

Article

Leveraging the Power of Human Resource Management Practices for Workforce Empowerment in SMEs on the Shop Floor: A Study on Exploring and Resolving Issues in Operations Management

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Abstract

Operations management personnel emphasize the maintenance of workforce empowerment on the shop floor. This is made possible by implementing effective operations and human resource management practices. However, organizations are adept at controlling the workforce empowerment domain within operational scenarios. In the current industry revolution scenario, industry personnel often face failure due to a laggard mindset in the face of industry revolutions. There are higher possibilities of failure because of standardized operations controlling the shop floor. Organizations utilize well-established human resource concepts, including McClelland's acquired needs theory, Herzberg's two-factor theory, and Maslow's hierarchy of needs, in order to enhance the workforce's performance on the shop floor. Current SME individuals require fast-paced approaches for tracking the performance and idleness of a workforce in order to control them more efficiently in both flexible and transformational stages. The present study focuses on investigating the parameters and factors that contribute to workforce empowerment in an industrial revolution scenario. The present research is used to develop a framework utilizing operations and human resource management approaches in order to identify and address the issues responsible for deteriorating workforce contributions. The framework includes HRM and operations management practices, including Herzberg's two-factor theory, Maslow's theory, and lean and smart approaches. The developed framework contains four phases for achieving desired outcomes on the shop floor. The developed framework is validated by implementing it in a real-life electric vehicle manufacturing organization, where the human resources and operations team were exhausted and looking to resolve employee-related issues instantly and establish a sustainable work environment. The current industry is transforming from Industry 3.0 to Industry 4.0, and seeks future-ready innovations in operations, control, and monitoring of shop floor setups. The operations management and human resource management practices teams reviewed the results over the next three months after the implementation of the developed framework. The results revealed an improvement in workforce empowerment within the existing work environment, as evidenced by reductions in the number of absentees, resignations, transfer requests, and medical issues, by 30.35%, 94.44%, 95.65%, and 93.33%, respectively. A few studies have been conducted on workforce empowerment by controlling shop floor scenarios through modifications in operations and human resource

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management strategies. The results of this study can be used to fulfil manufacturers' needs within confined constraints and provide guidelines for efficiently controlling workforce performance on the shop floor. Constraints refer to barriers that have been decided, including production time, working time, asset availability, resource availability, and organizational policy. The study proposes a decision-making plan for enhancing shop floor performance by providing suitable guidelines and an action plan, taking into account both workforce and operational performance.

Keywords: human resource management; workforce contribution; operations management; shop floor scenario; emerging technologies

1. Introduction

The workforce acts as a pillar within organizations, and decides their fate in both current and upcoming scenarios. If workforce contribution deteriorates within an organization, it results in drastic losses. Therefore, the workforce must be adequately cared for and provided with suitable guidelines so that they can contribute their best input to the deployed workplace [1–3]. The human resource management (HRM) department ensures that workforce contributions align with organizational protocols [4,5]. Organization protocol governs the operations management arrangements. The HRM team develops a suitable action plan to address the identified discrepancies. HRM deals with workforce management and their allocation on the shop floor [6,7]. There are five primary objectives, including establishing workforce engagement, arranging suitable skill development programmes, occupational safety, efficient allocation, and maintaining operational efficiency. The HRM team employ a number of strategies to achieve these objectives within organizations, but have encountered challenges in maintaining a healthy work environment. The current operational scenario is being modified with cutting-edge technologies and advanced work setups. In the current operational scenario, organizations and HRM planning teams eagerly search for suitable approaches to resolve the problems faced in maintaining these plans. Organizations are continually improving and require revolutionary modifications in their control approaches in real-life scenarios. Figure 1 describes the objectives of the HRM team in operations management in the current scenario of the organization's shop floor.

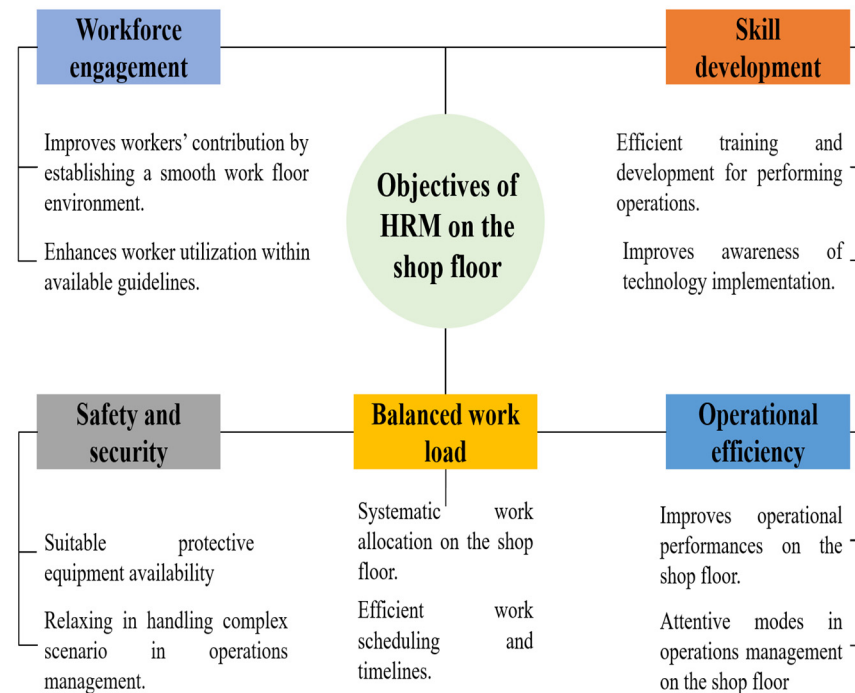


Figure 1. Objectives of HRM on the shop floor [8–13].

SMEs emphasize the workforce empowerment domain because of its relative outcomes achieved on the shop floor. Workforce empowerment provides mental peace to operators, enabling them to reach their targets and take ownership of their decisions on the shop floor [14,15]. Human resource management practices help establish an empowered platform by providing different paths and guidelines for the shop floor scenario. In operations management, where the workforce is maximized, motivational theories provide a solid basis for understanding how HRM can empower the workforce. According to Maslow's hierarchy of needs [16], employees will only function at their peak when their basic and psychological needs are satisfied. Higher-order motivation can be activated by HR practices that provide financial stability, promote job security, foster a sense of belonging at work, and offer opportunities for personal growth. These practices have a direct impact on employee productivity and goal alignment. In Herzberg's two-factor theory, similar distinctions are made between hygiene elements (such as pay, policies, and working conditions) and motivators (such as progression, job enrichment, and recognition). HR systems in SMEs that effectively reduce dissatisfaction (through safe working conditions and equitable policies) and foster intrinsic motivation (through meaningful job roles and recognition programmes) can lead to improved operational efficiency and long-term performance outcomes [17]. Furthermore, three motivational drivers—achievement, power, and affiliation—are highlighted in McClelland's acquired needs theory [18], which is crucial in the current competitive environment. Encouraging workers on the shop floor by matching duties to their primary needs encourages dedication, creativity, and accountability. For example, performance-based incentives or challenging projects might inspire workers who have a strong drive for success, promoting creativity and efficiency in achieving organizational objectives [19]. Those motivated by power or affiliation are better suited for leadership-driven and collaborative jobs, which directly improve organizational flexibility and competitiveness. SMEs can better strategically utilize human potential by establishing HRM practices based on these theories. This will increase productivity while guaranteeing that organizational objectives are reached sustainably and competitively. Similar studies have been reported. Kerdpitak et al. [20] identified job satisfaction

and absenteeism as major factors driving employee engagement in the workplace. Ogedengbe et al. [21] examined both the challenges and opportunities associated with implementing strategic HRM practices in the logistics and shipping sectors. For an organization to function efficiently and stay within regulatory bounds, HRM must prioritize comprehensive employee training and adherence to industry standards. Achieving this requires robust training initiatives, well-structured safety measures, and effective performance evaluation systems. While these demands pose particular challenges, they also present opportunities for innovation and expansion within the sector.

Akhter et al. [22] emphasized the value of workforce development. Their research confirmed that development and training significantly enhance employee performance; their findings align with those of previous studies [23–25]. Junaidi et al. [26] suggest that when competition intensifies on both local and global fronts, organizations are under pressure to evaluate their performance. In such a dynamic environment, boosting efficiency and effectiveness becomes crucial for long-term success and survival. Demortier et al. [27] proposed that employee performance is beyond speed. It also encompasses creativity, teamwork, and quality of output, especially in operational roles on the factory floor. Operations management performance depends on workforce contributions, and, as a result, organizations can improve the shop floor environment using various human resource management theories [28–30]. These theories provide a framework for enhancing workforce engagement on the shop floor, and organizational planning teams allocate them according to their respective areas of expertise. HRM oversees more than just hiring and training employees; it also has to create plans that support the organization's long-term goals [31,32]. Organizations compete internationally in addition to functioning in local markets in the current era of globalization. The business environment has undergone significant changes due to the development of communication, information technology, and the cross-border flow of capital, goods, and human resources. The rise of new competitors, both domestically and internationally, has intensified competition, prompting businesses to enhance their performance. In this changing climate, increasing organizational performance efficiently and effectively is essential for survival and success [33]. Efficiency, in this sense, refers to an organization's ability to utilize its resources effectively, including time, money, technology, and human capital, to produce more with less input. Reduced waste and increased productivity can lead to lower operating costs for a company. Effectiveness, on the other hand, refers to how well an organization can accomplish its strategic objectives [34,35]. Effectiveness is more focused on the outcome of an organization's performance, specifically if it can accomplish its declared goals, such as increasing revenue, enhancing customer satisfaction, or creating sustainable product breakthroughs. Organizations must improve their performance in an efficient and effective way, considering globalization and heightened competition. To accomplish this goal, human resource management is essential. These HRM practices help maintain a disciplined and cultured work environment that fulfils organizations' expectations.

The work environment plays a vital role in outcomes because it directly impacts the workforce's dedication on the shop floor. If the operators receive systematic information and a cleaner and safer environment on the shop floor, then they work fearlessly and achieve excellence within the constraints. Human resource management practices direct the roadmap for maintaining a cleaner and safer environment on the shop floor [36,37]. With roots in a wide range of academic fields, including psychology, sociology, education, economics, and management sciences, the study of human motivation is a complex and well-researched field. Researchers have sought to understand what motivates people to work and make significant contributions since the inception of organized human activity [38].

Motivational theories have evolved over time to explain various elements, including McClelland's acquired needs theory, Herzberg's two-factor theory, and Maslow's hierarchy of needs. According to Maslow's theory, every theory offers a unique perspective on how individuals behave in the workplace. Humans have a variety of wants, ranging from basic needs like food and safety to more complex desires like feeling valued and accomplishing personal goals. Good HR practices, such as transparent training programmes, equitable compensation, and opportunities for growth, can help SMEs meet these needs [39]. These benefit the company's operations in addition to the workers. Furthermore, both incentive theories emphasize the strategic importance of HRM in promoting workers' productivity and long-term organizational performance. According to Torrington et al., integrating technologies into HR activities not only automates administrative tasks but also satisfies the intrinsic and extrinsic motivational demands of employees by offering growth opportunities [40]. This dual effect promotes enterprise-wide performance excellence while also helping individuals reach their full potential.

1.1. Emerging Human Resource Practices for Tackling the Challenges at Workplaces

The current organization scenario supports emerging human resource management practices for workforce utilization [41,42]. These practices promote work flexibility, employee well-being, real-time monitoring, and innovative platforms for addressing workplace challenges. SMEs create a more resilient work environment by implementing emerging human resource management practices in the relevant section. The rapid advancement of technology and the increase in global competition have led to a significant transformation in human resource management in recent years. With the use of electronic human resource management (E-HRM), a department that was formerly mired in paperwork and routine administrative duties has evolved into a strategic function. Businesses can streamline procedures, reduce reliance on human labour, and focus more on long-term objectives and strategic planning thanks to these digital tools. Furthermore, it is essential to stress that contemporary HR is no longer merely a support function; rather, it is increasingly crucial to empower people in assisting firms in operating effectively, especially in small and medium-sized enterprises (SMEs) where hands-on work is the norm [43,44]. E-HRM helps create a more productive and flexible workplace by enhancing real-time decision-making, allowing employees to handle more tasks independently, and facilitating easier communication [45]. However, despite E-HRM's great potential, we still do not fully understand its impact on employee performance, particularly in small and medium-sized enterprises (SMEs). Some older studies, such as the one by Demortier et al. [27], highlight that employee performance encompasses a range of factors—not just productivity, but also creativity, collaboration, and the quality of their work. This is especially important for jobs on the shop floor. Still, many recent studies only examine performance as a single entity rather than breaking it down. According to Bamel et al. [46], E-HRM is a catch-all term encompassing all web-based HR applications, including e-selection, e-recruitment, e-compensation, e-training, and e-performance evaluation. These technologies are quite helpful for SMEs, which frequently lack sizable HR departments but demand great worker productivity. Al-Tit et al. [47] investigated the impact of employee development practices on intellectual capital, mediated by knowledge management, in the context of ICT firms. Using data from 464 employees, the research demonstrated that employee development practices have a significant impact on human capital, knowledge management, and social capital. It was established that knowledge management has a significant effect on human capital, but not on social capital, and mediates the effect of employee development practices on human capital. As a result of their fast-paced working atmosphere, SMEs must empower the workers at the shop floor level using strategic human resource management practices. According to recent studies, HRM practices

such as employee empowerment, employee participation, and participative decision-making have a powerful influence on SMEs' performance enhancement and worker empowerment [48,49]. Operational efficiencies and the need to keep pace with evolving technology necessitate the development of an innovative spirit and attitude, as well as the creation of human capital through ongoing training [50,51]. SMEs are capable of having multi-faceted human resources with skills that can assist in addressing shop floor problems and maintaining performance outcomes by systematically connecting HRM with functional strategies [52]. Pulu et al. [53] highlighted the need for cultural sensitivity when creating e-learning programmes for international teams. Recognition and adaptation to cultural variations play a significant role in the effectiveness of global training and development strategies. The integration of AI into HR has revolutionized core HR activities. AI is becoming deeply embedded in everyday HR operations, particularly within organizations that manage increasingly large datasets related to operations and workforce planning. Votto et al. [54] observed that this trend contributes significantly to the development of more sustainable business models. Operational environments, particularly for SMEs, have notably been reshaped by digital transformation. This shift directs SMEs to rethink their HR strategies, ensuring that staff are digitally prepared. Hokmabadi et al. [55] reported that embracing HRM practices that emphasize digital skill training, support innovation, and manage change effectively is now essential as technologies like AI and automation become an integrated part of production processes.

In this era of technological advancements, E-recruitment technologies help SMEs to find the right people for right job quickly, and save money and time when hiring by allowing applicants to electronically submit their resume and by screening applications based on organizational preferences; this leads to improvement in workforce competency and responsiveness in shop floor tasks where a timely workforce matters [56,57]. For SMEs, the E-HRM performance management system offers a structured and consistent way to assess employee productivity, track progress, and link performance outcomes to rewards or promotions [58,59]. These platforms provide real-time insights, reduce bias in performance evaluations, and enable quick corrective actions where necessary. Al Mashrafi, K. A. S. [60] further highlighted how these digital tools simplify the performance tracking process, ensuring that employees remain aligned with shifting company goals. E-HRM equips SMEs to address common operational challenges, such as closing skill gaps, aligning employee objectives with business priorities, and maintaining fair and transparent performance assessments—all of which are essential for empowering the shop floor workforce and driving organizational growth.

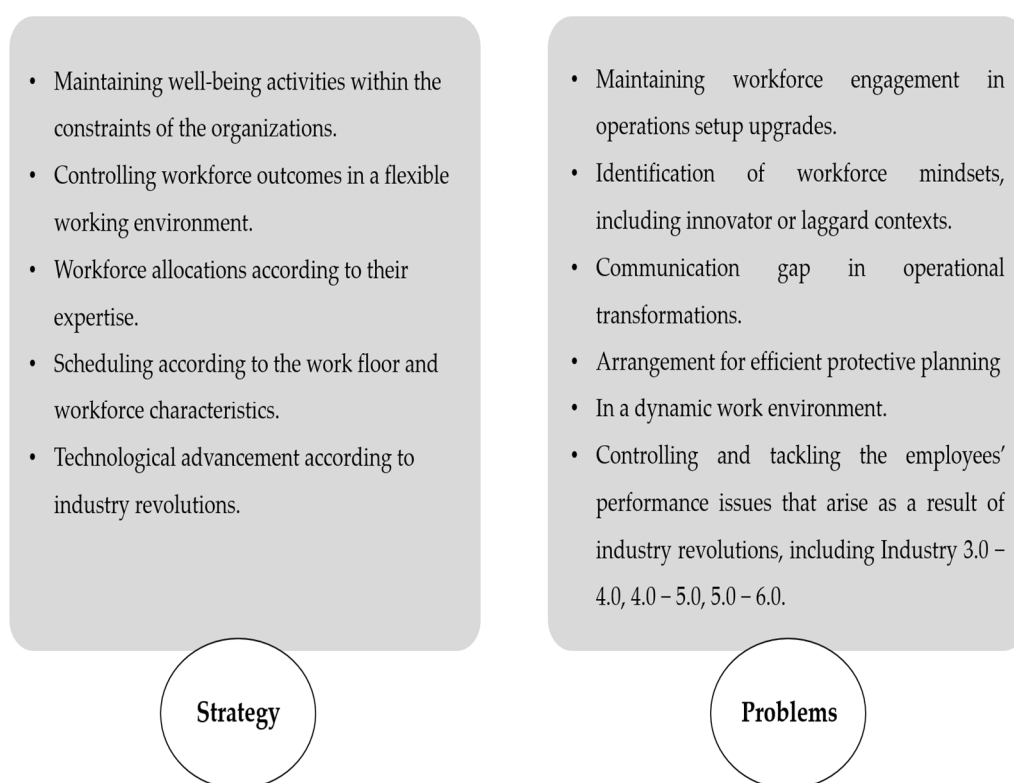
1.2. Challenges and Problems Faced in Workforce Empowerment on the Shop Floor

HRM teams emphasize a systematic approach to maintaining workforce sustainability. Workforce sustainability refers to a balanced life in the workplace, and it is primarily determined by workforce happiness on the shop floor [61,62]. HRM and operations management teams strive to determine how to feasibly maintain a healthy work environment. However, problems generate challenges in tackling both operational and workforce performance within the confined constraints. Previous research has shown that organizations can achieve growth only when workers experience happiness in the workplace [63–67]. HRM establishes guidelines for meeting the basic needs of the workforce through suitable rules and regulations [32,68]. Table 1 shows the challenges of HRM and its results in the current operations management scenario.

Table 1. Challenges of the human resource management strategy at the workplace and consequences of ignoring it on the shop floor.

Sl No.	Reference	Challenges of HRM	Results
1	Ponsteen et al. [69], Mutsuddi et al. [70]	Lack of skill	Confusion in allocation
2	Bayraktar et. [71], De Menezes et al. [30], Corallo et al. [72]	Ignorance of technological advancement	Unfit for operations management
3	Patrick Neumann et al. [73], McLean et al. [74], Lepak et al. [75], Azizi et al. [76], Macke et al. [77]	Enforcing guidelines and protocols	Lack of work performance
4	Guest et al. [78], Nifakos et al. [79]	Reliability and security	Negligence
5	Qin et al. [80], Albrecht et al. [81]	Controlling complex operational activities	Reduction in participation
6	Saadat et al. [82], Eichenseer et al. [83]	Workforce utilization	Delays in product delivery
7	Hasan et al. [84], Tripathi et al. [85], Ghobakhloo et al. [86], Attridge et al. [87]	Lack of communication gap	Reduced productivity
8	Koemtzi et al. [88], Maarof et al. [89], Schullery et al. [90]	Lack of engagement	Quality issues

These problems generate various dilemmas in the decision-making phase, resulting in drastic deterioration in operational management outcomes. If these problems are not resolved properly, they create huge challenges, leading the organization to become confused about what is right for operations management. HRM teams face a number of challenges in achieving continuous growth in organizational profits without hurdles. Organizational planning teams employ various strategies to address the problems encountered in operational scenarios. Figure 2 describes the strategies and problems that the HRM team face in the current organization scenario.

**Figure 2.** Description of the strategy opted for, and problems faced by HRM in the current operations management scenario [78,91–94].

It has been observed that HRM faces issues in controlling workforce outcomes in current small and medium enterprises (SMEs). In the current global scenario, rapid industrial growth is accompanied by continuous technological advancements. Organizations support the minimum budget for workforce remuneration with a maximum contribution [95]. The present study focused on developing a novel framework for enhancing workforce contribution using human resource and operations management policies. The developed framework helps achieve workforce sustainability within manufacturers' constraints in the current operations management scenario. The developed framework guides HRM teams in managing flexible manufacturing conditions in SMEs within established protocols and guidelines. A few studies have been carried out which controlled shop floor scenarios through modifications in HRM strategy. The present study developed a novel framework for enhancing workforce contribution through efficient HRM strategies within the limited constraints of the relevant manufacturers.

A sustainable HRM guideline promotes operational outcomes by improving workforce attention to the working environment [96,97]. Operations and HRM teams maintain standardized guidelines for maximizing workforce outcomes; however, there may be higher failure possibilities due to technological advancements, changes in work setups, inefficient scheduling, unstable control, and biased reporting. Previous studies have reported that healthy HRM policies can fail due to inappropriate operations management, technological advancements, and industry revolutions [98,99]. There were many reasons for workforce deterioration, but few specific solutions for tackling the relevant issues [6,100–103]. These solutions cannot provide a universal path for controlling workforce empowerment within a flexible working scenario. The present research has been used to develop a framework for identifying and tackling the issues reported within a technological advancement scenario. The study focuses on industry transformation scenarios from Industry 3.0 to 4.0, 4.0 to 5.0, and 5.0 to 6.0, considering workforce empowerment on the shop floor with existing HRM and operations management approaches. The framework is verified by implementing it in a real-life operational scenario where the organization is eager to obtain a valid solution to tackle workforce empowerment-related problems within a flexible working environment. The organization has changed its work setups from Industry 3.0 to 4.0 and is planning for Industry 5.0.

Previous studies have reported that researchers have developed several approaches for workforce empowerment on the shop floor for a specified work environment. The developed approaches provide improvements in line with employees' performances and the current operational scenario in organizations. Operations and human resource management have faced dilemmas when controlling workforce performance in an advanced working environment. The present study developed innovative operations and human resource management for tracking employees' performances in a flexible environment. This approach helps identify the workforce's idleness and resolve by integrating leading-edge technology with existing practices. The strategy focuses on empowering the workforce in order to improve operations management on the shop floor by resolving the issues faced in organizing tasks and assignments in small to medium-sized enterprises (SMEs). These issues include lack of planning, bias, unhygienic conditions, insecurity, and exertion when completing tasks on the work floor. The study developed a framework for workforce empowerment in SMEs by leveraging the power of human resource practice. A few studies have been carried out on workforce empowerment by controlling shop floor scenarios through modifications in HRM strategy. The developed framework is novel in improving workforce contribution through HRM practices in the current industrial scenario, considering the limited constraints of the relevant manufacturers. The developed framework eliminates the challenges and issues faced by HRM teams and enhances the operations management outcomes by maximizing workforce contributions. The developed

framework was validated by the improvements achieved in workforce empowerment in a real-life shop floor scenario. The results showed that the operations and HRM teams can establish workforce-empowered platforms and achieve the desired outcomes on the shop floor. Organizations can achieve such milestones through operational, economic, and environmental sustainability

The present study consists of eight sections. The first section describes the introduction of human resource management practices aimed at empowering the workforce and ensuring operational sustainability on the shop floor in SMEs. The second section presents a literature review on human resource practices employed to enhance operational performance on the shop floor. The section describes the issues, suitable solutions, and recent advancements in HRM practices for operations management on the shop floor. The third section describes the methodology used for the present research. The fourth section presents the detailed framework. The fifth section discussed the implementation of the developed framework in a real-life scenario. The sixth section reveals the results and discussion on the feasibility and applicability of the developed framework. The seventh section shows the conclusion. Finally, the eighth section discusses future research directions.

2. Literature Review

HRM plays a key role in driving workforce sustainability on the shop floor in SMEs. Operations management can perform efficiently when operators work systematically and adequately [104,105]. Previous studies have focused on various attributes, including the impact of workforce sustainability, the role of HRM, the contribution of organizational guidelines and protocols, and advancements in technology for workforce engagement in operations management.

2.1. Impact of Workforce Empowerment

The integration of digitalization and advanced technology is extensively reshaping the outlook of human resource management by influencing the functions of HR, such as selection, recruitment, employee development programmes, compensation, and performance evaluation. There is a higher skill requirement for the workforce in the era of Industry 4.0, as advanced technologies like big data analytics, artificial intelligence, and IOT continue to increase. In order to become competent and grow within the industry, there is a need for highly skilled professionals and experts in these areas [106]. To address the advancement of technology, HR domains must actively identify skill gaps and implement new strategies to attract and retain employees within the organization. A similar study has been reported by Balouei et al. [107], which determined the drivers of human resource empowerment in Quality 4.0 in the era of digitization. Having examined the history of quality management in Industry 4.0 and consulted with experts and KIBS firm managers, the research found 29 drivers of workforce readiness and capability. Applying the Grey DEMATEL method, cause-and-effect relations between these drivers were examined and classified into new valuation methods, composite dimensions, team creativity, and intensive inspection. “Technical skills and problem-solving capability” were the most crucial drivers. Operational terrains are warped by digital transformation, especially for SMEs, which requires the assessment of HR processes to ensure employee readiness. SMEs need to focus on digital-focused HRM practices, e.g., digital competency training, innovation management and change management facilitation, as new technologies such as IoT, AI, automation percolate shop floor operation [108]. SMEs that utilize digital HRM practices, such as digital performance monitoring, e-recruitment, and online training, are more likely to manage operational disruptions and enhance employee flexibility [109]. Moreover, providing workers with digital skills enhances employee engagement, innovation capability, and the overall resilience of the firm, in addition to shop floor operating efficiency

[110]. Therefore, to maintain workforce competitiveness and operational performance in a rapidly changing environment, digitizing the HRM process is crucial.

Another impact of technological integration is the adoption of new, modern roles and responsibilities within the organization. Tasks that are performed manually are being progressively automated, which is changing the nature of work and requires employees to adapt to new, equipped demands [111]. In this regard, the HR domain plays a vital role in workforce empowerment by organizing training and development programmes and workshops to enhance employee skills. These workshops benefit employees by improving their skills and fostering a sense of empowerment through the acquisition of new skills and knowledge. The concept of workforce empowerment has emerged as a crucial component of organizational performance, promoting high levels of output, innovation, and creativity. Employees are empowered in the workspace as they are provided with the necessary resources to support them in performing their roles effectively. This also helps cultivate a sense of accountability among employees [112]. Employee empowerment plays a crucial role in boosting productivity, driving innovation, and enhancing employee satisfaction within the organization. When workers feel powerless in their positions, empowerment becomes even more significant [113]. Therefore, identifying the factors that impact empowerment becomes crucial. Additionally, HRM policies and strategies should align with workforce empowerment, emphasizing the creation of a supportive and positive work environment. Rapid technological advancements can lead to resilience issues among employees. This is where the HR department can empower employees to be more accountable and responsible for their roles, enabling them to adapt to the technological shift seamlessly.

2.2. Role of HRM

The role of HRM is driven by the expectations of the next generation of employees, who are undergoing significant transformations in sync with the organization's HR policies and new offerings. As a result, Smart HR practices have emerged, involving advanced HR systems and strategies [114]. The two major factors responsible for shaping the future of work are innovative HR strategies and technological advancements, both of which are linked to the integration of technology in the workspace. The relationship between these two factors is interdependent, as both support and influence each other [115]. **Workspace Transformation:** Workforce transformation is necessary due to the increasing demand for technology-oriented skills, and modern HR strategies play a crucial role in adapting to this transformation. This transformation requires the training and development of employees to provide them with the necessary skills. HR plays a vital role in helping employees acquire new skills and knowledge seamlessly, thanks to innovative tools and platforms [116]. Islami et al. [117] discussed three primary HR practices—performance appraisal, recruitment and selection, and training and development—and inspected their impact on operational performance via a hierarchical regression model. The outcomes suggest that the efficient use of HR practices has a substantial impact on operational performance. Anwar et al. [118] focused on the power of HRM on the performance of government institutions during enhanced economic transformation establish on quantitative research with 240 respondents. The result highlighted that, notwithstanding the denial of all the hypotheses, decentralization was still positively correlated with organizational performance, demonstrating its dominant role in enhancing the competitiveness and flexibility of government institutions.

Zhang et al. [119] investigated the function of empowerment-based HRM practices in interfirm learning by considering employee views on the incorporation of external inputs. Employing empirical survey evidence across several countries and structural equation modelling, the research identified that job enrichment, job autonomy, teamwork, and

cross-functional communication all have positive effects on relationship learning. **Data-Driven Decision-Making:** The use of advanced technologies in workforce transformation has generated a significant amount of data that HR professionals utilize to enhance decision-making. These data support various HR activities, including recruitment, performance evaluation, assessment, and employee engagement within the organization. For instance, these data enable the HR team to identify and analyze employee engagement, as well as the factors that contribute to employee satisfaction levels. The study conducted by PWC indicates that organizations using data-driven strategies in HR are more likely to attain higher levels of employee productivity [120–122]. **Employee Experience:** By emphasizing technology-enabled systems, collaboration, and flexibility, advancements in HR practices have altered the performance of work. HR supports this shift by implementing new, modern tools and techniques that improve overall team performance and coordination among employees [123]. The advancement focuses attention on the organization to achieve its goals in the current era; management must ensure efficient and effective operations and maintain a solid financial foundation, effectively manage personnel and information, and stay up to date on the latest technological advancements.

2.3. Contribution of Organization Policy

For decades, personnel and industrial–organizational psychologists have focused on employee-oriented practices, including empowerment, training, and teamwork. Traditionally, these practices were studied at the individual and job levels, emphasizing their impact on personal performance and satisfaction. However, the concept of “high commitment management” has been introduced, which argues that such practices are essential for fostering organizational effectiveness, particularly in the face of volatile and increasingly competitive economic conditions [124]. This idea laid the foundation for a broader perspective on how employee-centred practices can drive organizational success. Based on this foundation, the approach of high-involvement management was designed, which focuses attention on employee empowerment and develops critical paths for organizational performance. These concepts were later integrated into this framework of high-performance work practices, emphasizing the prudent role of HR in designing systems that sync individual contributions with broader organizational goals. The principles of high involvement and high commitment are closely connected with operations management and modern HR practices. Operations management concentrates on the optimum utilization of resources, workflow, and output, which directly benefits from empowered and trained employees. High-performance work policies such as teamwork, continuous training, and participative leadership style fulfil the organization’s objective more effectively by aligning with employee capabilities [125]. Furthermore, HR policies and procedures play an important role in operational success by incorporating these employee-focused strategies into the workplace. For example, initiatives for empowerment encourage employees to participate in the decision-making process of the organization and take ownership of their roles and responsibilities [126]. Similarly, continuous training and development programmes prepare the employee to adjust to changing operational requirements, and teamwork promotes cross-functional cooperation.

Ampauleng et al. [127] conducted qualitative research to assess the complex connections between psychological factors and strategic HRM practices. The focal points of the study emphasize the obligation of associating HR practices with organizational values and goals to develop employee performance, retention, and satisfaction in order to achieve long-term success. The study also stresses how critical it is for HR professionals and organizational leaders to implement a creative and bright HRM approach. Also, the use of sustainable HRM practices creates a workplace environment that improves workers’ retention, satisfaction, and operational flexibility [128]. Additionally, empirical

evidence supports the fact that workforce agility, job craft opportunities, and empowering leadership behaviours in employees are strong mediators that intensify the role of HRM interventions in affecting shop floor innovation and operational efficacy [129]. Therefore, for SMEs seeking to address operational issues and achieve long-term competitiveness, it is crucial to have the proper integration of HRM policies within shop floor operations. SME shop floor working problems can be tackled quickly with the assistance of strategic HRM methods. SMEs become better placed to boost workforce empowerment and gain productivity if they apply HRM policies such as competency mapping, flexible work arrangements, cross-training, and ongoing learning at the operational level [130,131]. Moreover, HRM programmes that focus on leadership development, empowerment, and employee involvement have a significant influence on shop floor quality and operational responsiveness [132]. Firms that incorporate HRM interventions, such as kaizen-based training and problem-solving seminars, alongside operational management objectives, tend to exhibit a lower turnover and higher worker motivation [133]. Establishing an empowered workforce that can adapt to operational challenges in SMEs thus relies on the inclusion of strategic HRM practices on the shop floor.

2.4. Recent Advancements in the Work Environment

The expansion of technology has positively influenced human resource management by creating a strong interconnection on a global scale. Often recognized as a key driver of economic systems reshaped by capitalist models, technological advancement plays a vital role in shaping the workforce development process and improving service delivery [134]. In today's world of artificial intelligence, business operations excel in geographical boundaries and promote the seamless exchange of goods, services, technological innovations, and managerial expertise across international and domestic markets. This modern digital transformation has modified HRM [135]. Furthermore, modern technologies such as artificial intelligence and cloud-based systems have redefined conventional HR practices [136,137]. This improvement enables HR experts to optimize recruitment, streamline payroll management, and enhance employee performance through personalized learning platforms. For instance, in order to identify insights in HR regarding the turnover rate of employees and the rate of talented employees, AI-driven tools help analyze a large amount of data and provide actionable insights for workforce planning [138]. Furthermore, digitalization and hybrid work technologies have boosted employee morale and encouraged them to work more flexibly, thereby improving their skills. Additionally, technology empowers employees by enabling HR departments to implement data-driven strategies that promote inclusivity and sustainability. Organizations can track diversity measures, gauge employee engagement, and identify areas for ongoing development by utilizing sophisticated HR analytics [139]. In addition to enhancing worker capacities, this technological HRM arrangement supports the broader objectives of sustainable human resource management, ensuring long-term organizational flexibility and adaptability in a rapidly changing corporate environment.

It has been observed that when organizations set their targets without discussion and analysis, with limited resource availability, this hampers workforce engagement and contribution. Operators complete the goals however they can, and no one pays attention to the quality of the work [140,141]. The problems become severe when operators argue and request improvement in operations and HRM practices, but organizations fail to provide suitable solutions. This trauma and failure directly impact workforce contribution and engagement, causing severe losses to the organization. Previous studies have reported various roadmaps and methods for employee performance excellence. These studies employed motivational human resource management (HRM) theories, including McClelland's acquired needs theory, Herzberg's two-factor theory, and Maslow's hierarchy of

needs. These theories help in the enhancement of workforce contributions. Human resource management teams provide suitable amenities for boosting the workforce's performance [142]. It has been observed that HRM teams have struggled to maintain operational excellence in management when organizations seek to transform their work environment from Industry 3.0 to 4.0 or 4.0 to 5.0. Organizations are concerned about improving their operations management performance due to the complexity of managing workforce contributions. Employees fear what might happen to them, including the potential loss of facilities or the introduction of unfavourable working conditions, which could result in a reduction in their contributions [143,144]. The present study developed an HRM and operations management approach for tracking workforce performance and providing suitable amenities according to their needs. The framework encompasses HRM and operations management practices, including Herzberg's two-factor theory, Maslow's theory, and lean and smart approaches. The framework offers an innovative platform for harnessing the power of HRM practices in motivating employees in cutting-edge work environments.

The present study develops a framework for identifying and addressing the issues responsible for the deterioration of workforce contribution and engagement in operations management through human resource management policy. A few studies have reported on workforce empowerment by controlling shop floor scenarios through modifications in operations and human resource management strategy. The developed framework is novel in improving workforce contributions through human resource management and operations management practices in the current industrial scenario, within the limited constraints of the relevant manufacturers. The framework integrated operations and human resource management practices in order to tackle issues in flexible shop floor environments. The study employed smart approaches to identify idle activities and grievance theories, aiming to improve shop floor outcomes. The developed framework is validated by investigating its feasibility in a real-life electric vehicle manufacturing scenario where the human resources team was exhausted and looking to resolve employee-related issues instantly and establish sustainable operations management. The feasibility of the developed framework is evaluated by a report over the next three months for the same manufacturer. The operations and human resource teams assisted in collecting and observing the relevant information. The results showed improvements in workforce empowerment, including a reduction in absenteeism, resignations, transfers, and medical issues. These issues severely affected workforce performance and engagement on the shop floors. The present study also provides decision-making plans for achieving operations and HRM excellence. Decision-making planning can help authorities choose a suitable approach for tackling the challenges faced on the shop floor. The present study reviewed various databases to analyze the literature, as shown in Figure 3. Figure 4 illustrates the factors and parameters according to the publication years, categorized in five-year intervals from 2010 to the present day. This analysis helps to identify suitable factors and parameters to be considered in achieving the desired goals on the shop floor in SMEs. These factors and parameters play a prominent role in achieving operational management excellence through precise investigation in the relevant departments of the organization [145–152].

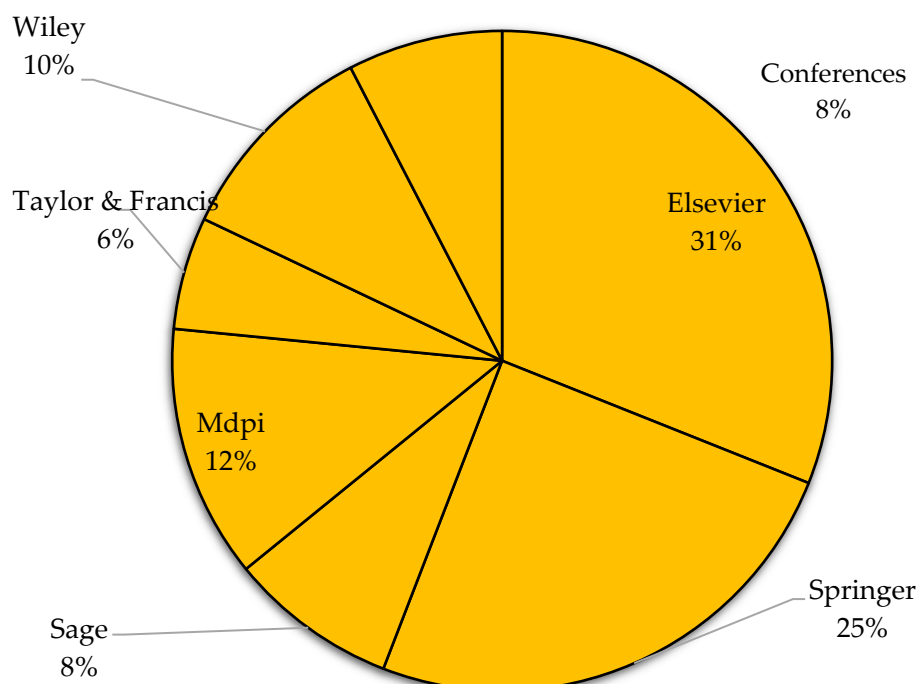


Figure 3. Details of research database.

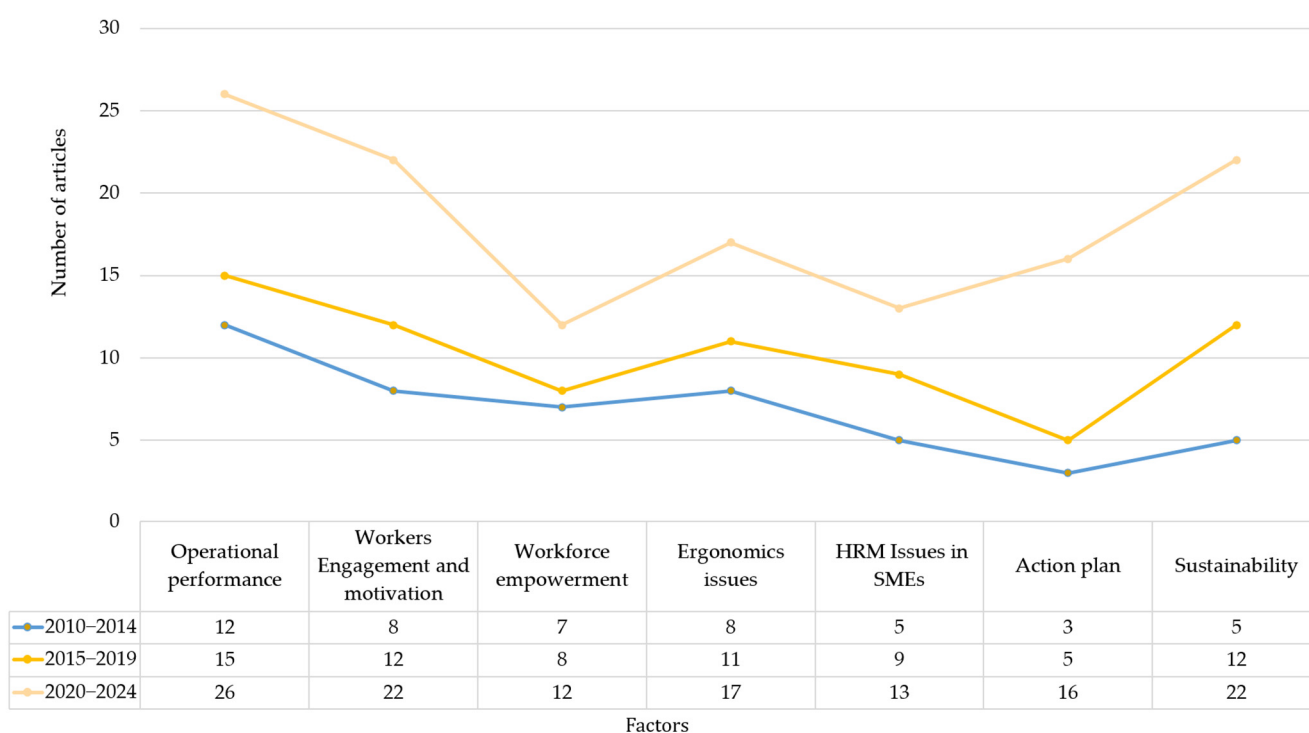


Figure 4. Description of factors considered in previous research studies.

3. Methodology

This section outlines the strategy employed to systematically illustrate this study. The methodology facilitates understanding of the current research and elaborates on the activities used to achieve the desired outcomes of current organizations on the shop floor. This research adopts a five-step methodology. The methodology aims to address the current research. The first step reviews the literature on operations and HRM frameworks used to enhance workforce empowerment in SMEs. The review examines approaches,

methods, platforms, and advancements in maintaining standardized workforce contributions on the shop floor. It provides insights into workforce contributions, problem-solving frameworks, standardized management protocols, productivity constraints, and organizational policies. This step helps in researching the studies on workforce empowerment on the shop floor by using operations and human resource management practices. The thorough analysis examines the operations and human resource approaches, issues faced in achieving employee performance excellence, recent advancements in approaches used for operational and workforce sustainability, and human resource strategies used in SMEs. The second step investigates the challenges encountered when implementing HRM strategies for workforce excellence within the current shop floor scenario in SMEs. This step elaborates on the challenges faced by operations management teams in addressing workforce sustainability. It examines suitable operations and human resource management approaches for addressing workforce performance-related issues within the current organizational context. The investigation helps identify the problems faced when enhancing workforce engagement and motivation. The third step develops a framework for workforce empowerment using HRM strategies in operations management.

The developed framework helps address the issues and challenges faced by SMEs in the current leading-edge work scenario. This step provides suitable path planning for achieving the desired goals on the shop floor within existing operations and human resource controlling practices. The plan offers a cleaner shop floor environment, along with enhancements in workforce empowerment and operational parameters. The fourth step discusses the implementation of the developed framework in an emerging SME shop floor scenario. The step reviews the operations and human resource management attributes in a chassis manufacturing department. This step elaborates on the current operational scenario by observing operations, reviewing previous records, and consulting with reports from shop floor teams. Finally, the fifth step presents the conclusion of the present research. It represents the impact of the developed framework on SMEs in a real-life scenario. This step investigates the feasibility of the developed framework in a real-life scenario. It assesses the adaptability of the developed framework by reviewing reports from the organization over the next three months after implementation. The report analyses the operations and the performance of the human resource management team on the shop floor. Table 2 shows the current methodology.

Table 2. Description of the present methodology.

Step	Detail	Action
1	Review	Background of HRM and operations management approach
		Workforce empowerment strategy in the current organization scenario
		Technological advancement in tackling operations management
2	Recognition	Problems faced in workforce empowerment on the shop floor
		Challenges in maintaining the motivation of employees
		Suitable operations and HRM approaches
3	Development	Innovative approach for leveraging the competency of operations and HRM practices
		Strategy for improvement in parameters, including workforce, shop floor, HRM, operations management, and technological advancement.
4	Assessment	Implementation of the developed framework in a real-life scenario
5	Validation	Investigation on the improvement in workforce contribution on the shop floor
		Employees' motivations for innovative platforms

Workforce adaptability for a flexible manufacturing environment

There are five stages used for a thorough discussion on the present operations and HRM era for SME outcomes. The stages contain different action plans with details related to the information provided. The current methodology is developed through an extensive analysis of the existing domain, considering research questions that include operations and HRM concepts, as well as the challenges faced by organizations. The authors of the current research prepared the methodology by reviewing previous articles in the same domain.

4. Developed Framework

HRM establishes a smooth work environment on the shop floor, and this practice has a direct impact on the mental and psychological well-being of the workforce. The present study developed a novel framework for workforce empowerment through a modified HRM strategy. The framework was developed by reviewing previous literature that focused on improving operations management outcomes, considering the issues faced in enhancing workforce contribution on the shop floor. The literature helped in preparing a suitable path plan that considers essential attributes and aligns the action plan in order to tackle the challenges and issues faced in the operational scenarios. The framework integrated operations and human resource management practices in order to tackle issues in flexible shop floor environments. The current work includes HRM and operations management practices, including Herzberg's two-factor theory, Maslow's theory, and lean and smart approaches. These approaches help empower the workforce and address the challenges faced in meeting the organization's needs. These practices help address the specific problems in the working environment and improve outcomes using a suitable strategy and amendments. Figure 5 illustrates the developed framework for enhancing workforce empowerment. The developed framework contains four phases. The first phase focuses on a systematic HRM analysis of different parameters. This phase helps eliminate issues reported by operations management teams on the shop floor. The second phase establishes a smooth work environment by making suitable modifications in various sections of the shop floor and analyzing reports on different factors through previous cases and current shop floor scenarios. This phase helps identify discrepancies in HRM strategies and the workplace. The third phase provides a regulatory plan for improving workforce engagement by addressing issues in the existing HRM strategy on the shop floor. The regulation plan directs HRM teams in tackling the dynamic challenges faced in a flexible manufacturing environment. Finally, the fourth phase analyzes the improvements achieved in workforce empowerment by verifying with conversations and meetings. The developed framework improves workforce contributions in SMEs within manufacturers' constraints. Table 3 shows the details of the action plan for workforce empowerment in SMEs on the shop floor. The action plan helps direct the implementation of phases in an operations management scenario, considering appropriate factors for the shop floor scenario. The action plan outlines the actions considered in five distinct phases. It describes the phases' directions by considering various factors necessary for achieving the manufacturer's desired goals within available resources.

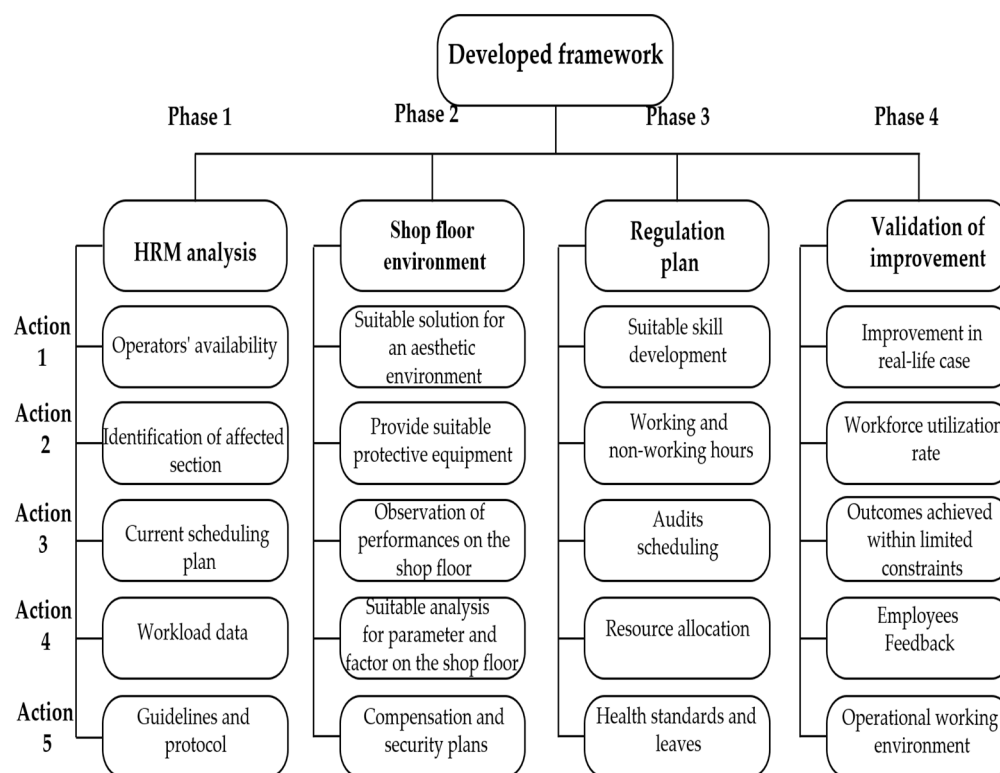


Figure 5. Developed framework.

Table 3. Details of the action plan.

Phase	Action	Detail
1—HRM Analysis	1	Categorization of operators according to expertise and previous records.
	2	Identification of affected sections or zones where bias is reported.
	3	Work in line with machinery availability and relevant operators.
	4	Analyzing workforce engagement and contribution conditions.
	5	HRM practices and rules for the current shop floor scenario.
2—Shop floor environment	1	Modifying the shop floor plan as needed.
	2	Preparing safety plans for preventing unexpected injury and unhygienic incidents, and conditions. Also, providing suitable equipment for accident-prone areas.
	3	Paperless reporting on daily performance records of employees.
	4	Analyzing work excellence considering quality, results, expectations, and performance.
	5	Preparing suitable compensation and security policy.
3—Regulation plan	1	Suitable training and skill development programme as per availability and needs.
	2	Smart and flexible reporting system according to production needs provided beforehand by operations teams.
	3	Planning for the investigation of the work environment and performance on the shop floor.
	4	Analyzing employee engagement and their performances, and outcomes.
	5	Real-time monitoring platform for basic amenities conditions.
4—Validation of improvement	1	Implementation in instances where workforce engagement and contributions-related discrepancies are reported.
	2	Digitized reporting on workforce utilization according to activities performed in the relevant section.

3	Analyzing the improvement achieved considering operational, economic, and environmental sustainability.
4	Establishing a grievance section for reporting issues faced by the workforce in the organization through digital/manual modes.
5	Final reporting on workforce performance considering psychological, engagement, contribution, excellence, and utilization factors.

The developed framework uses four phases to improve workforce empowerment with an HRM strategy. These phases use a five-action plan to improve workforce outcomes by analyzing factors and attributes on the shop floor. HRM and operations management teams can tackle challenges by resolving the specified issues faced on the shop floor. The developed framework was validated by implementing it in a real-life shop floor scenario. The results assured the feasibility of the developed framework in an SME environment.

5. Implementation of the Developed Framework

The present study focuses on outcomes faced in the case of abandonment, ceasing the operations and negligence of the workforce on the shop floor. These were the prevalent issues in the operational scenario, and the developed framework tackles these issues by implementing a suitable action plan with an HRM strategy. The developed framework is validated by implementing it in a real-life shop floor case where the HRM team was exhausted and looking to resolve employee-related issues instantly and establish sustainable operations management. This example happened within the automobile industry. The organization was selected by reviewing market scenarios on workforce empowerment on the shop floor in SMEs. The study considers manufacturers who encouraged advancement and promoted workforce empowerment in their workplaces but failed to achieve their desired goals. The present research selected an electric vehicle manufacturing organization because they were eagerly searching for a framework to resolve the challenges and issues faced in maintaining much-needed workforce engagement, contributions, and empowerment in operations management on the shop floor. The manufacturer was worried about their chassis manufacturing section because they were continuously failing to achieve the goals due to negligence and incomplete reports in the same section. Figure 6 shows the current shop floor layout.

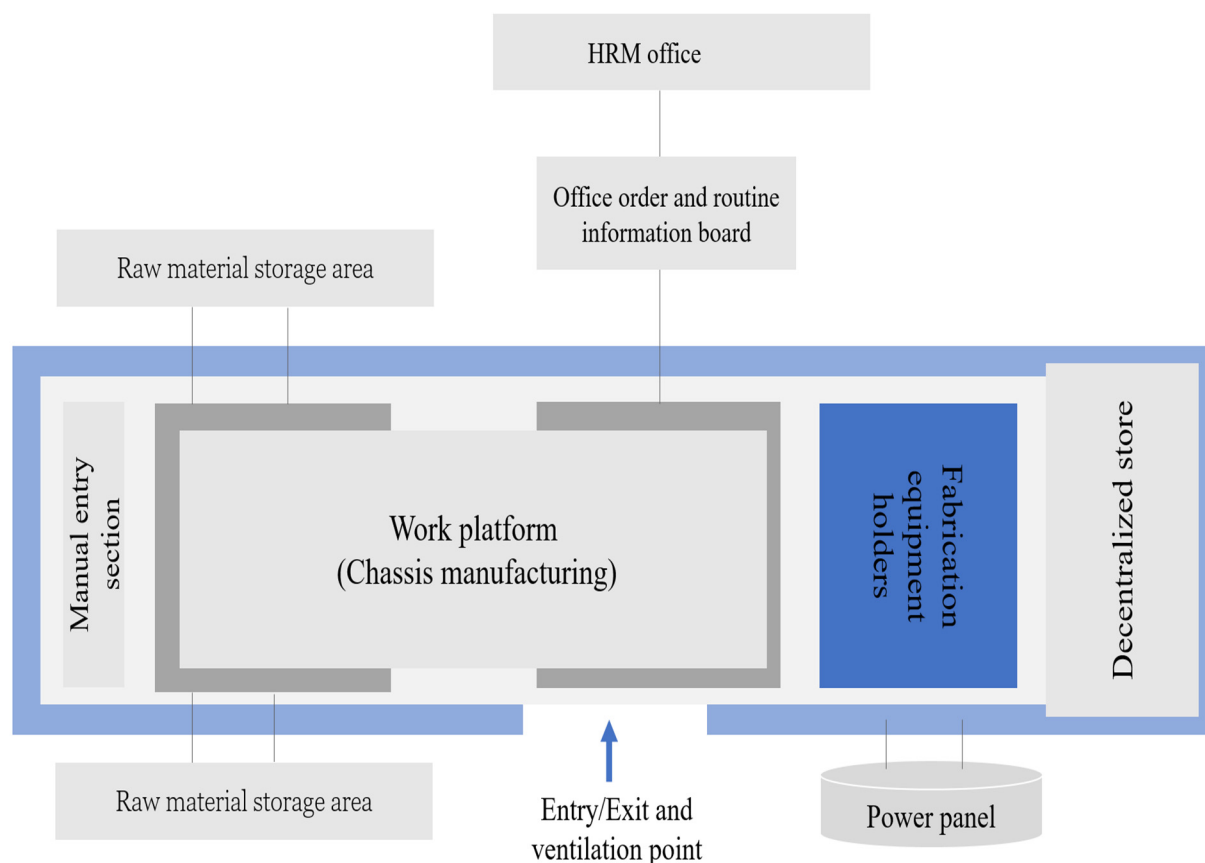


Figure 6. Illustration of the current chassis manufacturing section.

5.1. HRM Analysis

The chassis manufacturing section faced severe problems due to negligence, resignation, transfer applications, lack of collaboration, and absenteeism. The company was located in the national capital region of India. The company reports showed significant variation in workforce contributions, rapid transfers, and job changes. This habit had a drastic impact on industry outcomes, ultimately leading them to the brink of disaster. The developed framework was implemented in one section of the shop floor. Table 4 shows the details of the real-life case example.

Table 4. Details of the current shop floor section.

Sl No.	Information	Source	Detail
1.	Section	Observation	Chassis manufacturing
2.	Working time	Documentation, conversation	08:00 a.m.–05:00 a.m.
3.	Break time	Documentation	12:00 a.m.–12:50 a.m.
4.	Workers (Unit)	Documentation	56
5.	Departments	Observation	13
6.	Safety plans	Observation	Available
7.	Health insurance	Observation	Not available
8.	Leaves	Documentation	4 Sundays + 1 casual leave
9.	Salary structure	Observation	Not available
10.	Lunch section	Documentation	Available
12.	Innovation centre	Observation, conversation	Not available
13.	Grievance section	Observation	Not available
14.	Incentive plan	Conversation	Available

15.	Issues	Observation, conversation, documentation	Rapid transfer, resignation, negligence, lack of contribution
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The HRM team helped by analyzing the relevant information for understanding the actual problems that generated dilemmas when planning suitable solutions. The current manufacturer was worried because of unexpected conditions and customer pressure when completing demands within the available budget.

5.2. Shop Floor Environment

The documentation revealed discrepancies in the operations management and HRM strategy. Several issues were observed at workstations, including the absence of work platforms, the location of flexible machinery, manual operations, inadequate protective equipment, insufficient ventilation, manual scheduling, unequal remuneration despite working in challenging conditions, and the repetition of the same posture when performing operations on the shop floor. Figure 7 shows the developed shop floor layout after analyzing relevant factors. The developed framework was implemented in the investigated case in order to achieve suitable improvements in workforce empowerment. Operations planning teams allotted the workforce on the shop floor as needed, but it was observed that workforce allocation planning was inefficient in achieving the desired outcomes. The workforce was unable to work effectively as a team due to a lack of collaboration and a poor work environment. Several challenges and issues were found on the shop floor, including workforce exhaustion, insecure platforms, biased allocation, negligence, and performance deterioration. A thorough discussion and observation revealed discrepancies in operations and the HRM system. The reports were collected from previous results, current observations, and conversations with relevant departments. The authorities emphasized an innovative framework for tackling the issues faced in workforce empowerment in operations management on the shop floor.

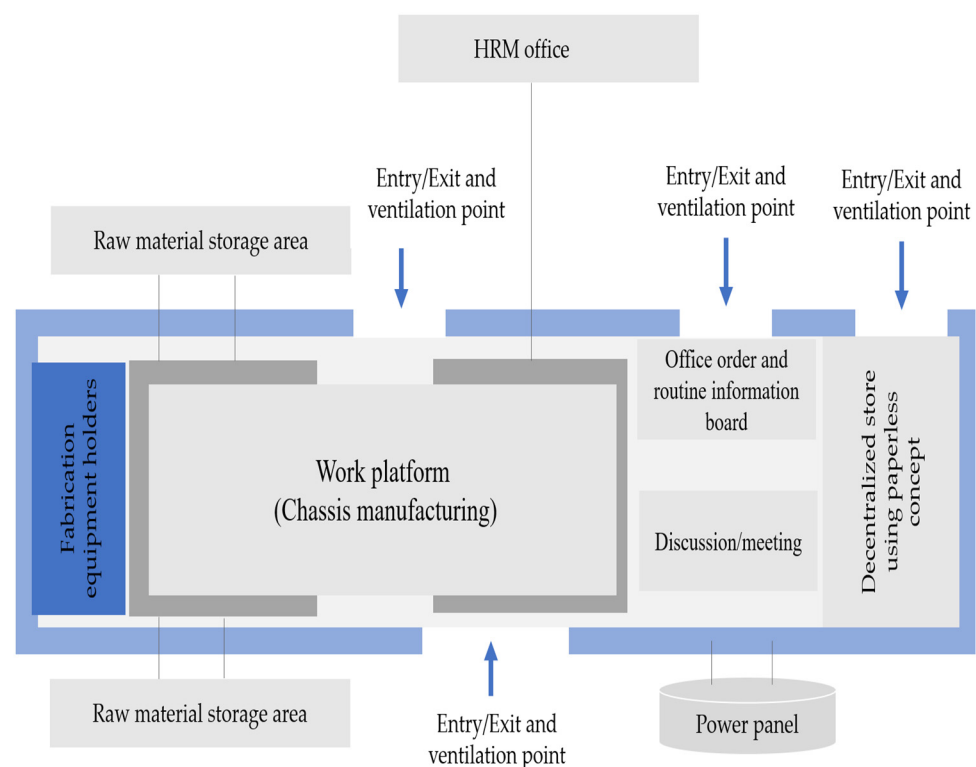


Figure 7. Modified chassis manufacturing section.

5.3. Regulation Plan

HRM and operations teams directed an appropriate action plan for amendments in the shop floor work environment. These amendments aimed to help achieve operational and environmental sustainability within the constraints of the relevant departments. HRM teams analyzed different factors, including work environment, HRM practices, monitoring plan, and workforce views for the operational scenario. This analysis helped in preparing a strategy for eliminating issues in workplace operations management. Table 5 describes the strategy implemented to improve workforce contribution on the shop floor. Five prevalent attributes were considered for enhancing workforce contributions on the shop floor. These attributes play a vital role in achieving desired outcomes in SMEs.

Table 5. Details of strategies implemented, considering attributes.

SI No.	Attributes	Strategy
1.	Workforce	• Recruitment of experienced personnel in the same field. • Three days of training periods, including learning and testing. • Planned Excel spreadsheet for workforce deployment. • Transparent report on workload data. • Digital guidelines and protocols. • Online reporting and monitoring.
2.	Shop floor	• Systematic workload planning. • Maintaining a scheduling plan according to resource availability. • Implementation of lean principle for the elimination of idle activities. • Operations performance controllers and centres for activities outcomes. • Real-time operations and resource monitoring. • Workforce allotment considering operational conditions.
3.	HRM	• Providing break times in a categorized format. • Establishing amenities area for operators. • Planning systematic leave applications. • Balanced load distributions. • Systematic health policy according to age groups.
4.	Operations management	• Centralized store management for mitigation of excess motion. • Expert and skilled operators in each operation. • Flexible selection of machinery and layout to eliminate idle time. • Panels for safety purposes on the workstations. • Fixed foundations for the fabrication process with systematic tools and caddies.
5.	Technological advancement	• Smart equipment for information exchange. • Real-time operations and workers' performances. • Remote access facility for scheduling and allocation corrections. • Paperless mapping for operations and workforce flow on the shop floor. • Digital display to describe the current shop floor conditions.

The strategies discussed in Table 3 were implemented in the chassis manufacturing section because the manufacturer was reporting numerous problems from the HRM and operations teams. These strategies were prepared through meetings and conversations with personnel from the same sections. The strategy was planned according to attributes, conditions, and performances on the shop floor.

6. Result and Discussion

The study emphasizes enhancing workforce empowerment by fostering a cleaner and more organized work environment. Cleaner workplaces help mitigate distractions and improve psychological empowerment. The developed framework meets the

manufacturer's needs by utilizing HRM teams within the required constraints. HRM and operations teams collected the information and suggestions given by the planning and grievance department. The operations and HRM teams arranged the data according to priority and similarity. Priority refers to the conditions where significant discrepancies were reported. The similarity refers to the reported types of issues and challenges, which include biased allocation, lack of protective equipment, unplanned activities, and biased appreciation. These data were confidential and submitted to a separate department that was controlled by superior authorities. The grievance reports were collected online and offline. The relevant authorities provided a suitable format for describing the issues and offered appropriate suggestions for amendments. The workforce suggested several amendments for operations and human resource management on the shop floor. The figure illustrates the modifications implemented after analyzing reports submitted to the grievance department in both online and offline modes. The operations and human resources teams made suitable modifications to the layout and asset management on the shop floor. The modified layout was approved after discussion and meetings with operators and supervisors. Table 6 presents the revised workforce allocation plan and amendments needed to meet the expectations of the relevant manufacturer.

Table 6. Details of the modification plan.

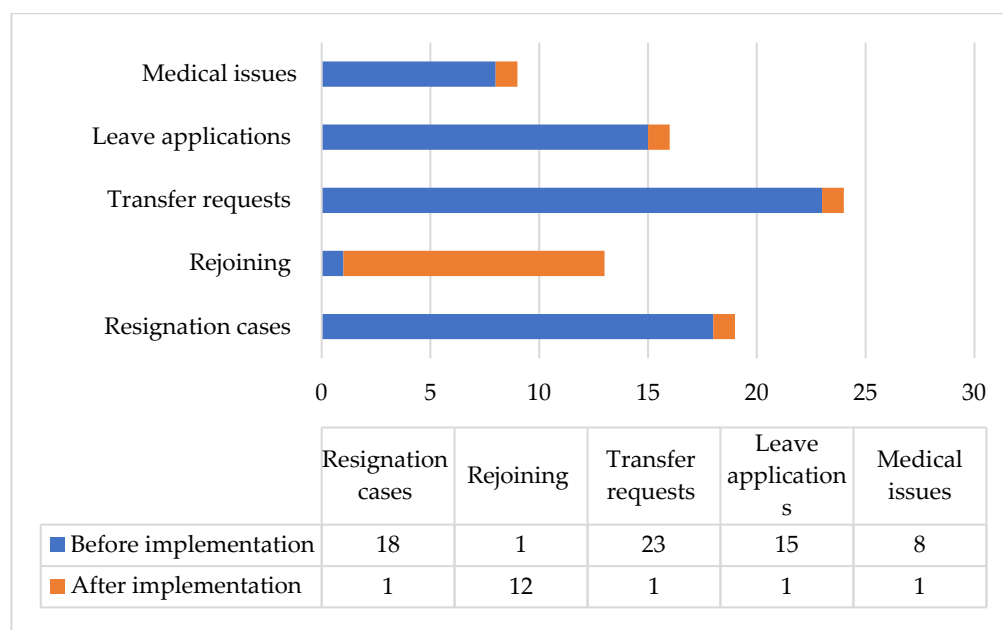
Department	Workforce (Unit)	Modification
Human resource	9	Rotational deployment of two individuals for audit reporting.
Operations head	2	Collaboration for making minor/significant improvements
Raw material storage	5	Online data transaction within storekeepers
Decentralized storekeeping	3	Digitized recording and monitoring
Manual entry section	3	Make a separate section in the decentralized store
Power controlling	4	Automatic power supply system
Design	2	Prior planning and sharing expertise
Fabrication	8	Flexible scheduling and allocation
Finishing	3	Deployment of suitable operators according to availability
Quality inspection	5	Separate scheduling for investigation
Alignment testing	3	Prior training for analysis and measurement within the limited time
Follow-up care	3	Digitized reporting with rotational-based allocation in collaboration with the quality inspection department
Maintenance	4	Intelligent sensor-based condition monitoring and diagnostics

After acknowledging the framework on the shop floor, the HRM and operations management teams reported several improvements by analyzing the suggestions. The operations and HRM teams prepared a modified plan for the current section and workforce allotment on the shop floor. The modifications suggested for various activities performed in chassis manufacturing improved outcomes on the shop floor. Their engagement and contributions increased workforce performance and also enhanced operational sustainability. The suggestions created a positive work environment on the shop floor and encouraged the workforce to achieve the manufacturer's targets within the available conditions. The HRM and operations teams analyzed the daily data and implemented individual appreciation policies for employees who completed their tasks. This appreciation tradition established a platform that was mentally and physically equipped to achieve operational and workforce sustainability. Table 7 presents the improvements in various factors and parameters following the implementation of the developed framework.

Table 7. Details of the improvement in factors and parameters.

	Observed Condition	After the Implementation of the Developed Framework
Resignation cases	18	0–1
Rejoining	1	10–12
Transfer requests	21–23	0–1
Leave applications	14–15	1–2
Medical issues	7–8	0–1
Production on time	2 to 3	Completion on time
Machinery malfunctioning	12 to 15	0–1
Manufacturing defect	23 to 25	1–2
Shop floor utilization	65% (actual output—6–7 units, potential output—11 units)	98% (actual output—10–11 units, potential output—11 units)
Accidents	18 to 26	0–1

After implementing the developed framework, the operations management and HRM teams reviewed the results for the next three months. The data was collected by reviewing the chassis manufacturing section by observation, interviews, and conversations with operators from the relevant departments. The observation reports verified the improvements on the shop floor. The interviews and conversations were organized individually after obtaining permission from higher authorities. The report showed drastic improvement in workforce contributions as a result of HRM policy, and all discrepancies were resolved as reported in previous workplace conditions. Figure 8a–c illustrate the improvements achieved in the chassis manufacturing section, considering operations and HRM performance on the shop floor. Table 8 describes the improvement in attributes over the next three months.

**(a)**

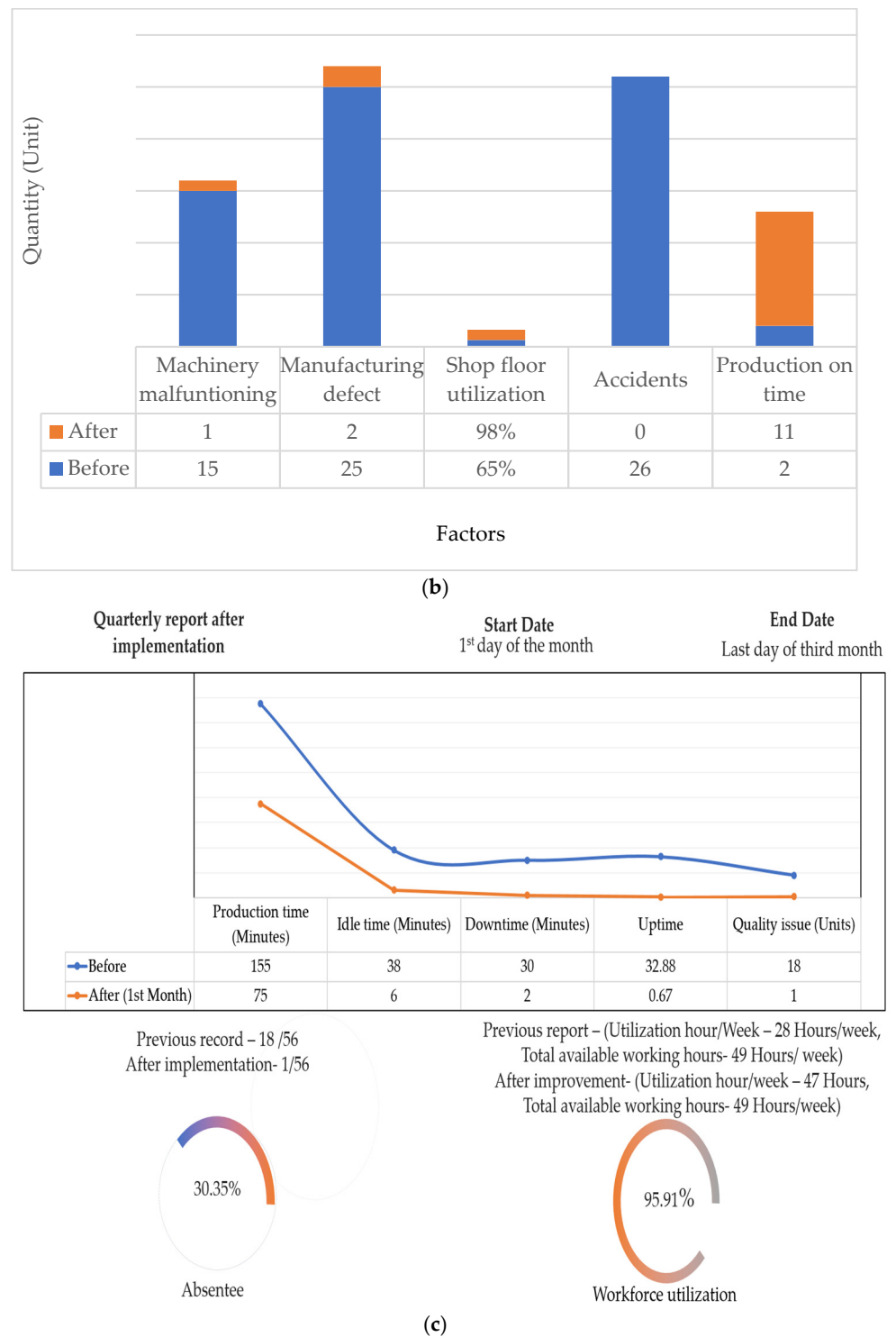


Figure 8. (a) Improvements in HRM outcomes. (b) Improvement in operations management outcomes. (c) Description of reports over the next three months considering workforce and factors on the shop floor.

Table 8. Analysis of the improvement achieved over the next three months.

Implementation Status	Attributes	First Month	Second Month	Third Month
Before	Idle time (Minutes)	5460	5670	5460
	Utilization time (Hours)	121.33	126	121.33
	Absentees (Units)	18	17	17
After	Idle time (Minutes)	520	540	520
	Utilization time (Hours)	203.66	211.49	203.66

Absentees (Units)

0

1

0

Operations and HRM teams collected three months of shop floor data after implementing the developed framework in the chassis manufacturing section. It was observed that the number of reported medical issues was 7–8, but according to the analysis, the number of medical issues reported was 14–15 because there were some individuals who worked in more than one department. The monthly report showed that the number of reported medical issues reduced from 15 to 1, but, in fact, it reduced from 8 to 1. Similarly, the number of absentees was reduced by 18, from 56 down to 1. The number of resignation applications was reduced by 17, and the number of transfer requests was reduced by 23 to 1. These results revealed a drastic improvement in workforce empowerment in the existing work environment by reducing the number of absentees, resignations, transfers, and medical issues by 30.35%, 94.44%, 95.65%, and 93.33%, respectively. The data report showed enhancements in operations and workforce outcomes within limited constraints. The results showed that the developed framework can fulfil the needs of SMEs through suitable operational and working environment amendments. Comparative analysis between relevant previous research and the present study is shown in Table 9.

Table 9. Comparison between previous results and the present study outcomes.

SI No.	Parameter/Factor	Improvement/Reduction	
		Previous Study	Present Study
1	Idle time	Tang et al. [153] reduced by 20%	Reduced by 91.42%
2	Absentees	Tarro et al. [154] reduced by 44.25%	Reduced by 94.44%
3	Resignation	Njau et al. [155] revealed that strategic policies and empowerment play a vital role in the reduction in resignation rates.	Reduced by 94.44%
4	Accidents	Tang et al. [153] reduced by 15%	Reduced by 96.15%
5	Shop floor utilization	Das et al. [156] improved shop floor utilization by resolving congestion issues.	Improved by 98%
6	Manufacturing defect	Amrani et al. [157] reduced by 66%; Gijo et al. [158] reduced by 85.26%	Reduced by 92%
7	Downtime	Kazmierczak et al. [159] revealed that the downtime can be reduced by proper scheduling.	Reduced by 93.33%

The current study presents a leading-edge workforce empowerment framework for addressing the dilemmas faced by operations and HRM teams in controlling performance parameters on the shop floor. Adu et al. [160] utilized AMO theory to examine how Green Employee Empowerment (GEE) mediates relations between Green HRM and environmental performance in Ghana SMEs. The study found that GHRM practices improve environmental performance both directly and indirectly through GEE, based on data from 322 respondents. This shows the crucial role of GEE in enhancing the impact of GHRM on environmental outcomes. Tasleem [161] examined the evolution of HR technology and the role of people analytics in contemporary HRM practices. This paper reviewed literature, case studies, and trend analysis to conclude how businesses use analytics-driven strategies to enhance and optimize their workforce. It also discusses challenges such as data privacy, employee resistance, and implementation costs.

Atnafu and Balda [162] examined the relationship between inventory management and firm's competitiveness and organizational performance and stated that operational performance significantly impacts the performance of the business via expense costs, quality, and delivery. Gao [163] revealed that Maslow's hierarchy of needs has been influencing organizational behaviour for a very long time, and it has also been a great source of employee motivation. The study focused on the importance of employee needs based

on Maslow's hierarchy and found that it aided managers in identifying the needs of employees in order to increase productivity. Akinyetun [164] discussed how organizations aim to increase productivity by aligning employee's well-being with organizational goals; thus, Maslow's hierarchy of needs helps in identifying worker motivation, starting from basic amenities to the self-actualization needs of individuals. It focuses on how fulfilling these five types of needs can lead to the formation of engaged and high-performance teams, which, in turn, leads to increased productivity through people-centric management. Murphy [165] proved that Herzberg's two-factor theory has played a vital role in improving employee productivity in the retail sector. With the help of hygiene factors and motivators (job security, job satisfaction, recognition, and growth), turnover can be reduced, which also enhanced motivation among employees. It also noted that efficient HR practices and adaptive leadership coincide with Herzberg's model, further enhancing retention and boosting employee performance. Michelsson [166] proved the importance of Maslow's hierarchy of needs in enhancing employee productivity, highlighting that when an organization met employee needs, including recognition, belonging, and self-actualization, this gave rise to motivation. This study also features key drivers such as feedback, team support, and well-being, which harmonize with Maslow's hierarchy of needs, proving that achieving these needs enhances performance and workplace engagement. Nguyen et al. [167] discussed that the key to organizational performance is motivation, which Maslow's hierarchy of needs also suggests. Nguyen, in this study, revealed that growth opportunities, recognition, and positive relationships influence employee motivation to a great extent, and these are also the main drivers of Maslow's hierarchy of needs. Bexheti [168] authenticated the importance of Herzberg's two-factor theory in achieving employee productivity in the retail sector. This study found a potent link between motivation and productivity, including hygiene factors such as compensation, workplace relationships, job security, and job satisfaction; these were found to have a much larger impact than the motivators. This emphasizes the need for managers to prioritize both hygiene and motivational factors, enabling the organization to become more productive and retain satisfied employees.

6.1. Role of Decision-Making Planning for Operation and HRM Excellence

Industry personnel approach frequent workflow on the shop floor with suitable decision-making planning. Decision-making planning helps mitigate the possibility of failure by controlling the performance of various attributes on the shop floor. Industry personnel are able to feel mental and physical relaxation after the acknowledgement of efficient decision-making planning. The present study developed a novel framework for enhancing operational outcomes on the shop floor using HRM policies. The framework helps develop a healthy work environment, assures all employees that they are completely safe, and encourages them to commit to delivering the best possible results. HRM teams can perform high-quality work in dynamic work environments and achieve the goals of SMEs. The developed framework suggests a decision-making plan for maintaining shop floor standardization within limited constraints. Figure 9 shows the decision-making planning for achieving operations and HRM excellence. The decision-making plan consists of guidelines and an action plan for tackling shop floor performance in terms of workforce and operational factors. The guidelines show the directions for controlling workforce performance efficiently on the shop floor. The authorities can choose a suitable approach for enhancing workforce performance if they face any challenges in performance on the shop floor. The action plan is used for analyzing operations and workforce performances on the shop floor. The analysis helps in beginning suitable traditions and policies for eliminating negative thoughts with a positive work environment within the constraints of the manufacturer.

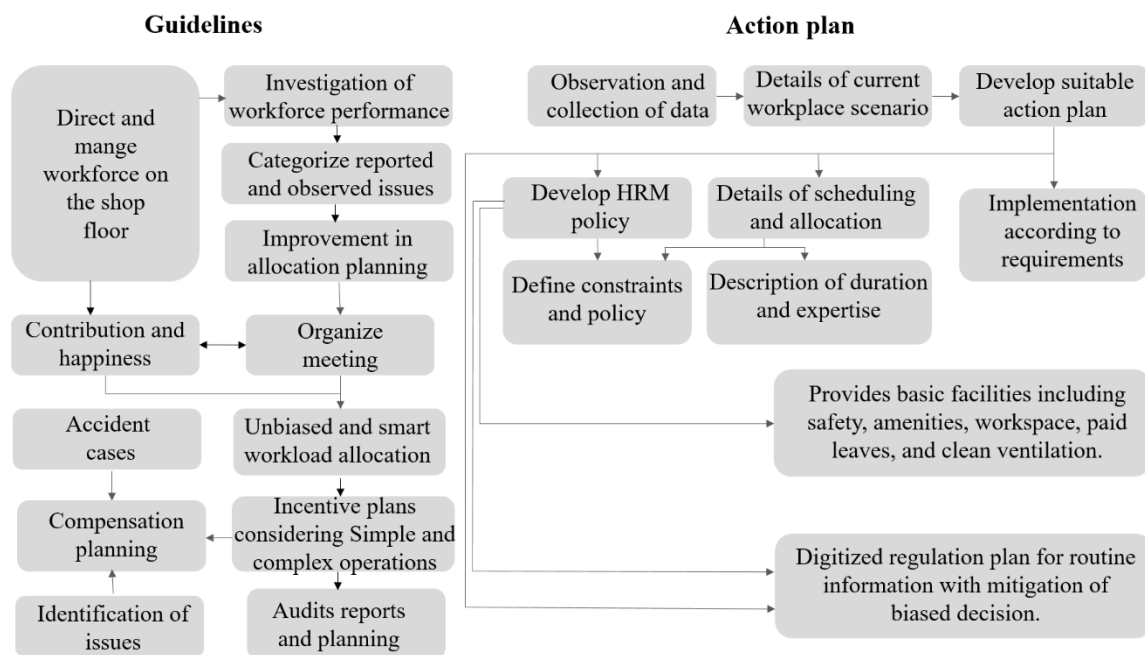


Figure 9. Suggested decision-making planning.

6.2. Technological Advancement for Enhancing Managerial Impacts on the Shop Floor

Technological advancements attract the attention of manufacturers toward emerging technologies, leading them to implement these technologies in their work. Emerging technologies can be used to help resolve challenges and issues faced by relevant departments on the shop floor. Several emerging technologies, including the Internet of Things, big data, digital twin, cyber-physical systems, cloud, etc., are implemented in order to mitigate issues faced on the shop floor. These technologies establish an innovative work platform for achieving the desired standards of excellence with zero gap in the communication reports. The present study developed a framework for identifying issues responsible for deteriorating workforce contributions using HRM principles on the shop floor. The developed framework helps in the identification and elimination of issues in operations and HRM. The developed framework enhances the contribution of the workforce and also eliminates concerns about safety on the shop floor; thus, they are more likely to be dedicated to delivering the best results. Figure 10 describes the contribution of technological advancements in enhancing workforce empowerment on the shop floor. The contribution describes the benefits of the developed framework in tackling the issues in operations and workforce management on the shop floor. The framework helps operations and human resources teams combat issues in flexible work environments within confined constraints. Operations and human resource teams can direct the workforce in achieving operational sustainability by establishing an innovative work platform. Innovative platforms use paperless and cutting-edge technologies to resolve operations and workforce-related issues in the current SME scenario. The study shows that the operations and human resources teams can achieve operational, environmental, economic, and workforce sustainability on the shop floor.

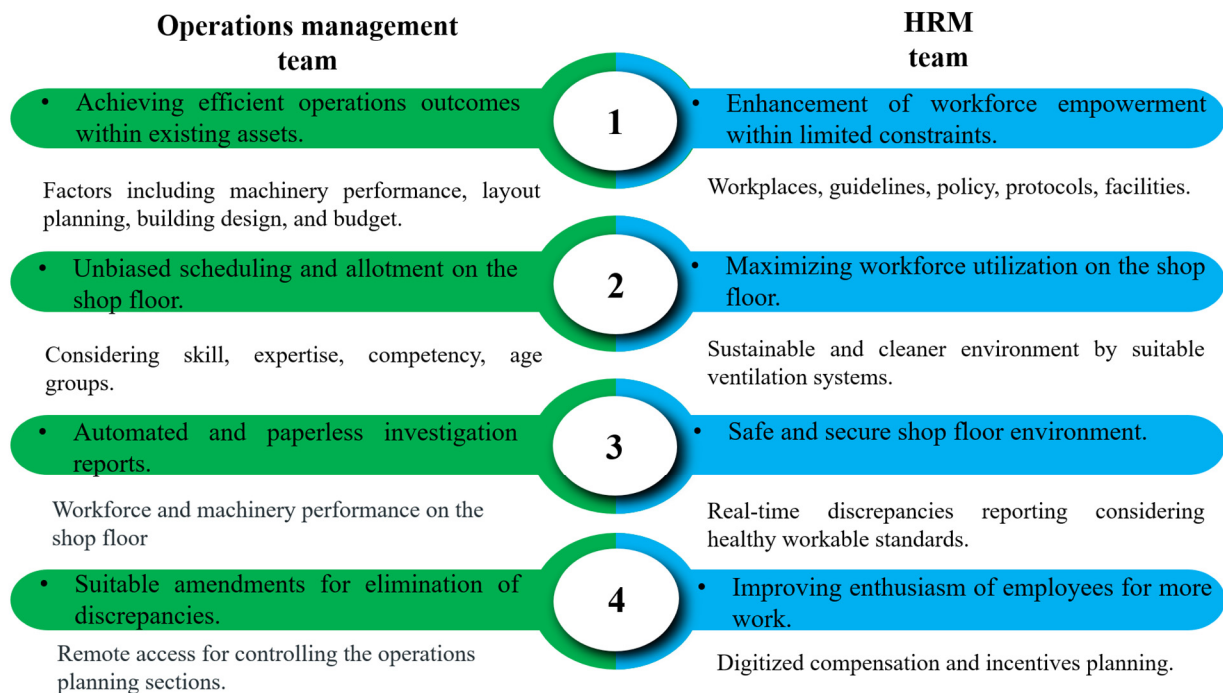


Figure 10. Contribution of the developed framework.

7. Conclusions

Workforce empowerment plays a vital role in achieving desired goals within limited constraints on the shop floor. Operations and HRM teams may create suitable action plans for resolving workforce-related issues; however, when worker contributions are lacking, they fail to rectify these problems using the available resources. This study reviewed the challenges and issues faced by operations and HRM teams in controlling workforce contributions. These challenges and issues significantly reduced the workforce's attentiveness and diminished their contributions to SMEs. The current research integrates operations and human resource management practices in order to tackle issues in flexible shop floor environments. This study helped to leverage the impact of operations and HRM practices on the shop floor and eliminate the chasm between introducing cutting-edge technologies and their adoption by the existing workforce. The present study developed a framework for identifying and tackling the problems responsible for the deterioration in workforce contributions using human resource management practices on the shop floor. The feasibility of the developed framework is verified in a real-life shop floor scenario of an electric vehicle manufacturing organization. The authors sought the help of industry personnel from the department in question in order to implement suitable amendments. The applicability of the developed framework was verified by extracting reports over a period of three months from the relevant shop floor section. Operations and HRM teams analyzed the data over the next three months, considering the workforce, operations, and resource performances after implementing the developed framework in the selected shop floor section. Both teams helped in explaining the applicability of the developed framework in the current SMEs scenario by discussing precise information, including observed conditions, actual conditions, and improved conditions. This discussion aided in achieving the required improvements after implementing the developed framework in a manufacturing scenario. The teams revealed that the discrepancies in reporting sections were due to workforce negligence, communication gaps, unrestricted data access centres, and a lack of allocation and scheduling on the shop floor. The results revealed a drastic improvement in workforce empowerment in the existing work environment by reducing the

number of absentees, resignations, transfers, and medical issues by 30.35%, 94.44%, 95.65%, and 93.33%, respectively. The operations and HRM teams assured us that the developed framework had proven to be a miracle for their organization. The study also provided a decision-making suggestion plan for controlling and monitoring workforce empowerment in SMEs. It helps by taking appropriate and clever paths to eliminate the issues generated in a negative work environment. This study also helped to maintain workforce contributions in an industry transformation and revolution scenario, considering Industry 3.0–4.0, 4.0–5.0, and 5.0–6.0. Operations and human resource management can collaborate effectively in order to achieve their desired goals after achieving workforce empowerment in SMEs. The developed framework fulfils the manufacturer's goals with minimum hurdles and challenges.

8. Future Research Direction

The results suggest that operations and human resource teams can integrate emerging technologies with human resource practices in order to analyze workforce empowerment and maintain operational and workforce sustainability within the circumstances and constraints of specific SMEs. Our research suggests that cutting-edge technologies can be used to resolve human resource and operations management loopholes in real-life scenarios, as well as promoting intelligent shop floor platforms for suitable work alignment, strategic allocation, and a sustainable environment within SMEs. Furthermore, operations and human resource management teams can collaborate with individuals in order to enhance workforce empowerment with paperless and digitized solutions for tackling dynamic work scenarios on the shop floor in SMEs.

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