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A Study On Skills Development Program To Address Industry 4.0 Needs In Super Auto Forge Pvt Ltd

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Abstract: This study, titled "A Study on Skills development program to address industry 4.0 needs in Super Auto Forge Pvt Ltd,". The advent of Industry 4.0 has revolutionized the manufacturing landscape, necessitating a dynamic shift in workforce competencies to align with advanced technological processes. The research focuses on assessing the current skill levels of employees, identifying the gap between existing competencies and industry expectations, and evaluating the training methodologies adopted by the company. Using a mixed-methods approach involving employee surveys, interviews with training coordinators, and analysis of performance metrics, the study highlights the key areas of improvement and the impact of upskilling initiatives. The findings reveal that targeted training in automation, data analytics, IoT, and digital tools significantly enhances productivity and adaptability among workers. The study concludes with strategic recommendations for continuous learning and integration of emerging technologies to sustain competitiveness in the evolving industrial ecosystem.

Key Terms **- Industry 4.0, Skills Development, Workforce Training, Digital Transformation, Technical Skills and Soft Skills.**

I. INTRODUCTION

This study explores the skills development program in a forging industry, with a specific focus on Super Auto Forge Pvt Ltd. Industry 4.0, often referred to as the fourth industrial revolution, represents the integration of advanced technologies such as automation, data exchange, Internet of Things (IoT), and artificial intelligence into manufacturing systems. Super auto forge private limited is a leading manufacturer of precision-forged

and machined automotive components. Industry 4.0 is being embraced to enhance operational efficiency, quality control, and production flexibility. By adopting smart manufacturing practices, the company aims to stay competitive in the global market, reduce downtime, and improve decision-making through real-time data analytics, thus aligning with the evolving demands of modern automotive industries.

II. REVIEW OF LITERATURE

Surajit Bag and Jan Harm Christiaan Pretorius (2020) explores the impact of Industry 4.0 technology adoption on sustainable manufacturing and the circular economy. It conducts a literature review to identify barriers, drivers, challenges, and opportunities in this space and proposes a research framework integrating Industry 4.0 (big data analytics powered by artificial intelligence), sustainable manufacturing, and circular economy capabilities. The study highlights the interplay of institutional pressures, resources, and skills in Industry 4.0 adoption, emphasizing the positive influence of technology on sustainability and circularity. It also discusses the social implications of traditional manufacturing processes and the need for sustainable practices. The research framework serves as a guide for firms to enhance circular economy capabilities. **Emanuele Gabriel Margherita (2021)**

Manufacturing organizations are adopting Industry 4.0 (I40) technologies to automate decision-making and operational tasks along the assembly line. While these technologies can optimize production, stabilize employment, and enrich worker roles, they can also lead to job disruptions and a reduction in workforce expertise. Current research lacks studies on how organizations can balance capital benefits with labor welfare in Industry 4.0 adoption.

III. OBJECTIVES

Primary Objective:

A study on Skills development program to address industry 4.0 needs in super auto forge private limited company

Secondary Objectives:

-To Analyze the existing workforce competencies and identify gaps in knowledge related to Industry 4.0 technologies such as IoT, AI, robotics, and data analytics.

-To Train employees on sustainable manufacturing practices, including energy efficiency, waste reduction, and compliance with environmental regulations.

-To Encourage a culture of continuous learning to enhance adaptability to technological advancements and promote innovation in forging processes.

IV. RESEARCH METHODOLOGY

This study uses a descriptive research design. Primary data was collected using structured questionnaires from 110 employees at super auto forge pvt ltd, selected through stratified sampling. Secondary sources included journal articles and reports.

1. Research Design

This study adopts a descriptive research design to analyze Skills development program at Super Auto Forge Pvt Ltd. The research focuses on Industry 4.0, Skills development, Workforce training, Digital transformation, Soft skills and Technical skills.

2. Data Collection Methods

Primary Data: Collected using structured questionnaires targeting employees at super auto forge pvt ltd. Sample size: **110 employees** selected through **stratified sampling** to ensure diverse representation. Questionnaires designed to measure employee perceptions of Super Auto Forge Pvt Ltd.

Secondary Data: Gathered from journal articles, books, company reports, and industry research. Sourced from industry reports, academic journals and company records.

3. Sampling Technique

Stratified Sampling: Employees were categorized based on department, tenure, and hierarchical level. This ensures balanced insights across various organizational roles.

4. Data Analysis Techniques

The studyapplies multiple statistical tools to evaluate Super Auto Forge Pvt Ltd.

Chi-Square Test: Determines the relationship between categorical variables (e.g., age and years of experience).

ANOVA (Analysis of Variance): Tests **group-wise differences** in perceptions about department and education qualification of respondents and ratings of respondents in super auto forge pvt ltd.

Correlation Analysis: Assesses the link between gender of the respondents & the respondents of importance of continuous learning in super auto forge pvt ltd.

V. ANALYSIS TOOLS

- Chi-Square Test: To identify relationships between categorical variables.
- ANOVA: To test group-wise perception differences about super auto forge pvt ltd.

- Correlation Analysis: To evaluate the relationship between two variables.
- Quantitative data collected from the survey was analyzed using **SPSS software,** applying the following statistical tools.

SUMMARY OF STATISTICAL TESTS

Test Type	Variables Tested	Test Statistic	Degrees of Freedom (df)	Significance (p- value)	Inference
Chi-Square Test	Age vs Years of experience	5.624	4	0.229	No Significant relationship
ANOVA Test	Department vs Education qualification	1.183	4	0.320	No Significant difference
Correlation Analysis	Gender vs Importance continuous learning	-0.115(r)	-	0.234	Very weak negative correlation, not significant (fail Ho)

VI. Findings

- Majority of respondents (61%) are aged 25-35, with 38% below 25 and minimal representation above 45.
- 68% Majority of respondents are male, were 32% are female.
- 71% from Production, followed by 21% from other departments.
- 82% are trainees, indicating a young or early-career workforce.
- Robotics and Automation (55%) and Data Analytics (41%) are seen as most important.
- Teamwork (42%) and Adaptability (36%) are considered crucial.
- 68% feel least prepared in Data Analytics, while 48% identify Automation and Robotics as key upskilling areas.
- 55% are moderately aware, but only 35% are highly aware of tools like ERP and IoT.
- 81% prefer on-the-job training, while 15% favor online courses.
- 59% find current training somewhat effective, but 44% perceive a significant skill gap for Industry 4.0.
- Time constraints (56%) and lack of training programs (27%) are major obstacles.
- 57% are somewhat confident, while 33% are very confident.
- 65% are comfortable, but 4% feel uncomfortable.
- 66% rate their knowledge as “good”, but 16% rate it as “fair”.
- 62% are somewhat familiar with Industry 4.0, while 37% are very familiar.
- 73% believe their department is “almost ready” for digital transformation.

- 55% are willing ("maybe") to attend skill development programs.

VII. Suggestions

- Focus on Data Analytics and Automation/Robotics, as there are critical skill gaps.
- Offer on-the-job training (preferred by 81%) supplemented with workshops and online courses.
- Reduce time constraints by integrating training into work schedules or offering flexible learning options.
- Increase awareness and accessibility of training programs to combat lack of participation.
- Provide hands-on workshops for tools like ERP and IoT to improve awareness and confidence.
- Introduce cybersecurity training to elevate understanding beyond "good" to "excellent".
- Highlight the importance of continuous learning (64% find it extremely important) through incentives or certifications.
- Leverage trainee-heavy workforce by embedding Industry 4.0 concepts early in their roles.
- Regularly assess training effectiveness and adjust programs based on employee feedback.
- Track progress in closing skill gaps (44% see a significant gap) through measurable outcomes.
- Ensure gender diversity in training programs, as females represents 32% of respondents.
- Cater to older employees (minimal representation above 45) with tailored upskilling initiatives.
- Foster a culture of adaptability to reduce resistance to change (only 2% cited this as a barrier).

VIII. Conclusion

The data reveals a workforce that is moderately prepared for industry 4.0 but highlights significant gaps in technical skills, training effectiveness, and time management. By addressing these areas through targeted, flexible, and continuous learning initiatives, the organization can better equip its employees for the demands of digital transformation. The research findings show that employees at various levels require targeted training in both technical and soft skills, especially in areas such as machine learning basics, smart equipment handling, predictive maintenance, and problem-solving under automated systems. Although some internal training programs are already in place, they need to be expanded and updated regularly to keep pace with technological changes.

IX. References

- Ahmed Tlili, Daniel Burgos (2023)-Education and Workforce Development in the Era of Industry 4.0.
- Rupert Maclean, Shanti Jagannathan, Brajesh Panth (2022)-Skills Development for Inclusive and Sustainable Growth in Developing Asia-Pacific.
- Natalia Konina (2021)-The Future of Work in Industry 4.0: Innovation, Automation, and Workforce Development.
- Das, P., Godbole, S., Maxwell, D. W., & Moehler, R. (2023). Exploring the role of Industry 4.0 in the building

industry: Proceeding of Creative Construction Conference, 309-316.

- Ayanwale, M. A., Adelana, O. P., Ishola, A. M., & Adeeko, O. (2024). Education 4.0: EURASIA Journal of Mathematics, Science and Technology Education, 20(8), em2492.
- Kiradoo, G. (2023). Exploring the opportunities and challenges for entrepreneurs in Industry 4.0 Current Topics on Business, Economics and finance, 2, 181-196.
- Kumar, L., & Sharma, R. K. (2023). Exploring research issues and potential future directions in industry 4.0 adoption in SMEs: A comprehensive analysis and integration.
- Rico-Cortez, M., Andersson, N. -E., & Johansen, K. (2024). Sustainable Production through Advanced Manufacturing, Intelligent Automation and Work Integrated Learning (672-685).
- Margherita, E. G., & Braccini, A. M., (2024). International Journal of Operations & Production Management, 44(6).

WEBSITES REFERRED:

- https://scholar.google.com
- https://www.google.com/
- https://www.wikipedia.org
- https://www.superautoforge.net
- https://www.iosrjournals.org/