obtain consistent estimates. The baseline model takes the form:

$$ALPHA_{i,t} = \lambda ALPHA_{i,t-1} + \beta_1 CCC_{i,t} + \beta_2 PRO_{i,t} + \beta_3 SALESGR_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 LEV_{i,t} + \epsilon_{i,t}$$

This framework enables us to capture a firm-specific dynamics over the full sample of 500 firms across 11 years, ensuring robust inferences on how CCC variations relate to stock performance after accounting for historical patterns and control variables.

3.2. Decile Portfolio Level Analysis: Recognising that working capital efficiency may

exert non-linear effects on stock returns, the study further investigates this relationship at the portfolio level by constructing decile portfolios. Each year from 2015 to 2025, firms are sorted into 10 groups based on their CCC, from the lowest to the highest. This decile sorting helps smooth out form-specific noise and highlights systematic trends across different regions of working capital efficiency. For each decile portfolio, the author calculates the average ALPHA, CCC, and other key characteristics. The resulting panel data set of designed portfolios is then used in regression models that mirror firm-level specifications but focus on capturing broad patterns across the CCC distribution. This level of analysis is visually instructive and helps us identify whether stock performance exhibits a piecewise or threshold relationship with working capital practices. Moreover, by comparing the performance of portfolios with the lowest versus highest CCC, the author gains initial evidence on whether maintaining more aggressive or conservative working capital policies systematically influences excess stock returns.

3.3. Industry Effects and Robustness: To account for sector-specific characteristics that might influence both CCC norms and market perceptions, industry fixed effects were Inc where appropriate. Tests for homogeneity, such as Kruskal-Wallis and ANOVA, were conducted to explore differences in CCC distribution across industries. Additionally, diagnostic checks, including the Hausman test, were performed to confirm the suitability of random versus fixed cross-sectional effects, and the Durbin-Watson statistic was used to assess autocorrelation.

3.4. Estimation of Threshold Cash Conversion Cycle: To formally identify whether there exists a critical threshold level of CCC, the analysis employs other regression methodologies applied to the decile portfolio panel. The threshold estimation involves sequentially testing multiple candidate cutoff points across the CCC spectrum and selecting the threshold that minimises the residual sum of squares in the regression model. The general form of the threshold model is

$$ALPHAD,t = \gamma 1\ DECPOSk,D,t + \gamma 2\ DECNEGk,D,t + \delta XD,t + \mu D,t$$

Where,

- DECPOS represents the absolute positive deviation of the CCC from the candidate threshold in the decile exceeding the threshold.
- DECNEG captures the absolute negative deviation in decile below the threshold and,
- δXD,t is a vector of control variables averaged at the portfolio level.

By systematically evaluating these models across various threshold candidates (using a decile k=2 to k=9), the analysis pinpoints the CCC values approximately 88.5 deals in the study at which the relationship between CCC and stopping an hour undergoes a significant structural change. The robustness of the identified threshold is further validated by inspecting the adjusted R2 and the residual sum of squares, confirming that this level best segments the data into distinct regimes.

3.5. Firm-Level Validation of Estimated Threshold Cash Conversion Cycle: To reinforce the threshold findings at a more granular level, the author extended the analysis by incorporating the estimated threshold into firm-level dynamic panel regressions. Specifically, the author introduced two new vari-

ables:

- THRPOS, defined as the absolute positive deviation of a firm's CCC above the identified threshold (88.5 days) and,
- THRNEG, representing the absolute negative deviation below the threshold.

The extended firm-level model is specified as:

$$ALPHA_{i,t} = \lambda ALPHA_{i,t-1} + \theta 1\ THRPOS_{i,t} + \theta 2\ THRNEG_{i,t} + \beta X_{i,t} + \epsilon_{i,t}$$

This specification allows us to explicitly test whether deviation above and below the threshold have system at a symmetric effect on stock return. Consistent with the threshold regression at the desired level, the results typically indicate that while exceeding the threshold, CCC is associated with system at Satish tickly significant reduction in ALPHA, operating below this threshold does not materially improve returns, highlighting asymmetric market response to working capital policies.

The validity of this firm-level threshold model is confirmed through standard diagnostic checks, including the Hansen or J-statistic for instrument validity in the GMM framework, the Hausman test for model specifications and the Durbin-Watson statistics to check for serial correlation.

Analysis of Results

1. Firm-Level Analysis

The descriptive statistics offer important insights into the characteristics of a sample of find it NSE-listed firms throughout 2015 to 2025. The mean of the suggested axis return ALPHA stands at 0.29, with a modest positive skew of 1.34, indicating that while most forms clustered around moderate or excess written, a few outlined outliers have delivered exceptionally high stock performance. The standard deviation of 0.57 underscores considerable dispersion in market-adjusted firm outcomes, consistent with the diverse industry representation.

Table 1: Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera (p-value)
ALPHA	0.29	0.26	3.92	-1.22	0.57	1.34	4.76	0.000 (***)
CCC (days)	96.8	90.5	278.3	7.4	49.3	0.98	3.89	0.000 (***)
SIZE	8.48	8.30	13.15	4.72	1.61	0.52	3.14	0.000 (***)
SALES-GR	0.13	0.10	1.21	-0.49	0.28	0.81	4.21	0.000 (***)
PRO	0.079	0.074	0.47	-0.21	0.069	0.70	3.67	0.000 (***)
LEV	1.61	1.15	14.90	0.06	2.89	2.97	10.92	0.000 (***)

Notes: *ALPHA is the annualised risk-adjusted excess stock return from the market model. CCC is the cash conversion cycle. SIZE is the natural logarithm of total assets (INR Core). SALESGR is the annual sales growth. PRO is the profitability that is (Sales – Cost of Sales) / Total Assets. LEV is the leverage calculated as Total Debt / Total Equity. Jarque-Bera p-values indicate rejection of normality at 1% significance level*

Source: The Authors.

The average cash conversion cycle is about 97 days, with the median slightly lower at 90.5 days, suggesting that most firms take roughly 3 months to turn their investment in inventory and convert it into cash flows. The relatively high standard deviation of 49.3 days and maximum value near to 80 days reflect substantial variation across firms, potentially tied to sector-specific operating cycles. The positive skewness in CCC indicates that while many firms manage working capital within a moderate range, some extend their cycle significantly.

Firm size, proxy by the natural algorithm of total assets, centres around a mean of 8.48, with values spanning from 4.72 to 13.15, capturing a broad range from mid-sized to large-sized firms. Sales growth averaged 13%, although the data is right-skewed, hinting that while many firms grow steadily, a subset experiences rapid expansion. Profitability, measured as a return on assets, shows an average 7.9%, again with mild right skewness.

Financial leverage presents noteworthy findings, an average ratio of 1.61 indicates that firms typically carry 1.6 times more debt than equity, though the high skewness is 2.97 and kurtosis 10.92 to reveal that a few firms or heavily leveraged, pull up the distribution tail.

Moreover, the Jarque-Bera statistics strongly reject normality across all variables, emphasising the importance of using robust estimation methods like GMM and threshold regression to capture nonlinearities and mitigate the influence of outliers.

Table 2: Correlation Matrix

Variable	ALPHA	CCC	PRO	SIZE	SALESGR	LEV
ALPHA	1.000					
CCC	-0.124***	1.000				
PRO	0.257***	-0.082**	1.000			
SIZE	-0.165***	-0.074**	0.061*	1.000		
SALESGR	0.108***	-0.138***	0.248***	-0.014	1.000	
LEV	-0.019	0.032	-0.094**	0.037	-0.029	1.000

Notes: *The table represents the correlation coefficient values. ***, **, * indicate significance at 1%, 5%, and, 10% levels respectively.*

Source: The Authors

Table 2: Correlation Matrix reveals important preliminary relationships. As anticipated, the CCC shows a **significant negative correlation with ALPHA (-0.124),** suggesting that firms with longer cash conversion cycles generally underperform in risk-adjusted stock returns. CCC also negatively correlates with profitability and sales growth, indicating that operational inefficiency in working capital is linked to weaker financial fundamentals.

Firm size is negatively correlated with both ALPHA and CCC, hinting that larger firms, on average, maintain tighter working capital cycles but may achieve only moderate abnormal stock returns, possibly due to mature growth stages. The modest positive correlations of leverage with CCC suggest that more indebted firms may allow cash to stay tied up longer, although this relationship is weak.

Table 3: Effect of CCC on ALPHA at Firm Level (Dynamic Panel GMM)		
Variables	**Linear Model**	**Quadratic Model**
ALPHAi,t-1	0.438***	0.402***
CCCi,t	-0.027**	-0.066
CCC²i,t		-0.00009
PROi,t	3.991**	4.786**
SALESGRi,t	0.561	0.702
SIZEi,t	-1.533**	-1.704**
LEVi,t	-0.036	-0.031
J-statistic	10.023	8.541
p-value (J)	0.405	0.484
Notes: ****, **, * indicate significance at 1%, 5%, and, 10% levels respectively.*		

Source: The Authors

Table 3: Effect of CCC on ALPHA at Firm Level (Dynamic Panel GMM). The firm-level regression confirms and deepens these insights. The linear game model that shows CCC has a statistically significant negative effect on ALPHA (-0.027, $p < 0.05$), underscoring that longer cash conversion cycle erodes excess stock return even after accounting for firm persistence, profitability, growth, size and leverage. However, the quadratic term in the second model is statistically significant, implying there is no robust evidence of a classic inverted-U shape or precise internal optimum point across CCC values in this dataset.

Importantly, the profitability remains a strong positive driver of ALPHA across both models, while firm size exerts a consistent negative impact; larger firms tend to deliver smaller abnormal returns, possibly due to reduced growth opportunity. Leverage and sales growth do not show significant direct effects in this framework.

The J-statistics with high pay value across both models validate the instrument set used in the GMM approach, reinforcing the reliability of these estimates.

Table 4: Effects of Deviations form Yearly Industry Median CCC on ALPHA (Dynamic Panel GMM)				
Variables	**Coefficient**	**Std. Error**	**t-Statistic**	**Significance**
ALPHAi,t-1	0.371***	0.087	4.26	0.000
MEDPOSi,t	-0.031*	0.017	-1.82	0.069
MEDNEGi,t	0.072	0.058	1.24	0.214
PROi,t	4.399**	1.921	2.29	0.022
SALESGRi,t	1.104	0.821	1.34	0.181
SIZEi,t	-1.371*	0.726	-1.89	0.059
LEVi,t	-0.039	0.028	-1.41	0.159
J-statistic	6.823			p = 0.747
Notes: *Estimated via Arellano-Bond GMM; MEDPOS is absolute positive deviation from yearly industry median CCC; MEDNEG is absolute negative deviation below the median; J-statistic supports instrument validity and ***, **, * indicate significance at 1%, 5%, and, 10% levels respectively.*				

Source: The Authors

Table 4: Effects of Deviations from Yearly Industry Median CCC on ALPHA (Dynamic Panel GMM) represents the dynamic panel result, highlighting that positive deviation from the yearly industry median CCC (MEDPOS) significantly reduces ALPHA, with a coefficient of -0.031 ($p < 0.1$). This suggests that firms that maintain working capital levels substantially above their industry norms tend to suffer in terms of risk-adjusted excess returns. Meanwhile, negative deviation (MEDNEG) does not produce a statistically significant effect, pointing to an asymmetric relationship; makers appear more sensitive to inefficiency long CCC than two moderately aggressive working capital strategies.

Table 5: Details of Industry Classification and Test of Homogeneity Among Industry				
Industry Group	**Firms**	**Avg. CCC**	**Median CCC**	**Std. Dev. CCC**
Textiles & Apparel	63	102.8	97.4	51.1
Pharmaceuticals & Healthcare	61	107.3	99.8	48.2
Chemicals & Petrochemicals	55	91.2	86.7	43.9
Automobiles & Auto Components	50	94.9	89.5	42.4
Metal & Metal Products	48	99.6	92.3	53.0
IT & Telecom	47	83.8	79.9	39.3
Consumer Goods (FMCG & Durables)	45	86.5	82.1	37.7
Construction & Infrastructure Materials	44	101.8	96.2	54.1
Diversified Industrial Conglomerates	43	89.7	84.9	46.9
Services (Retail, Hospitality, Trading)	44	88.6	83.7	40.8

Test	Statistic	p-value
Kruskal-Wallis H-test	14.47	0.106
One-way ANOVA F-test	1.41	0.192

Table 5: Details of Industry Classification and Test of Homogeneity Among Industries, although mean CCC level vary from about 84 days in IT & Telecom to over 107 days in pharmaceutical, statistical test (Kruskal-Wallis and ANOVA) indicates these differences are not significant at conventional levels, implying that while operating cycles reflect some sectoral characteristics, extreme differences do not dominate the dataset. This uniformity strengthens the argument for a universal cash conversion cycle threshold across industries rather than sector-specific optima.

Table 6: Threshold Regression: Dependent Variable								
Variables	**k=2**	**k=3**	**k=4**	**k=5**	**k=6**	**k=7**	**k=8**	**k=9**
Threshold CCC (days)	42.7	58.3	72.9	88.5	103.6	120.4	141.8	169.5
DECPOSk,D,t	-0.0012***	-0.0011***	-0.0011***	-0.0010***	-0.0010***	-0.0009**	-0.0009*	-0.0007
DEC-NEGk,D,t	-0.0019	-0.0006	0.0005	0.0010	0.0011*	0.0012**	0.0011**	0.0012**
PROD,t	2.26**	2.32**	2.43**	2.59**	2.68**	2.73**	2.66**	2.68**
SALESGRD,t	0.19	0.21	0.22	0.20	0.18	0.18	0.19	0.20
SIZED,t	-0.021	-0.024	-0.030	-0.041	-0.049	-0.054	-0.050	-0.051
LEVD,t	0.017	0.018	0.019	0.021*	0.021*	0.021*	0.020	0.020
Residual SS	0.1685	0.1670	0.1664	0.1657	0.1681	0.1705	0.1673	0.1666
Adjusted R^2	0.727	0.679	0.658	0.646	0.664	0.673	0.654	0.651
F-statistic	16.1***	13.0***	12.0***	11.5***	12.3***	12.8***	11.7***	11.6***
D–W statistic	2.07	2.08	2.07	2.08	2.05	2.03	2.07	2.08
Hausman χ^2 (p-value)	5.37 (0.71)	4.61 (0.80)	5.76 (0.66)	7.53 (0.47)	5.63 (0.69)	5.89 (0.66)	4.66 (0.79)	4.60 (0.79)
Period FE F-test	12.0***	11.9***	12.1***	12.2***	12.0***	12.1***	12.2***	12.3***
Notes: ****, **, * indicate significance at 1%, 5%, and, 10% levels respectively*								

Source: The Authors

This Table 6 robustly establishes the existence of a threshold effect in how the cash conversion cycle (CCC) impacts stock market performance among the NSE-listed Indian firms. Action The Thane Showroom regression systematically explores various CCC cut-offs based on deciles from 42.7 to 169.5 days.

At k=5 (88.5 days), the residue on some of the squares is minimised, indicating that this is the point where splitting the CCC distribution best explains the variation in ALPHA. The result shows that for a CCC value exceeding this threshold (captured by DECPOS), there is a statistically significant and negative impact on ALPHA, with a coefficient of -0.001 ($p < 0.001$). This means each additional day of CCC beyond 88.5 days incrementally reduces the risk-adjusted excess returns.

In contrast, the effects of firm operating below the threshold (DECNEG) are not statistically significant in the lower decile but turn mildly positive and significant only in the higher threshold (above k = 6). This reinforces an asymmetric relationship, the market penalises inefficiently high CCC levels more sharply, while the benefit of aggressively low CCC are limited or non-significant.

Other control variables behave as expected. Profitability (PRO) consistently exhibits a strong positive association with Alpha across all thresholds, underscoring the importance of fundamental operational efficiency. Firm size (SIZE) shows a small negative effect, suggesting that a smaller firm may deliver higher abnormal returns, possibly reflecting a risk premium. Leverage (LEV) turns marginally positive and significant around the main threshold, indicating some tolerance by the market for moderate debt levels when

coupled with efficient working capital management.

Overall, this analysis robustly validates the hypothesis that there exists a critical threshold in the cash conversion cycle around 88.5 days, beyond which excess investment in working capital materially erodes shareholders' value. It also highlights that the market's response to deviation from the optimal zone is not symmetrical, offering crucial insights for financial managers and investors alike.

Table 7: Testing For Threshold CCC with Firm Level Data For ALPHA (Dynamic Panel GMM)

Variables	Coefficient	Std. Error	t-Statistic	Significance
ALPHAi,t-1	0.422***	0.085	4.96	0.000
THRPOSi,t	-0.034**	0.016	-2.13	0.034
THRNEGi,t	0.073	0.057	1.28	0.201
PROi,t	4.276*	2.093	2.04	0.052
SALESGRi,t	0.659	0.745	0.88	0.380
SIZEi,t	-1.237*	0.704	-1.76	0.079
LEVi,t	0.012	0.023	0.52	0.601
J-statistic	6.927			
p = 0.738				

Notes : *Estimated using Arellano-Bond dynamic panel GMM, controlling for persistence, endogeneity, and unobserved heterogeneity.* ***Dependent variable:*** *ALPHA (firm-level risk-adjusted excess stock return).* ***THRPOS_{i,t}:*** *absolute positive deviation of firm's CCC above the identified threshold (~88.5 days).* ***THRNEG_{i,t}:*** *absolute negative deviation below the threshold.* ***J-statistic*** *validates instrument set (high p-value indicates over-identifying restrictions hold). ***, **, * denote significance at 1%, 5%, and 10% levels respectively.*

Source: The Authors

Table 7, The firm-level dynamic panel estimation further solidifies the threshold effects identified in the design portfolio analysis. Specifically, the coefficient THRPOS (-0.034, $p < 0.05$) shows that for each unit increase in CCC above the estimated threshold of 88.5 days, from experience a statistically significant decline in the risk-adjusted excess written. This underscores that maintaining an operating cycle materially longer than this critical benchmark tends to erode shareholders' value. Conversely, the impact of having CCC below the threshold (THRENG = 0.073) is positive but not statistically significant. This symmetry echoes the earlier portfolio level findings, while markets penalise and inefficiently long cash conversion cycles, they do not equivalently reward firms that push CCC aggressively lower, perhaps due to concern over operational risk like stockout or strained supplier relationships. Profitability (PRO) remains a consistent driver of excess stock returns, while firm size (SIZE) exhibits a mild negative relationship, implying that smaller firms may still enjoy a market premium, possibly reflecting higher perceived growth opportunities. Sales growth (SALESGR) and leverage (LEV) show no significant direct influence on ALPHA in this specification, consistent with a market focus on operational and liquidity efficiency. The high p-value on the J-statistics (0.738) confirms that the model's instruments are valid, lending credibility to these es-

timates.

In essence, this firm-level validation robustly supports the earlier threshold regression result; there exists a critical CCC level beyond which additional days in the operating cycle start to significantly hurt market performance, while being more conservative does not necessarily unlock extra market reports. This nuanced insight is highly valuable for financial managers seeking to optimise working capital without compromising stockholder interest.

Conclusion

The study is set out to unravel the interesting relationship between the working capital efficiency captured through the cash conversion cycle and stock market performance for a robust panel of 500 non-financial firms spanning 10 key indicators listed on the national stock exchange of India over the period 2015 to 2025. By moving beyond traditional linear or quadratic frameworks, the research introduces a threshold perspective to investigate whether there exists a critical CCC level that fundamentally alters how market prices of a firm's liquidity management.

The analysis, conducted through a combination of a decile portfolio regression and dynamic firm-level panel estimation, provides compelling evidence of a distinct threshold effect. Specifically, the study identified approximately 88.5 days as the optimal CCC benchmark, beyond which additional capital tied up in operational cycles begins to significantly erode risk-adjusted excess returns. The asymmetric nature of this relationship is particularly striking, while firms that maintain CCC about this stretch old face clear market penalties, those operating below it do not enjoy proportionate rewards, suggesting that investors primarily penalise inefficiency rather than aggressively reward hyper-efficient working capital practices.

Moreover, the findings are remarkably consistent across the robustness check. Deviations above yearly industry median CCC levels were shown to adversely impact stock returns, while deviations below had a negligible or statistically insignificant effect. This indicates that while Indian capital markets are sensitive to signs of excessive liquidity trapped in operations, perhaps weaving it is an opportunity cost against growth or debt reduction, they do not discriminate in rewarding increasingly tighter working capital policies, likely due to concern over operational fragility.

By leveraging dynamic panel GMM estimators, the study also mitigates concerns of indoor units into unity and persistence in stock returns, reinforcing the reliability of these results. The lack of significant differences in CCC distribution across the broad applicability of these insights points to the possibilities of a common optimal working capital benchmark for a diverse set of sectors within the Indian economy.

Taken together, these findings contribute meaningfully to the existing body of literature by highlighting that the CCC stock return Nexus is best understood through a threshold-driven, asymmetric lens rather than simplistic linear models. This has important practical implications. For corporate managers, the evidence underscores the need to avoid letting operational cycles drift well beyond the identified threshold, thereby protecting shareholder value. For investors, it suggests that CCC can serve as an effective screening tool, particularly in flagging firms where excessive working capital investment may dampen future stock performance.

This research enriches the disclosure on working capital management in emerging markets by empirically validating the presence of performance performance-critical threshold of CCC. It sets the stage for future studies to explore whether such inflation points hold across different macroeconomic environments or evolve with shifts in market liquidity and supply chain structures.

Practical Implications

This study provides actionable insights for financial managers and corporate decision makers across India's listed firms. The clear evidence of a threshold in the cash conversion cycle (CCC), approximately 88.5 days, beyond which excess investment in working capital starts to erode shareholder value, offers or tangible benchmark for liquidity management. A finance executive can use this as old as a strategic guideline when setting inventory, receivables and payable policies, ensuring that the operational cycle does not become unnecessarily elongated, which can tie up cash that could otherwise fund growth initiatives or reduce financing costs.

Moreover, the assessment trick findings imply that while the market penalises firms that maintain CCC well above this benchmark, they do not equivalently reward firms for extremely aggressive reductions. This nuance is critical; managers should aim to optimise, not merely minimise, working capital. Excessively low CCC levels could expose operations to risks like stock-outs or weakened supplier relationships, even if these are not immediately penalised by the market. Thus, the study underscores the importance of balancing liquidity efficiency with operational resilience, helping firms avoid the hidden costs of either extreme.

For investors in equity analyst, CCC emerge as a robust screening tool. Given that firm exceeding this threshold tend to underperform on a risk-adjusted basis, portfolio managers might integrate CCC metrics into their fundamental analysis framework to better identify stocks that could lag market expectations due to insufficient capital deployment in day-to-day operations.

Social Implications

Beyond direct financial application, this research carries broader social and economic relevance. By highlighting the inefficiencies tied to excessive working capital, the study indirectly promotes more judicious use of scarce financial resources in the economy. When firms maintain operational cycles within efficient bounds, they free up cash flows that can be redirected towards investment in innovation, capacity expansion or employment generation, fostering a healthier corporate sector that contributes positively to national economic growth.

Furthermore, in an emerging market context like India, where access to affordable capital is often limited, ensuring optimal working capital practice across industries can reduce systematic vulnerabilities. Efficient firms can better position to withstand economic shocks, sustain their supplier ecosystem and uphold wage and job stability even during downturns. In this way, the findings support a broader narrative of financial prudence translating into economic resilience and social welfare, ultimately benefiting not just shareholders but also employees, suppliers and local communities dependent on the health of these firms.

Limitations and Scope for Future Research

While the study provides valuable insights into the threshold-driven relationship beyond working capital efficiency and stock market performance, it also carries certain limitations that open avenues for future enquiry.

- First, the analysis is confined to listed non-financial firms on NSE, which, although comprehensive across sectors, may not fully capture the dynamics of unlisted Enterprises or the SME segment that often face different equity constraints and working capital norms. Extending this research to include smaller or privately held firms could provide a more holistic view of how working capital policy impacts firm value across the broader Indian corporate landscape.
- Second, while the study period of 2015 to 2025 offers a robust decade-long panel, the empirical

framework does not explicitly model the effects of macroeconomic shocks or structural policy changes, such as the implementation of GST or pandemic-related restrictions, which could temporarily disrupt working capital patterns and market perceptions. Future research might integrate time-varying macroeconomic controls or structural break tests to isolate these effects more precisely.

- Third, the investigate the investigation focuses primarily on the cash conversion cycle (CCC) as a composite measure of working capital efficiency. Although CCC is widely accepted in literature, disagreeing with its components, day inventory outstanding, days sales outstanding and days payable outstanding, might uncover more nuanced interactions. Such granularity could reveal whether certain operational levers drive the observed threshold effects more than others.
- Finally, given the emerging market context of India, there is substantial scope for cross country comparative studies to test whether similar thresholds exist in other developing or developed economies, or how institutional factors such as credit availability, supply chain infra, and legal protections for creditors might shift the optimal balance between liquidity and profitability.

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Nursing Skill Assessment: Identifying Training Priorities to Enhance Clinical and Non-Clinical Protocol Compliance

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Abstract:
This study evaluates the performance of 80 nurses across 37 clinical and non-clinical protocols to assess compliance and identify training needs in a 120-bed hospital in Mumbai. The assessment, conducted via in-person demonstrations overseen by In-Charges, measured adherence to established protocols with an expected excellence threshold of 95%. Results indicate significant variability in protocol compliance, with 30 out of 37 protocols falling below the benchmark. The lowest-performing protocols, such as Grievance Protocol (57.25%) and Restraint Policy (72%), highlight critical areas for targeted training. This analysis informs a prioritized training strategy to enhance nurse competency and patient safety, emphasizing individualized performance tracking to address skill gaps effectively.
Keywords: *Nursing Assessment, Training Needs, Protocol Compliance, Infection Control, Clinical Competency*

Introduction

Healthcare delivery depends greatly on the competence and adherence of nursing staff to standardized protocols. With nurses forming the cornerstone of clinical services, ensuring protocol compliance is vital to safeguard patient care, reduce errors, upholds patient satisfaction and maintain quality standards.

In India, the nursing workforce is often challenged by high patient loads, documentation demands, and varying exposure to standardized training programs. Despite accreditation initiatives like NABH in India, protocol implementation and maintaining quality indicators remains inconsistent due to staff shortages, workload pressures, and inadequate refresher training.

According to Taylor et al. (2010), non-compliance with protocols can directly impact morbidity and mortality outcomes, making competency evaluation an essential quality control measure. [Taylor, C. R., Lillis, C., LeMone, P., & Lynn, P. (2010). Fundamentals of Nursing.]

This research was conducted in a 120-bed hospital in Mumbai to assess the practical compliance of 80 nurses with 37 essential protocols. These protocols are of routine and specialized areas— including infection control, medication administration, patient transfers, grievance redressal, and documentation practices. By identifying key areas of skill deficiency, this assessment aims to guide hospitals in planning focused training modules, thereby improving both staff performance and patient care outcomes.

Literature Review

Nursing protocols encompass clinical (e.g., infection control, medication administration) and administrative (e.g., grievance redressal, documentation) domains. Several studies have documented the importance of standardized clinical proto-

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cols and the role of training in achieving nursing excellence. Johnson and Cowin (2015) assert that real-time competency assessment offers more accurate insight into nursing capability than written evaluations. [Johnson, M., & Cowin, L. S. (2015). Measuring clinical competence in nursing.]

Brown and McCormack (2020) link protocol adherence to patient safety outcomes also they highlighted how failure to adhere to infection control protocols can lead to preventable nosocomial infections, while Lee and Kim (2019) emphasize the role of grievance redressal in maintaining trust. They linked low patient satisfaction to unaddressed grievances and poor communication practices. [Brown, T., & McCormack, B. (2020). Patient safety and protocol adherence.] [Lee, S. H., & Kim, J. (2019). Patient complaint management and its impact.]

Clark and Kenski (2017) advocate simulation-based training for complex, less frequently performed tasks such as tracheotomy care, Adverse Drug Reaction Protocols, and CLBSI (Central Line-Associated Bloodstream Infection) management. [Clark, C. M., & Kenski, D. (2017). Simulation-based training for nursing procedures.]

Similarly, Smith & Crawford (2018) advocated for competency-based assessment tools that allow hospitals to track practical skills of individual staff. Protocols such as Hand Hygiene, Biomedical Waste Management (BMW), VAP (Ventilator-Associated Pneumonia) prevention, and Grievance Redressal are not only regulatory requirements but are also crucial for maintaining safe hospital environments. [Smith, J., & Crawford, L. (2018). Competency-based assessment in nursing education.]

Abbreviations

Abbreviation	Full Form
KAP	Knowledge, Attitude, Practice
BMW	Biomedical Waste Management
NSI	Needle Stick Injury
CAUTI	Catheter Associated Urinary Tract Infection
VAP	Ventilator Associated Pneumonia
CLBSI	Central Line-Associated Bloodstream Infection
ECG	Electrocardiogram
RT	Ryle's Tube
HGT	Heel-stick Glucose Test
I/O	Intake and Output
MLC	Medico-Legal Case

Methodology

A cross-sectional observational study was conducted involving 80 nurses. Adherence to 37 protocols was assessed through floor-based demonstrations observed by nursing In-Charges. Each protocol had a total score of ~400 points. Compliance percentage was calculated:
Protocols scoring below 95% were flagged for targeted training.

Formula Used:

Percentage Score = (Scores Received) / (Total Scores Assigned) ×100

Results

Only 7 protocols met or exceeded the 95% benchmark. These included:

- Vitals (99.2%)
- Handover (98.4%)
- IV Therapy (96.5%)

The lowest compliance was noted in:

- Grievance Protocol (57.25%)
- Restraint Policy (72%)
- Adverse Drug Protocol (77.25%)

These reflect critical gaps in staff preparedness and patient safety measures.

Importance of Protocols Assessed

- **Grievance Protocol:** Critical for maintaining trust, reducing complaints, and ensuring service transparency. This protocol elevates patient feedback if managed efficiently.
- **Restraint Policy:** Incorrect application can lead to legal and ethical violations in mentally unstable patients.
- **VAP, CLBSI, CAUTI:** Core infection control indicators monitored by accreditation bodies like NABH. Mismanagement of these protocols can lead to mortality of the patient.
- **Adverse Drug Protocol:** Mismanagement can result in severe patient harm and litigation.
- **Tracheotomy Care:** Highly specialized and essential for critical care patients. It is very crucial for patients in ICU.
- **Hand Hygiene and BMW:** Foundational infection control measures critical to preventing cross-contamination.

Each of these protocols, especially those scoring low, directly or indirectly influence patient safety outcomes, legal compliance, and clinical efficiency.

Discussion

The findings of this assessment reveal that a significant proportion of the evaluated nursing protocols—81.1%—fell below the predefined excellence threshold. This indicates a concerning gap in the adherence to and execution of critical clinical and administrative guidelines. Notably, specialized tasks such as medication administration, wound care, catheter insertion, and infection control protocols, along with administrative procedures like documentation accuracy and handover communication, consistently received the lowest scores.

This pattern suggests that while basic procedural compliance may be in place, more complex or nuanced aspects of care are inadequately implemented or understood. One plausible explanation is that current in-service training and professional development modules may not be sufficiently addressing the evolving competencies required for modern nursing practice. Traditional lecture- based instruction and periodic refreshers alone may not effectively reinforce deep learning or critical decision-making in high-pressure clinical environments.

To bridge this identified gap, there is a compelling need to adopt blended learning approaches—which combine face-to-face instruction with modern methods such as simulation-based training, interactive case-based learning, and peer-to-peer mentoring. Simulation labs, for example, offer nurses the opportunity to engage in realistic, risk-free environments where they can practice and refine both technical and soft skills. Similarly, structured case-based learning enhances critical thinking and allows for contextual application of knowledge, which is crucial for specialized and administrative protocols.

Moreover, the findings advocate for tailored interventions that are aligned with the individual performance levels of nurses, rather than one-size-fits-all training programs. Competency-based assessments can help identify specific strengths and weaknesses, allowing nurse educators and administrators to design personalized development plans that focus on targeted improvement. This may involve focused coaching, role shadowing, skill-specific workshops, or access to e-learning modules for continuous self-paced learning.

Such strategic, data-informed, and personalized capacity-building efforts are not only likely to enhance protocol adherence but also contribute to improved patient outcomes, reduced clinical errors, and higher institutional credibility. Over time, this may also foster a culture of continuous quality improvement and accountability within nursing teams.

In conclusion, the study underscores a systemic need to revamp existing training models by

integrating evidence-based educational strategies and individualized development mechanisms to uplift nursing practice and hospital care quality. This should be linked with their performance review and reward system in HR practices so that nurses will get motivated to attend the training with interest and improve themselves in practical way.

Training Strategy Implications

1. **High Priority Training:**
   - Grievance Handling
   - Restraint Application
   - Infection Control (VAP, CLBSI, CAUTI)
   - Tracheotomy and Emergency Protocols
2. **Customized Training for Low Performers:**
   - One-on-one or small-group coaching based on assessment scores.
3. **Simulation and Role-Play Modules:**
   - For less frequent but high-risk procedures.
4. **Refresher Training:**
   - For near-threshold protocols.
5. **Periodic Re-Evaluation:**
   - To ensure sustained improvements and identify emerging gaps.

Conclusion

This study revealed significant disparities in protocol adherence among nursing staff, especially in safety-critical and administrative domains. By establishing a data-driven training roadmap, hospitals can enhance care delivery, reduce risks, and align with accreditation standards.

This comprehensive nursing skill assessment revealed significant gaps in compliance with essential clinical and administrative protocols. By identifying specific areas for improvement, the study lays the groundwork for a robust, targeted training program. The findings reinforce the importance of regular skill assessments and continuous education in ensuring that hospital staff are equipped to deliver safe, standardized, and patient-centred care.

Suggestion

This study methodology helps in determining the areas of nurse skill assessment and identifying key protocols to focus on while designing training programmes for nurses. It can also be effectively used to evaluate the performance of medical officers. Customized, protocol-based staff groups can be formed, or staff requiring training on specific protocols can be grouped together for focused training.

Instead of offering blanket or standardized training, it is more effective to provide skill assessment–based customized training programmes. This approach ensures optimal utilization of time and resources, while enhancing the outcomes of the training.

At the time of induction—regardless of the staff member's years of experience—they should be assessed on key clinical and non-clinical protocols that are crucial for patient care. To avoid emotional bias in evaluation, two separate teams should be designated: one for conducting training and another for assessing protocol compliance both before and after the training.

The assessment results should be shared with the staff, HR department, and their reporting officers. Based on these results, training programmes should be developed and delivered. Staff should be informed about their areas of improvement and encouraged to work on them during the probation period.

They should also be made aware that a re-assessment will be conducted after three months of probation. These results should again be shared, and the staff should be given an additional three months to improve, if necessary. At the end of the six-month

probation period, a final evaluation should be conducted. Confirmation of employment or extension of the probation period should depend on achieving a minimum benchmark score, which should be predefined by the hospital management. Staff should be clearly informed about this target score to give them a clear sense of purpose beyond patient care and to motivate them to perform better.

This method can also be adopted for annual performance reviews to help determine the amount of performance-based increment, in addition to the standard annual increment.

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Corporate Sustainability Investments and Financial Outcome: The Moderating Effects of Organisational Structure

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Abstract:

Purpose

This study investigates how corporate social responsibility (CSR) investment intensity influences firm financial performance, explicitly examining whether this relationship is moderated by organisational structure, captured through business group (BG) affiliation. The research draws on social capital theory (SCT) to explore how CSR-driven stakeholder relationships translate into economic outcomes within corporate frameworks.

Design / Methodology / Approach

The analysis utilises a robust panel data set of 250 publicly listed Indian financial and non-financial firms covering the period 2014 to 2024. The firm's performance is measured through return on assets (ROA), return on capital employed (ROCE) and return on net worth (RONW). A series of panel regression models incorporating interaction terms assess through moderating role of BG affiliations. Variance Inflation Factor (VIF) diagnostic and additional robustness checks, including lagged CSR regression, confirm the stability of results.

Findings

Study finds that CSR investment intensity has a significant positive effect on firm performance across all measures, supporting the SCT perspective that CSR enhance stakeholder trust and operational legitimacy. However, this positive impact is notably weaker for BG-affiliated firms, indicating that organisational structure moderates the CSR performance link. Marginal effect analysis reveals that while stand-alone firms experience substantial performance gains from CSR, BG firms see only about half the benefit. VIF analysis rules out multicollinearity concerns, and findings remain robust under alternative specifications.

Research Limitations

The study is limited to publicly listed Indian firms, which may restrict generalizability to private entities or firms in other institutional contexts. Additionally, CSR is measured primarily through expenditure intensity, which may not fully capture qualitative differences in CSR effectiveness or stakeholder perceptions.

Practical Implications

Managers of stand-alone firms can view CSR as a clear lever for enhancing financial performance. For BG affiliated firms, however, CSR strategies should be carefully calibrated to ensure that investment contribute not only to group wide reputation but also to individual firm profitability. This is especially critical under evolving global framework like European Union's Corporate Sustainability Reporting Directives (CSRD), which demand explicit linkage between sustainability activities and financial outcomes.

Social Implications

By demonstrating that CSR investment generally enhances firm financial performance, albeit unevenly across organisational structures, this study reinforced the broader societal value of encouraging corporate engagement in

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social and environmental initiatives. The result highlights the importance of tailoring the CSR approach to organisational realities to ensure sustainable economic and social return.

Keywords
Corporate Sustainability Reporting Directives (CSRD), Corporate Social Responsibility (CSR), Firm Performance, ESG Reporting, Social Capital, Emerging Markets.

Introduction

Corporate social responsibility has emerged as a strategic imperative for organisations navigating an increasingly complex stakeholder environment. Firms today or not only expected to perceive profitability but also demonstrate accountability towards societal and environmental concerns. Despite the growing adoption of CSR initiatives, the impact of such investments on firm financial performance remains a subject of debate. Some scholars argue that CSR enhance stakeholders' trust, strengthens reputational capital, and ultimately improves financial outcomes. Others contended that CSR may divert critical resources from core business operations, creating inefficiencies and diminishing returns. These competing views, largely grounded in social capital theory and shareholder value theory, reflect a longstanding tension in the literature that has yet to reach a consensus.

One potential factor contributing to this inconsistency is the influence of organisational structure, particularly whether a firm operates independently or as part of a larger business group. Business groups, which consist of multiple affiliated firms bound by common ownership or strategic control, play a prominent role in emerging economies such as India. The structure offers benefits such as internal financing and shared resources, but may also introduce complexities in decision-making, especially when it comes to discretionary expenditures like CSR. For group-affiliated forms, CSR may be used not only to fulfil regulatory obligations but also to manage group-level reputation and mitigate shared risk. However, it remains unclear whether such an intensification of CSR activities translates into proportionate financial gain at the firm level.

This study seeks to address this gap by examining how CSR investment affects performance and whether this relationship is moderated by business group affiliation. Unlike prior research that often limits its scope to manufacturing firms or short time horizons, the study utilises a comprehensive panel data set of 250 publicly listed Indian financial and non-financial interests spanning the period 2014 to 2024, sourced from the Prowess Database. This broader data is it allows for a more representative and sector-wise analysis of CSR behaviour in the Indian corporate landscape. The study explores whether business group-affiliated firms derive the same financial benefit from CS as standalone from or whether structural differences lead to divergent outcomes.

This research also holds continual relevance given the global push for announced sustainability reporting standards. In particular, the European Union's Corporate Sustainability Reporting Directives (CSRD) mandate that both financial and non-financial institutions disclose the financial impacts of their sustainability initiatives. This regulatory development raises important questions about the strategic alignment between CSR activities and financial objectives. By uncovering how organisational structure influences the CSR performance relationship, the study offers insights that are not only theoretically significant but also practically relevant for firms preparing to meet more stringent reporting expectations under frameworks like the CSRD.

The remainder of this paper is structured as follows: Section 2 reviews the relevant theoretical and empirical literature. Section 3 outlines the research design, including data sources, variable construction, and metrological approach. Section 4 presents empirical findings, while Section 5 discusses their implications. Section 6 concludes with a summary of the contribution limitation and suggestions for future research.

Literature Review

The link between corporate social responsibility and firm performance has generated a substantial scholarly interest, but it remains marked by conceptual audit debate and mixed empirical evidence. Theoretically, two dominant perspectives frame this discourse. According to Social Capital Theory (SCT), hypothesizes that CSR initiatives build a network of trust, credibility and reciprocity among shareholders, enhancing firms' intangible assets, ultimately translating into superior financial outcomes (Asiaei et al., 2023; Sen & Cowley, 2013). Through activities such as community engagement, environmental stewardship, and ethical governance, firms accumulate relational capital that can reduce transaction costs, attract talent, and secure customer loyalty, all of which reinforce competitive advantage.

By contrast, Shareholder Value Theory (SVT) suggest that CSR might impose costs that detract from a firm's primary objective of maximising shareholders' return. Following Friedman's 2007 classical assertion that the business of business is business, this view argues that resources you take to social or environmental causes, or any present funds from more profitable investments. Empirical studies rooted in this perspective have sometimes found that excessive CSR spending can strain financial resources, it can affect short-term performance or a single managerial overreach (Blomgren, 2011; Servaes & Tamayo, 2013).

Empirical investigation into the CSR performance nexus has produced a rich but intense a conclusive body of work. Meta-analysis and cross-sectional studies have reported positive (Khan et al., 2022; Koh et al., 2023), negative (Servaes & Tamayo, 2013) or even neutral (Ikram et al., 2019; Silva et al., 2023) effects of CSR on a firm's performance, underscoring that this relationship is likely contingent on contextual variables. Industry dynamics, firm size, market maturity, and regulatory environments all appear to shape how CSR investments influence financial metrics such as return on assets (ROA), return on capital employed (ROCE) and return on net worth (RONW).

One particularly silent contact jewel factor in emerging economies is organisational structure, specifically, whether a firm is affiliated with a diversified business group. Business groups, characterised by a network of legally independent but economically linked firms often bound by family control or cross shareholdings, play a prominent role in countries like India (Khanna & Rivikin, 2001; Masulis et al., 2023). They frequently arise and as institutional responses to market imperfections, such as an underdeveloped credit market or weak legal protection, providing their affiliates with internal capital, managerial oversight and collective market power (Richer & Chakraborty, 2023).

However, these structural advantages may also complicate the relationship between CSR and performance. Group-affiliated forms of an engaging higher level of CSR, motivated by the need to uphold a shared reputation and mitigate group-level risk (Sung Kim & Oh, 2019; Saiyed et al., 2023). While such strategies can strengthen the group's standing with regulators, investors, and communities, they may not always translate into proportional financial gains at the level of individual affiliates. In some cases, extensive CSR engagement by business group firms might dilute immediate financial returns, reflecting agency frictions or the pursuit of long-term legitimacy at the expense of short-term

profitability.

Despite this compelling theoretical backdrop, there remains a lack of comprehensive empirical work that integrates these dimensions in the context of India's broader corporate landscape. Existing studies frequently concentrate on manufacturing sectors or narrower time frames, leaving questions about whether these patterns hold across both financial and non-financial institutions over longer periods. By utilising a robust panel dataset of 250 publicly listed Indian financial and non-financial institutions spanning 2014 to 2024, this study aims to bridge the gap. It provides a more holistic perspective on how organised instruction moderates the CSR performance relationship, offering insights that are especially timely given the rising global pressure for a transparent system that is put under a framework such as the European Union's Corporate Social Sustainability Reporting Directive (CSRD)

Table 1
Summary of Relevant Studies on CSR, Firm Performance and Organisational Structure

Study	Context & Sample	Focus & Methodology	Key Findings	Relevance to Present Study
Friedman (2007)	Conceptual (Global)	Theoretical discourse on corporate purpose	Argued that CSR distracts from profit maximization, reflecting core SVT views.	Frames critical shareholder perspective on CSR costs.
Sen & Cowley (2013)	Conceptual (CSR mechanisms)	SCT lens on stakeholder trust & legitimacy	Proposed that CSR builds intangible assets that strengthen performance.	Supports investigation of CSR as relational capital.
Servaes & Tamayo (2013)	S&P 500, USA	Empirical panel on CSR & valuation	Found positive CSR impacts only when external awareness is high.	Highlights that context and firm visibility matter.
Khan et al. (2022)	Indian listed firms	Panel study on CSR & performance	Reported generally positive CSR–performance link in India.	Establishes local empirical support for SCT pathway.
Ikram et al. (2019)	Pakistan	Cross-sectional CSR analysis	Identified non-significant link between CSR and financial returns.	Shows emerging market variations & need for moderation.

Sung Kim & Oh (2019)	South Korean business groups	Regression on group affiliation & CSR effects	Found group firms use CSR to shield shared reputation, but with mixed firm-level gains.	Motivates examination of business group role.
Saiyed et al. (2023)	Indian business groups	Disclosure & governance analysis	Showed BG firms engage heavily in CSR to manage political & social legitimacy.	Highlights structure-driven CSR incentives in India.
Masulis et al. (2023)	Emerging markets multi-country	Study on BG capital markets & governance	Revealed how BGs allocate resources internally, affecting external financial metrics.	Contextualizes structural impacts on CSR outcomes.
Richter & Chakraborty (2023)	Indian business groups	Agency & ownership study	Emphasized both governance benefits & agency frictions in BGs.	Informs expectation that BG structure moderates CSR impact.
Koh et al. (2023)	Multi-country panel	CSR intensity & ROA/ROE regressions	Generally found CSR supports profitability globally.	Reinforces global SCT perspective for comparison.

DATA AND METHODOLOGY

A. Data Source and Sample Construction

This study utilises a comprehensive panel dataset comprising 250 publicly listed Indian financial and non-financial institutions spanning the period from 2014 to 2024. The data were extracted from the Prowess database maintained by the Centre for Monitoring Indian Economy (CMIE), which offers extensive firm-level information, including annual financial statements, ownership structures, and CSR expenditures.

The sample was constructed by first identifying firms continually listed on the Bombay Stock Exchange (BSE) or the National Stock Exchange (NSE) over the study period, ensuring consistent reporting necessary for longitudinal analysis. To capture the diverse landscape of the Indian corporate sector, firms were selected across various industries, including banking and financial services, manufacturing, information technology, consumer goods, energy and other service sectors. Firms with an incomplete record of key financial variables or missing CSR expenditure data were excluded to maintain data integrity.

This approach aided an unbalanced panel, typically in firm-level research, due to occasional delisting or temporary data gaps. Nonetheless, it provides a rich longitudinal structure well suited to exploring how CSR investment influences financial performance across different types of organisational structures.

B. Measurement of Variables

1. **Dependent Variables:** Firm financial performance serves as a principal outcome, captured through three complementary

measures:

- **Return on Assets (ROA):** Net Income Divided by Total Assets, reflecting operational efficiency.
- **Return on Capital Employed (ROCE):** Earnings before interest and taxes divided by capital employed. Assessing returns on long-term funding.
- **Return on Net Worth (RONW):** Net Income divided by shareholders' equity. Indicating profitability relative to the owner's investment.

Using multiple indicators mitigates the limitations of relying on a single metric and allows for more robust conclusions.

2. Independent Variable

- **CSR Investment Intensity (CSR):** Measured as the firm's annual CSR expenditure scaled by total sales. This ratio standardises CSR spending relative to firm size and operational scale, enabling meaningful cross-firm comparisons.

3. Moderating Variable

- **Business Group Affiliations (BGA):** A binary variable coded 1 if the firm is identified as part of a business group, determined through ownership patterns and disclosures in CMIE Prowess and 0 otherwise. This classification captures the structural distinction between firms operating under a group umbrella and standalone firms.

4. Control Variables

- Firms Size (FS): Natural logarithm of total assets. Capturing scale effects.
- Sales growth (SG): Annual growth rate of sales. Reflecting expansion potential.
- Leverage (DE): Debt-to-Equity Ratio. Indicating financial risk.
- Profitability Efficiency (PE): Gross Profit divided by sales, measuring operational margins.
- Interest Efficiency (IE): Ratio of EBIT to Interest Expenses. Assessing coverage strength.
- Market Valuation (TQ): Tobin's Q, calculated as the market value of assets divided by their replacement cost. Indicating investor perceptions of growth prospects.

C. Econometric Model and Estimation Strategy

To examine the impact of CSR investment on firms' performance and the moderating role of business group affiliation, the study implies the forming panel regression specifications.

$$\text{Performance}_{it} = \alpha + \beta_1 CSR_{it} + \beta_2 BGA_i + \beta_3 (CSR_{it} \times BGA_i) + \gamma X_{it} + \delta_s + \lambda_t + \epsilon_{it}$$

Where,

- Performance denotes the financial performance measure (ROA, ROCE or RONW) for firm i in the year t
- CSR_{it} is the CSR investment intensity.
- BGA_i indicates business group affiliations.
- $CSR_{it} \times BGA_i$ catpures the interaction effects.
- X_{it} is the vector of control variables
- δ_s and λ_t represent industry and year fixed effects, respectively, controlling for sectoral heterogeneity and macroeconomic trends,
- ϵ_{it} is the error term

A random effects panel regression framework is adopted, consistent with Hausman specification tests indicating no significant correlations between the firm effects and the regressors. This approach leverages both within and between firm variation, providing efficiency gains over fixed effects models when the assumptions hold.

To ensure robustness, alternative specifications are estimated using each financial perfor-

mance proxy. Additionally, clustered standard errors at the firm level are employed to address potential serial correlations and heteroskedasticity.

Table 2
Description of Variables

Variable	Type	Measurement / Definition	Expected Influence
ROA	Dependent Variable	Net income divided by total assets; gauges operational efficiency.	Positive with effective CSR.
ROCE	Dependent Variable	EBIT divided by capital employed; measures returns on long-term funding.	Positive with effective CSR.
RONW	Dependent Variable	Net income divided by shareholders' equity; reflects owner profitability.	Positive with effective CSR.
CSR	Independent Variable	Annual CSR expenditure divided by total sales; captures CSR intensity relative to firm scale.	Key variable of interest.
BGA	Moderator	Dummy variable equal to 1 if firm is part of a business group, 0 otherwise; identifies organizational structure.	May weaken or amplify CSR impact.
FS	Control Variable	Natural logarithm of total assets; proxy for firm size.	Larger firms may have better performance.
SG	Control Variable	Annual percentage growth in sales; indicates business expansion.	Expected positive effect.
DE	Control Variable	Debt-to-equity ratio; reflects financial leverage.	High leverage may lower performance.
PE	Control Variable	Gross profit divided by sales; shows cost efficiency.	Anticipated positive association.
IE	Control Variable	EBIT divided by interest expenses; measures interest coverage capacity.	Expected positive impact.
TQ	Control Variable	Tobin's Q ratio (market value vs asset replacement cost); captures market expectations.	Positive, reflects investor sentiment.

D. Correlation Matrix and Summary Statistics

The correlation matrix and summary statistics are presented in Table 3 (Panel A and Panel B).

Table 3 (Panel A)
Summary Statistics of Variables

Variable	Mean	Std. Dev.	Min	Max
ROA	0.094	0.078	-0.051	0.366
ROCE	0.127	0.098	-0.063	0.421
RONW	0.154	0.112	-0.082	0.538
CSR Intensity (%)	0.38	0.42	0.001	2.37
BGA (0/1)	0.57	0.49	0	1
FS (Log Total Assets)	10.92	1.68	7.45	14.31
SG (%)	5.8	14.6	-22.4	48.2
DE (Debt-to-Equity)	0.61	0.54	0.02	2.89
PE (%)	13.9	7.3	2.1	34.6
IE (EBIT / Interest)	4.02	2.75	0.9	13.8
TQ (Tobin's Q)	4.13	2.11	1.06	9.42
Observations	**1,985**			

Insights from Summary Statistics (Panel A)

Profitability metrics (ROA, ROCE, RONW) show modest mean consistent with diversified sectoral participation, typical of large Indian listed firms. The wider standard deviations highlight heterogeneity across financial and non-financial sectors. CSR intensity averages 0.38% of sales, with considerable variations (max reaching over 2%), reflecting differences in firm commitments and regulatory or strategic drivers. 57% of firms are affiliated with business groups (BG = 1), reinforcing the structural prominence of conglomerates in India's corporate landscape. Sales Growth (SG) and Leverage (DE) indicate healthy expansion but also highlight firms that are still actively leveraging debt markets, aligning with typical emerging economy financing patterns.

Insights from Correlations (Panel B)

Performing metrics (ROA, ROCE, RONW) are highly correlated with each other, as expected, validating them as alternative perspectives on underlying profitability. CSR is positively but weakly correlated with performance indicators, suggesting standalone benefits that are modest in magnitude, highlighting why the moderation by BGA becomes important. BGA is negatively correlated with profitability measures

and Tobin's Q, hinting at a potential structural trade-off where group affiliations, despite scale advantages, might temper firm-level returns. Firm Size (FS) is strongly correlated with CSR intensity, reflecting that larger firms may be better positioned financially and strategically to engage in formal CSR programs. As anticipated, leverage (DE) has a negative correlation with all profitability measures, while efficiency metrics (PE, IE) are positively associated with firm performance.

Table 3 (Panel B)
Correlation Matrix of Variables

	ROA	ROCE	RONW	CSR	BGA	FS	SG	DE	PE	IE	TQ
ROA	1										
ROCE	0.871***	1									
RONW	0.798***	0.843***	1								
CSR	0.112***	0.104***	0.091**	1							
BGA	-0.131***	-0.128***	-0.114***	0.219***	1						
FS	-0.078**	-0.092**	-0.086**	0.347***	0.312***	1					
SG	0.049	0.057*	0.064*	0.021	-0.008	0.016	1				
DE	-0.347***	-0.332***	-0.301***	0.044	0.051	0.103**	0.027	1			
PE	0.229***	0.211***	0.198***	0.037	-0.022	-0.045	0.039	-0.186***	1		
IE	0.134***	0.117***	0.108***	0.033	0.012	0.056*	0.017	-0.121***	0.271***	1	
TQ	0.414***	0.387***	0.361***	-0.069*	-0.093**	-0.127***	0.021	-0.217***	0.162***	0.089**	1

RESULTS and DISCUSSION

1. CSR Investment Intensity and Firm Performance

Table 4 presents the core panel regression estimates examining how CSR investments relate to firm performance, accounting for the potential moderating effects of organisational structure (business group affiliation), along with standard firm-level controls.

Table 4.
Panel Regression Results – CSR and Firm Performance

Variables	(1) ROA	(2) ROCE	(3) RONW
CSR	0.128***	0.102***	0.089**
BGA	-0.042**	-0.037**	-0.031*

CSR × BGA	-0.067**	-0.053**	-0.047*
FS	-0.015**	-0.018**	-0.013*
SG	0.009*	0.012*	0.011*
DE	-0.056***	-0.049***	-0.042***
PE	0.024***	0.028***	0.021***
IE	0.019**	0.016**	0.015**
TQ	0.036***	0.029***	0.027***
Industry & Year FE	Yes	Yes	Yes

Note: Robust standard errors clustered at the firm level. Significance level: *p < 0.10, ** p < 0.05, *** p < 0.01

- CSR Investment intensity is positively associated with all three measures of financial performance (ROA, ROCE, and RONW). This supports the social capital perspective, suggesting that CSR activity stands on stakeholders' relationship and operational legitimacy, translating into higher financial returns.
- The coefficient on BGA is negative and significant across all models, indicating that, on average, a firm that belongs to a business group tends to report lower standalone financial performance. This might reflect the agency cost, cross-subsidisation, or internal resource allocation frictions often cited in the business group literature.
- The interaction term is significantly negative, which implies that the positive impact of CSR on firms' performance is notably weaker for business group-affiliated firms compared to stand-alone firms. The support the view that while business groups may pursue extensive CSR to safeguard the collective reputation, such initiatives do not yield proportional financial benefit at the individual firm level.
- Leverage (DE) consistently shows a stronger negative association with performance as expected. Profitability efficiency (PE), interest coverage (IE) and Tobin's Q (TQ) are all positively linked to financial outcome, reflecting that operational margin, debt servicing capacity, and investor expectations impact firm performance. Firm size (FS) has a negative relationship, perhaps indicating diseconomies of scale or the fact that larger firms may face more mature market growth opportunities. Sales growth (SG) is positively linked, underscoring the importance of dynamic market expansion

Table 5 reports the Variance Inflation Factor (VIF) for each independent and moderating variable included in the study's panel regressions, along with its reciprocal, 1/VIF, also known as tolerance. While the VIF quantifies how much the variance of an estimated regression coefficient is inflated due to multicollinearity, the tolerance (1/VIF) indicates the proportion of variance in a variable that other predictors do not explain.

Table 5
Variance Inflation Factors & Tolerance

Variable	VIF	1/VIF
FS (Firm Size)	2.31	0.433
SG (Sales Growth)	1.18	0.847
DE (Leverage)	1.42	0.705
PE (Profitability Efficiency)	1.95	0.513
IE (Interest Efficiency)	1.67	0.599
TQ (Tobin's Q)	2.08	0.481
CSR (CSR Intensity)	1.52	0.658
BGA (Business Group Affiliation)	1.09	0.917
CSR × BGA (Interaction Term)	1.27	0.787
Mean VIF	**1.61**	**0.644**

- All VIF values are well below common concern thresholds. The general rule of thumb is that a VIF above 10 signals serious multicollinearity issues, and values above 5 may warrant closer inspection. In this dataset, the highest VIF observed is 2.31 (for firm size), indicating very low risk.
- Correspondingly, all tolerance values are comfortably above 0.1, reinforcing that each variable contains substantial unique information not overly protected by the others.
- The mean of BIA is 1.61, and the average tolerance of about 0.64, points down only modest correct correlation across variables, typical of well-behaved financial data sets.
- CSR intensity (VIF = 1.52; 1/VIF = 0.658) and the interaction term CSR X BGA (VIF = 1.27; 1/VIF = 0.787) show low multicollinearity. This indicates that introducing the interaction to test the moderating role of business group affiliation does not inflate standard errors excessively or threaten the stability of estimates.
- Business group affiliations (BGS) itself (VIF = 1.09; 1/VIF = 0.917) has almost perfect tolerance, reflecting that this structural identifier is largely independent of the other financial controls.

2. CSR Investment Based on Organisational Structure

Organisational structure, particularly the distinction between the firm operating as a part of a business group (BG) versus those functioning as standalone entities, can play a pivotal role in shaping corporate strategies related to social responsibility. In emerging markets like India, where family-controlled business groups and diversified conglomerates are prevalent, CSR initiatives often serve purposes that extend beyond the immediate firm, aiming to protect collective reputation, manage group-level legitimacy, or strengthen political or stakeholder ties. This section explores whether such structural differences manifest in varying in-

tensities of CSR investment.

To investigate this, the author analyses a robust panel dataset comprising 250 publicly listed Indian financial and non-financial institutions over the period 2014 to 2024, categorising firms based on their affiliations with business groups. Table 6 summarises the comparative differences between BG firms and Non-BG (Standalone) firms in terms of CSR intensity and several key financial and operational characteristics.

Table 6
Comparison of CSR Investment and Firm Characteristic by Organisational Structure

Variable	BG Firms (Mean)	Non-BG Firms (Mean)	Difference	t-statistic
CSR Intensity (%)	0.52	0.17	0.35***	4.92
Firm Size (Log Total Assets)	11.28	10.54	0.74***	3.84
Sales Growth (%)	5.3	6.1	-0.8	-0.89
Debt-to-Equity (DE)	0.64	0.57	0.07	1.12
Profitability Efficiency (PE)	13.2	14.7	-1.5*	-1.76
Interest Efficiency (IE)	3.8	4.1	-0.3	-0.64
Tobin's Q (TQ)	3.92	4.37	-0.45**	-2.24
Observations	142	108		

The result in Table 6 reveals notable structural differences in the CSR investment pattern. On average, BG-affiliated firms allocate approximately 0.52% of their annual sales to CSR activities, substantially higher than the 0.17% observed among stand-alone firms, a difference that is statistically significant at the 1% level. This finding underscores the inclination of business group firms to invest more heavily in CSR, potentially driven by the motive to uphold the broader group's reputation or to align with informal expectations placed on diversified conglomerates in the Indian context. Further, BG firms tend to be significantly larger in scale, with average firm size exceeding that of the total non-BG firm by 0.74 units, also significant at 1% level. This size advantage may enable the BG firm to absorb and distribute the cost of CSR more comfortably across diverse operations. However, this more aggressive CSR posture does not coincide with uniformly superior financial or operational metrics. BG firm exhibits slightly lower profitability efficiency (PE), with a gap of 1.5% points, significant at the 10% level and notably lower than Tobin's Q by 0.45, significant at 5% level, suggesting that investors might apply a discount to BGA filleted firms. These outcomes may reflect market perception of a more complex agency relationship or concern over cross-subsidisation within the group structure. Interestingly, no statistically significant differences are found in sales growth, leverage or interest efficiency, indicating that these aspects are related to listen similarly between BG and non-BG firms over the observed period.

This evidence suggests that while business group firms engage in higher CSR spending, likely to protect or NRC group-wide reputational capital, the direct financial advantage at the firm level or less clear. Such dynamics carry important implications for both managers and investors, highlighting the need to carefully calibrate CSR strategies so that they meaningfully contribute to long-term financial resilience, particularly in an environment increas-

ingly governed by a stringent disclosure framework such as the European Union's Corporate Sustainability Reporting Directives (CSRD).

3. Moderating Role of BG Affiliation

Beyond assessing the direct influence of corporate social responsibility investment on the firm performance, this study investigates whether the impact of CSR is systematically based on firms' organised structure, specifically, its affiliation with a business group (BG). Theoretical insights from the agency and institution perspective suggest that while BG firms may engage more intensively in CSR to safeguard collective reputation and navigate stakeholder expectations, such investments might not always translate into equivalent financial benefits at the individual firm level. This raises the possibility of a moderation effect, where business group affiliation alters the strength of the relationship between CSR and financial performance.

To empirically test this, interaction terms between CSR investment intensity and a binary indicator for BG affiliation were included in the panel regression models. This approach allows for a nuanced examination of how the return to CSR differs for firms embedded with diversified group structures compared to standalone entities.

Table 7
Moderating Effect of Business Group Affiliation on CSR Performance Relationship

Variables	(1) ROA	(2) ROCE	(3) RONW
CSR	0.153***	0.127***	0.113**
BGA	-0.048**	-0.042**	-0.037*
CSR × BGA	-0.078**	-0.065**	-0.059*
FS	-0.014**	-0.017**	-0.012*
SG	0.010*	0.013*	0.012*
DE	-0.058***	-0.051***	-0.044***
PE	0.026***	0.030***	0.023***
IE	0.021**	0.018**	0.017**
TQ	0.038***	0.031***	0.028***
Industry & Year FE	Yes	Yes	Yes
Observations	1,985	1,985	1,985
R^2	0.387	0.369	0.345

Table 7 provides compelling evidence that the positive impact of CSR investments on firm performance is significantly moderated by business group affiliation. The interaction term (CSR X BGA) is negative and statistically significant across all three performance measures – ROA, ROCE, and RONW, implying that the financial benefits derived from CSR investments are notably weaker for BG-affiliated firms compared to their standalone counterparts.

- The direct effect of CSR remains strongly positive and significant, affirming that, overall, increased CSR engagement tends to improve operational efficiency, capital productivity, and equity returns.
- However, the negative sign on the interaction term suggests that this relationship is less pronounced among PG forms. This aligns with theoretical expectations that BG firms may pursue CSR to protect group level legitimacy or respond to social and political pressures, these investments may not be as tightly coupled to individual from financial outcomes, possibly due to intra group cross subsidies, less transparent allocation of resources, or group-wide strategic objectives that dilute firm-level profitability signals.
- The marginal effect implied by these coefficients indicates that for standalone firms, the elasticity of financial performance concerning CSR spending is substantially higher, reinforcing the idea that such firms are more likely to see direct economic payoff from their CSR commitments.

These findings highlight the strategic complexity faced by firms operating within diverse business groups. While their heightened CSR activities may secure broader reputational or political advantage for the group, the attenuated firm-level financial returns suggest potential trade-offs that managers must carefully balance. In the context of tightening global sustainability reporting standards such as the European Union's Corporate Sustainability Reporting Directives (CSRD), these dynamics become even more critical. Regulators and investors increasingly expect transparent links between sustainability initiatives and financial outcomes, pushing BG firms to articulate how group-wide CSR commitments concretely contribute to individual firm performance.

4. Alternate Direct Measures of Performance

To further substantiate the validity of our primary findings, we conduct robustness checks using alternatives direct indicator of firm performance. Specifically, we examine the return on capital employed ROCE and return on net worth RONW as dependent variable. These metrics offer complimentary perspective on firm success by capturing returns relative to long-term capital deployment and shareholders' equity respectively.

The regression results presented in Tables 8 and 9 show that the core relationship holds consistently across the specifications. CSR investment intensity continues to exhibit a positive and statistically significant association with both ROCE and RONW, affirming that socially responsible initiatives contribute meaningfully to firm-level financial outcomes. Moreover, the interaction effect indicates that the incremental benefit of CSR is moderated by business group affiliation, remaining less pronounced for firms embedded within diversified group structures.

Taken together, these robustness tests reinforce the reliability of our conclusions, demonstrating that the above patterns are not artefacts of a single performance metric but instead persist across multiple dimensions of firm profitability.

Table 8
Impact of CSR Investment on Firm Performance

Variables	(1) ROCE	(2) RONW
CSR	0.127***	0.113**
BGA	-0.042**	-0.037*
CSR × BGA	-0.065**	-0.059*
FS	-0.017**	-0.012*
SG	0.013*	0.012*
DE	-0.051***	-0.044***
PE	0.030***	0.023***
IE	0.018**	0.017**
TQ	0.031***	0.028***
Industry & Year FE	Yes	Yes
Observations	1,985	1,985
R^2	0.369	0.345

Key empirical findings

1. **Positive Direct Impact Of CSR On Firm Performance**
   - Across both models, CSR investment intensity shows a strong, statistically significant positive relationship with ROCE and RONW.
   - The elasticity is slightly higher for ROCE (0.127) than for RONW (0.113), indicating that CSR spending may translate more directly into return on long-term capital employed, possibly through efficiency improvement or reputational leverage that reduces capital cost.
2. **Moderating Effect Of Business Group Affiliations**
   - Interaction term (CSR x BGA) is negative and significant in both specifications, suggesting that while CSR generally improve firm performance, the incremental benefit is smaller for firm belonging to business groups.
   - These findings underscore the complexity of group dynamics, where CSR might be perceived more for group wide legitimacy or political considerations than for direct form level profitability, thereby diluting its financial returns for individual affiliates.
3. **Other Firm-Level Drivers**
   - Profitability, efficiency and interest efficiency all have consistently positive effects on performance, emphasising that operational margin and debt service capacity remain fundamental determinants of firm success.
   - Form size exhibits a modest negative koi coefficient, perhaps reflecting that larger, more

diversified firms face scale frictions or diminishing marginal returns on additional investments.

- Sales growth positively influences both performance metrics, as expected, linking expansion with enhanced returns.

4. **Leverage (DE)** is negatively associated with both ROCE and RONW, aligning with standard financial theory that excessive debt burden erodes shareholder and capital return, particularly in volatile emerging markets.

These results support this social capital theory view that CSR investment helps firms build valuable stakeholder relationships and legitimacy, improving financial outcomes. However, the weak effects observed for business group firms resolve it with concerns from agency theory and shareholder value theory, where a resource allocation within a complex group may give rise to broader strategic or reputational objectives over immediate firm-level returns. In the context of evolving global sustainability standards like the CSRD, these findings emphasise that for business group-affiliated forms, simply scaling up CSR spending may not guarantee proportionate financial rewards. Instead, they may need to design CSR strategies that better link group-wide social initiatives to concrete financial and operational benefits at the firm level.

Table 9
Moderating Role of BG Affiliation on the impact of CSR on Firm Performance

Variables	(1) ROCE	(2) RONW
CSR	0.134***	0.119**
BGA	-0.041**	-0.036*
CSR × BGA	-0.071**	-0.063*
FS (Firm Size)	-0.015**	-0.011*
SG (Sales Growth)	0.012*	0.010*
DE (Leverage)	-0.052***	-0.045***
PE (Profitability Efficiency)	0.029***	0.023***
IE (Interest Efficiency)	0.020**	0.017**
TQ (Tobin's Q)	0.033***	0.030***
Industry & Year FE	Yes	Yes
Observations	1,985	1,985
R^2	0.374	0.348

This Table 9 assesses how the relationship between CSR investment and firm performance captured through two core profitability measures, ROCE and RONW, is influenced by whether firm operates as a part of a business group.

- **Positive direct impact of CSR on performance:**

The coefficient on CSR is positive and significant for both ROCE (0.134 at $p < 0.01$) and RONW (0.119 at $p < 0.05$). This reinforces the notion that firms investing more aggressively in CSR tend to realise higher return on capital and equity, consistent with the social capital theory perspective that emphasises trust building, legitimacy and operational benefits.

- **Negative interaction for BG firms:**

The interaction term (CSR x BGA) is negative and significant across both performance measures, implying that the positive effect of CSR on ROCE and RONW is less pronounced for business group-affiliated forms. This suggest that while BG firm often channel more resources into CSR, the incremental financial payoff they secure from these investment is lower compared to stand-alone firms.

- **Role of control variables:**

As expected, profitability, efficiency and

interest coverage consistently support higher capital and equity returns. Firm size has a modest but significant negative relationship with performance, possibly indicating that larger firms experience more complex managerial layers or diminishing marginal gains on additional investments. Sales growth contributes positively to returns, linking expansion to stronger profitability. Leverage continues to exert a substantial negative impact on both ROCE and RONW, aligning with financial risk conditions.

These finding highlights that the business case for CSR is conditional on organisational structure. For stand-alone firms, CSR initiatives are more directly tied to improving return on capital and equity, likely due to clear strategic alignment with the absence of complex intra-group priorities. By contrast, for PG firms, CSR spending may be partially driven by broader group-level reputational or political considerations, diluting its direct impact on firm-specific financial outcomes. This dynamic is critical in the context of rising global disclosure regimes like CSRD, which increasingly demand transparent links between such temporary activity and financial performance.

Discussion

This study set out to investigate how corporate social responsibility investment influences firm performance, with particular emphasis on whether this relationship is shaped by organizing structure, namely, business group affiliation. Drawing on the data from 250 publicly listed Indian financial and non-financial institutions over the period 2014 to 2024, the analysis reveals that CSR expenditure generally enhances firms' financial outcome, as evidenced by improvements in return on capital employed and return on net worth.

However, the findings also highlight a critical moderating role played by BG affiliation. While stand-alone firms appeared to translate CS investment more effectively into improved profitability metrics, the positive impact of CSR on performance is significantly muted for firms operating within business groups. This suggests that in group-affiliated contexts, CSR activities may be driven by broader reputational or political considerations that do not always yield Direct financial benefit at the level of individual firms. Such insights add depth to our understanding of the CSR performance linked in emerging markets, where diversity fight corporate structures are common.

Conclusion

The result of this research provides robust evidence that CSR investment serves as a strategic lever for enhancing firm performance among the Indian listed companies. Yet, the extent of these benefits is closely tied to organisational context. Business group affiliation, in particular, moderates the financial payoff from CSR spending, diminishing the strength of the relationship relative to stand-alone firms. These outcomes have meaningful implications at a time when global initiatives such as CSRD are pushing firms to demonstrate a clear connection between sustainability action and financial results. Overall, this study underscores the need for firms and policymakers to recognise that value derived from CSR is not uniform across organisational forms and that structural characteristics play a crucial role in shaping how sustainability initiatives translate into economic gains.

Theoritical Implications

From a theoretical standpoint, this research advances the disclosure on CSR and firm performance by integrating insight from both social capital theory (SCT) and shareholder value theory (SVT). The positive association between CSR investment and financial performance supports SCT, reinforcing the notion that a responsible practice cultivates stakeholder trust and institutional legitimacy, which in turn bolsters profitability. Conversely, the attenuated effect of CSR observed in BG firms lends credence to aspects of SVT, highlighting potential

agency costs and resource allocation complexities within diversified corporate structures that may dilute firm-specific returns.

Moreover, by explicitly modelling business group affiliation as a moderating factor, this study extends the existing theoretical framework, emphasising that the impact of CSR cannot be fully understood without accounting for the organisational structure in which firms are embedded.

Mangarial Implications

The insights derived from this analysis offer important guidance for corporate decision makers. For stand-alone firms, the evidence suggests that CSR investment can directly enhance financial performance, supporting the strategic entry integration of sustainability initiatives into core business objectives. In contrast, managers within business groups are cognizant that while CSR may fulfil critical group-level goals such as maintaining collective reputation or managing stakeholder relationships, its direct impact on individual firms' profitability may be less pronounced.

This underscores the importance of designing CSR program that aligns not only with social and regulatory expectations but also with firm specific economic imperatives. Particularly under a framework like the CSRD, which demands transparent articulation of how sustainability initiatives derive financial outcomes, managers in business groups may need to adopt more nuanced approaches to justify and communicate the financial rationale behind their CSR commitments.

Limitations and Future Research Directions

While the study offers a meaningful contribution, it also has a limitation that points toward avenues for further enquiry. The analysis relies on CSR expenditure intensity as the primary measure of social responsibility, which captures the scale of investment but not necessarily the quality or effectiveness of initiatives. Future studies could incorporate alternative indicators such as stakeholders' perception surveys or qualitative assessments of CSR programmes to provide a richer understanding of the CSR performance dynamics.

Additionally, the data is it focuses on publicly listed Indian firms, which may limit generalizability to privately held companies or firms in other emerging or developed markets. Comparative research across different institutional environment could reveal how variations in governance norms and market structure influence the CSR performance relationship. Finally, exploring long-term impact or incorporating multi-year lag might eliminate how the benefits unfold over extended horizons, offering deeper insights into the system of financial gains tied to responsible corporate practice.

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