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Operational Excellence and Management at Eicher Service Centre

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I. INTRODUCTION

The commercial vehicle sector is the silent arteries of global trade, the unseen arteries which transport goods, carry passengers, and ensure public safety in every developed and emerging financial system. Today, mechanical brute strength is no longer the only hallmark of the sector; it is a deep passion for scale, tenacity, and reliability in operation, now more often than not in an electric/digital form. This industry includes a very broad classification of motor vehicles engaged in business or for profit, separate from those used in personal transport, and primarily for financial gain in fulfilling a demand for supply. The definition of a commercial vehicle is elastic and can differ from region to region and regulation to regulation, and impacts registration, insurance, tax, and management of fleets. For example, in the U.S., a commercial vehicle is usually defined as any machine with a Gross Vehicle Weight (GVW) greater than 4,536 kg or designed to carry more than eight passengers for hire, while in Europe and India, the definition is more strictly tied to the Gross Vehicle Weight (GVW) limits.

A. *Categorization Frameworks and Segmental Definitions*

The backbone of the commercial vehicle market is a intricate classification framework, which not only determines regulatory adherence but also influences the practical use of commercial vehicles in everyday operations. These classifications are mostly based on tonnage, as this is a good indicator of payload capacity and engine needs.

1) *Regional Variations in Weight Classification*

The European market is divided into Light Commercial Vehicles (LCV) up to 3.5 tonnes, Medium and Heavy Commercial Vehicles (MHCV) over 3.5 tonnes and Heavy Commercial Vehicles (HCV) over 16 tonnes, as reported by the organization des Constructers Europeans d'Automobiles (ACEA). Passenger carrier are individually defined as Buses and Coaches (BC) >3.5 tonnes. This contrasts from the Indian classification system that is peculiar to the needs of an emergent infrastructure. In India LCVs refer to vehicles having a GVW of less than 7.5 tonnes and M&HCVs are for those with a GVW of over 7.5 tonnes. The Indian M&HCV segment is then segmented into in-between Commercial Vehicles (ICV) of 7.5-12 tonne, Medium Commercial Vehicles (MCV) of 12-16.2 tonne and Heavy Commercial Vehicles (HCV) above 16.2 tonne..

Vehicle Category	European Threshold (GVW)	Indian Threshold (GVW)	US Tonnage Equivalent
Light Commercial Vehicle (LCV)	3.5 tonnes	7.5 tonnes	category 1–3 (under 14,000 lbs)
Medium Commercial Vehicle (MCV)	3.5 – 16 tonnes	7.5 – 16.2 tonnes	category 4–6 (14,001 – 26,000 lbs)
Heavy Commercial Vehicle (HCV)	> 16 tonnes	> 16.2 tonnes	category 7–8 (> 26,001 lbs)
traveller Carriers	> 3.5 tonnes	Application-based	Large Shuttles/Transit Buses

B. *Company Profile: Eicher Motors & Service Operations*

Eicher Motors Limited: Corporate Profile and Strategic Service Operations is a brand-new report by GlobalData.Eicher Motors Limited: Corporate Profile and Strategic Service Operations is a brand new GlobalData report.

Eicher Motors Limited (EML), the parent company of the iconic Royal Enfield motorcycle brand, is a leader in Indian transnational automotive industry, having a business partnership with the Volvo Group for the manufacture of commercial vehicles in the global markets in terms of standards.Eicher Motors Limited (EML) is a premier Indian transnational automotive company and the parent company of Royal Enfield motorcycles, as well as a business partner with the Volvo Group for the manufacture of commercial vehicles in the global market, based on the standard. EML is based in New Delhi and has grown since the mid-20th century from a tractor importer to a diversified power source for automobiles with a market capitalization of ~$21.3 billion (as of early 2026). It is a key player in the Indian automotive industry, characterised as having "frugal engineering", a premium positioning and highly digitised service ecosystem.

1) Historical Evolution and Corporate Structure

The company can be traced back to the Goodearth Company founded by Vikram Lal in 1948 to import and service foreign-made tractors in India. It saw a significant change in 1958 when the Eicher Tractor Corporation of India was established and the first indigenous tractor manufactured in 1959.

The modern EML structure is defined by two primary business segments:

- Royal Enfield (Royal Enfield): Royal Enfield was a world leader in the middleweight motorcycle segment (250cc - 750cc) and was a subsidiary of EML since the company bought a controlling stake during the 1990s.
- VE Commercial Vehicles (VECV): VECV was created in July 2008 as a 50:50 joint venture with the Volvo Group. This company oversees the entire portfolio of Eicher's trucks and buses, Volvo buses and the exclusive dealership of Volvo trucks in India.

Financial Performance and Market Position (FY 2024–25)

Eicher Motors' financial results for the 2024-25 fiscal year were the best in the company's history. The company's total revenue from operations increased 14.1% to 18,870 crore (around $2.21 billion) from the previous year. It reported a 18.3 per cent jump in Profit After Tax (PAT) to 4,734 crore.

The commercial vehicle segment saw VECV's sales surpass a flat industry in FY25, rising 6% to 90,161 vehicles. VECV has revenue of more than 23,500 crore for the period, of which the PAT shows a substantial increase of 57 per cent to 1,286 crore. By late 2025, VECV had a decent market share of commercial vehicles, accounting for about 8.05% of the total commercial vehicle retail sales by December 2025.

Financial Metric (FY25)	Eicher Motors (EML Standalone)	VE Commercial Vehicles (VECV)
Revenue from Operations	18,870 crore	23,548 crore
EBITDA	4,712 crore	2,023 crore
Profit After Tax (PAT)	4,734 crore	1,286 crore
Annual Sales Volume	1,002,893 units (Motorcycles)	90,000 units (CVs)

Product group – Market Segmentation Commercial Vehicles (VECV) The Eicher truck and bus range covers the Gross Vehicle Weight (GVW) of 4.9 tonnes to 55 tonnes.

- Light and Medium Duty (LMD): Eicher is a market leader in 5–18.5 tonne segment. The key models are the intra-city logistics Pro 2049 and the fuel-efficient regional transport model Pro 2114XP.
- Heavy Duty (HD): The specialized vehicles such as Pro 8035XM flagship tipper of the company are categorized under the heavy duty segment, which is aimed at mining and heavy construction applications, with the price tag being around 77.99 lakh.

The buses are available in a large range of Eicher's Starline and Skyline Pro 12–72 seated buses, which can be used for school, staff and tourist applications.

An important competitive advantage of Eicher is its "Uptime" philosophy, which seeks to achieve maximum vehicle availability through an integrated service network.

2) The Eicher Uptime Centre

The industry-first Uptime Centre, at VECV head office, is staffed by 160 professionals, and operates 24x7 to keep a check on more than 110,000 connected vehicles from a remote place.

- Predictive Diagnostics: The centre utilises AI and machine learning to foresee mechanical issues and warn drivers and fleet managers in real time.
- Resolution Efficiency: The centre is able to resolve more than 98% of reported issues in record time of 4 hours.

Dealership and 3S Network VECV has a large network of more than 990 touch points spread across India & exporting to more than 40 countries in the world. The company's attention is on "3S" facilities, including the 30,000 sq. ft. facility launched in August 2025 in Agartala to serve the logistics needs in the North-East region of India.

3) The MyEicher Ecosystem is a digitalization

More than 275,000 Eicher's trucks and buses are linked to the Uptime Centre via the MyEicher app, and the app is the digital embodiment of Eicher's strength as a service provider.

- Fleet & Fuel Management: Operators can monitor real-time fuel expenditure, fueling events and potential fuel theft without need for any additional sensors.
- Workshop Tracking: Customer can see the status of their vehicle being repaired from booking to delivery – make sure there are no doubts in the service phases.
- EV Services: EV-specific modules are included in the app to monitor battery "State of Charge", EV charging usage and carbon footprint reductions for the growing electric vehicle fleet**.**

4) Future Strategic Outlook

As the company looks forward to 2026, Eicher Motors has three strategic priorities:

- The company will start commercialization of a new Small Commercial Vehicle (SCV) range in early 2025, entering into the high volume last mile delivery market.
- Electric-First Strategy: VECV is actively investing in the electric bus and LMD truck sectors and is collaborating with various stakeholders such as Tata Power to establish charging stations.
- Manufacturing Expansion: VECV has set up new manufacturing units in Industry 4.0 environment by the proximity to Bhopal and Ujjain for the new Pro X range and also to produce Electric Buses.

C. Problem Statement

A Problem Statement and Analysis of Eicher Service Operations

The ability of an organized commercial vehicle (CV) service network to maximize vehicle uptime and minimize fleet operators' total cost of ownership (TCO) is used to measure the good organization of the CV service network. Eicher (VE Commercial Vehicles) has placed itself in the Indian market with an "Uptime" guarantee, which is supported by a 24X7 remote observe centres and a digitized ecosystem. But specific bottlenecks in ground-level operations frequently arise that can leave a digital predictive alert and its corresponding physical repairs between each other.

The Uptime Execution Gap includes a statement of the problem.The Uptime Execution Gap contains a problem statement.

The performance of advanced telemetric and an industry first Uptime Centre, comes with important operational challenges at the points of service. These problems are reflected in extended stop times for vehicles, frequent mechanical failures even with high vehicle repair costs, and limited availability of major spare parts in the local area, which renders the "connected" logistics model ineffective.

D. Research Objectives

Focus Area	Core Objective	Key Performance Indicator (KPI)
Customer Experience	make different the brand through emotional connection and superior hospitality	Service fulfilment Index
Operational Uptime	Minimize unplanned downtime for logistics operators	98% resolution in < 4 hours
Digital Ecosystem	Leverage IoT for projecting and down to business maintenance	275,000+ connected vehicles
Technical Competency	Ensure "right-the-first-time" repair quality	lessening in repeat jobs within 15,000 km

II. LITERATURE REVIEW

One of the most significant socio financial changeovers in the past century has been the shift in the global economy from a manufacturing-based system to one driven by services. In the developed countries like the USA, about 78% of the Gross Domestic Product (GDP) is in the form of services, and there is a need for the strict application of industrial engineering (IE) principles in such non-tangible value streams. In the past, industrial engineering was a discipline confined to the factory floor, with an interest and an approach towards optimization of physical equipment, get-together lines and materials management; today, however, as the tertiary sector grows, the basic principles of the discipline, such as systems thinking, optimization, ergonomics and quality organization, are taking on a new meaning and new applications in order to improve productivity and efficiency in banking, healthcare, retail, hospitality and public administration. This review investigates the systematic incorporation of these principles, and how the new conditions created by the advent of Industry 4.0 and 5.0 technologies offer a new digital foundation for optimizing multi-faceted service systems.

A. Historical Trajectory and the Evolution of the Industrial Engineering Mindset

Industrial engineering is a field that grew out of the Industrial Revolution of the 18th century, when technology for manufacturing in large volumes rapidly emerged, and a systematic way of designing a system and managing the workforce was required. The early developments were marked by the emphasis on "one best way" work and the use of technical management, which advocated for strict control and quantification in work.In the early developments, Frederick Winslow Taylor's ideas of "one best way" and the use of technical management, promoting strict control and quantification of work, stood out. These were early attempts that concentrated on the mechanical and physical production aspects. The regulation developed over time in the early 20th century and incorporated personality elements, operations research and total quality management; it also transcended the boundaries of the factory to tackle the systemic problem of the wider industry. During this modern age, industrial engineering is going through what is being called a "revolution," whereby its principles are to be applied to every aspect of human activity. Some scholars claim that optimization is not a mere recipe of algorithms, but a mindset that aims to creative problem-solving and a constant revolution. This transformation is especially noticeable in the shift to Industry 4.0 and 5.0. Industry 4.0 was about mechanization, digitalization and Internet of Things (IoT) connectivity, whereas Industry 5.0 is about a human centric industrial ecosystem, sustainable and resilient. Within this context, industrial engineers can be considered as the architect of symbiotic systems, in which advanced technologies such as Artificial Intelligence (AI) and robotics complement and enhance human intelligence.

B. Theoretical Shift from Manufacturing to Service-Dominant Logic

Industrial engineering is applied to services and the service description of intangibility, expire ability, inspire ability and variability requires a nuanced consideration. Service quality is not as easily assessable as manufacturing quality; it is sometimes co-created with the customer. This has resulted in the emergence of 'Service Engineering' (SE) and 'Service Systems Engineering' (SSE) as well-structured and systematic ways to design and deliver high-quality services on a consistent basis. The Product-Service System (PSS) is a good example of this integration as in this concept the company moves from selling products to selling a package of products and services that meets a specific customer requirement. For example, a manufacturer may not sell an engine any more, but instead sell "power-by-the-hour," requiring a service communications, which is stylish, to manage the service life, data monitoring, and presentation.

C. Quantitative Foundations: Operations Research and queue Theory in Services

Use of numerical models to analyze and simulate the behaviour of complex systems is a foundation of the industrial engineering paradigm that has been moving towards.

D. The Mathematical Mechanism of Queueing Systems

Queue theory is a mathematical theory which was first used by A.K. Erlang in 1903 to solve a problem of telephone traffic congestion, and which deals with the occurrence of things (tasks, customers, or data packets) waiting to be served. Throughput, consumption and coming up time are typical metrics used to evaluate the performance of a service system. The utilization factor in an M/M/1 queue with one server, Poisson arrivals and exponential service times is defined as:
Where λ is the arrival rate and μ is the service rate. To ensure stability of the system, service rate should be greater than the arrival rate, or else the queue grows to infinity. With multi-server systems (M/M/c), industrial engineers can calculate the optimum number of servers required to minimize the total expected cost, consisting of the sum of the costs of the service facilities and customer waiting costs.

queue Parameter	Service Sector Application	Implication for Efficiency
Arrival Rate	Rate of customers entering a bank branch or call centre.	High variability necessitates flexible staffing.
Service Rate	Rate at which a teller or agent processes a transaction.	Improvements in service rate through training or tech reduce wait times.

queue Parameter	Service Sector Application	Implication for Efficiency
Queue Length	Number of patients in a hospital waiting room.	Excess leads to "balking" or "reneging" (customer loss).
Waiting Time	Time spent on hold with customer support.	Directly impacts Customer Satisfaction Scores (CSAT).
System Utilization	Percentage of time a consultant is billable.	Balancing avoids employee burnout while ensuring profitability.

E. Applications across Service Verticals

Queuing theory is used in healthcare for optimizing emergency department and outpatient clinic performance to minimize patient waiting times and increase throughput. The ability to simulate various scenarios, including the addition of more examination rooms, or altering the number of nurses, for example, let managers manage patient flow effectively in advance, avoiding congestion. These models can be used in call centres to help decide on the best number of agents and routing options to maintain a particular service level and reduce customer frustration. In the finance industry, queues are used to study the waiting times of customers in banks and the processing speed in electronic trading platforms. Beyond the simple lines, a discrete-event simulation (DES) can be used to model intra-logistics and Outbound Logistics processes in complex manufacturing and service configurations. These simulations provide "what-if" analysis capabilities, enabling managers to see how the system would perform under poles apart effective conditions before making capital-intensive changes.

F. Facility Layout Planning and Spatial Optimization in Service Environments

In any industry that depends on high efficiency and optimum use of the resources, Facility Layout Planning (FLP) is a mandatory job. Although FLP traditionally involved minimization of distance involved in handling materials in a factory, in the service sector, the main emphasis is on minimizing human movement, and accessibility, way pronouncement, and service quality are manifested.

G. Retail and Public Service Layouts

Industrial engineers are also used in retail to study customers' flow and behaviour, and then to improve the physical environment for the customer shopping experience, as well as the operational efficiency. In banking and hospitality, the principles of layout design are key to reformation processes and to minimize waiting time, thereby impacting the satisfaction of the customer. In addition, spatial quantitative analyses such as Geographic Information Systems (GIS) are increasingly applied to design the optimum location of public service facilities. For example, when researchers take spatial risk factors and add those with social media data (traffic, accidents, fires), they can produce heat maps to determine where the best placement to have Emergency Medical Services (EMS) bases could be. It is found to be an effective integrated solution that can enhance the amount of urgent situation requests covered and minimize the number of active ambulance bases needed.

H. Ergonomics and the Human-Centric Design of Work Systems

Ergonomics, also known as human factors engineering, is the science of work and the workers. The fundamental postulates are that it is essential to design systems and workstations that are comfortable, safe and productive, to make the job fit the worker's ability and limitations. Ergonomics plays a key role in the service industry where it helps avoid and stop work related disorder (MSDs), which occur when work demands are greater than a person's working capacity.

I. Physical and Cognitive Ergonomics

Boring movement, forceful exertion and uncomfortable postures. Today, in an inactive office environment or in technology driven data centres, ergonomic injury may occur from extended sitting time or poor static postures. Adjustable ergonomic chairs, appropriate desk heights, and the placement of display devices are key components to a proper workstation design to help maintain worker health. However, the field has grown to incorporate cognitive ergonomics, which is connected with sustainability through cognitive factors such as situational awareness, human reliability and decision making. In AI-integrated, highly developed service systems, supervising the cognitive burden of employees is as crucial as supervising their physical health when humans interact with AI and highly developed digital tools. This method of design is human centered and ensures the output of the system is in alignment with the desired goal(s) and supports the health and satisfaction of the workforce.

J. Innovations in Ergonomic Design

With these advanced tools, biomechanical capacity can be quantified and a quantitative comparison can be made of the effectiveness of the various workstation configurations. During Industry 5.0, the "human touch" is added once again, and technology is employed to complement the creative and efficient human workforce, and not to replace it.

Ergonomic area	Primary Focus in Services	Key IE interference
Physical Ergonomics	Position, seating, and repetitive strain (RSI).	Adjustable workstations and frequent postural changes.
Cognitive Ergonomics	Mental workload, decision-making, and error prevention.	Design of intuitive user interfaces and AI-assistants.
Organizational Ergonomics	Work schedules, communication, and management structures.	Flexible shifts and team-based problem-solving.
Environmental Ergonomics	Lighting, noise, and climate within the service space.	Optimized layouts to minimize noise and maximize light.
Socio-technical Ergonomics	Interaction between social systems and tech platforms.	Designing for inclusivity and ethical tech deployment.

K. Service 4.0: Digital Transformation and Advanced Technological Integration

The concept of "Service 4.0" is the result of a transformation, commonly referred to as Industry 4.0, that has profoundly impacted the service industry. The period is characterized by the use of innovative digital solutions, including the Internet of Things (IoT), Big Data Analytics, Cloud Computing and Artificial Intelligence (AI), in order to optimize service provisioning and develop new business models.

L. The Technology Interdependency Triad

In the service industry, technological modernization, technology services organization, and people management form a virtuous trio that contributes to the successful implementation of Industry 4.0.

1) Technological Innovation: Encompasses the technical skills needed to adopt cutting-edge technologies such as AI chatbots, IoT sensors, and blockchain to streamline processes and improve customer satisfaction.
2) Technology Services Management: It concentrates on the strategic relationship with partners and the stability of infrastructure, with the main emphasis being on having a strong cyber security protocol to ensure data protection, as well as service stability.
3) People Management: Enables the crucial "human factor" by training staff, overcoming resistance to change and appreciating ethical issues in the managerial civilization.

M. Strategic Implications of AI and IoT

The emphasis of a Service 4.0 is artificial brainpower, and it's the key to enhancing the showing of other technology. It enables the development of "AI-as-a-Service" (models, which provide included bundles of products and services that were previously abstract concepts. Predictive preservation, real-time monitoring and autonomous decision-making are now being utilized in many industries, including energy, aerospace and precision developed, with the help of AI and Machine Learning. Likewise, the Internet of Things is considered as an enabling technology for digital servitization. More IoT platforms are available to continuously monitor product functionality, thus enabling "results-oriented" PSS, which is a PSS approach where the customer pays for the results ('uptime' or 'units produced' etc.) instead of a 'price'. The virtual replicas of building or service systems, known as digital twins, include human behavioural models and real-time feedback loops to allow stylish “what if” scenario planning.

N. Industrial Engineering in Banking and Financial Services

The monetary services sector has been a pioneer in adopting industrial engineering principles to cope with intense opposition and the rise of FinTech. By applying IE tools, banks can make more efficient their operation, reduce costs, and provide a more customer-centric experience.

O. Business Process Re-engineering (BPR)
BPR is a radical redesign of a business process that involves basic re-thinking and a fundamental re-design of the business process to realize dramatic improvements in any of the critical appearance measures, such as cost, quality, and speed. In the banking sector this frequently comes in the form of "re-engineering efforts" that involve new working practices and new technologies to simplify things and make them quicker to react to. A study of the Online Student Account (OSA) opening process with Lloyds TSB Bank implemented action mapping to identify the bottlenecks, and a re-engineered process was created which was simpler, faster and less costly.

These re-engineered service processes are planned to be of large scale such as:
- Minimized Divergence: have standardized measures to help achieve economies of scale and uniformity in productivity.
- Enhanced Divergent Strategy: Developing niche strategies by making use of customization and flexibility.
- Reduced Complexity: Eliminating redundant processes and concentrating on delivering excellent customer satisfaction..

P. Retail Operations and Supply Chain 4.0
Retail industry is increasingly dependent on industrial engineering for global supply chain and multi-channel distribution management. In order to reach "Supply Chain 4.0" (SCM 4.0) – the transition to digital technology with IoT, AI and cloud computing, supply chains must be resilient, agile and responsive to customer needs.

Q. Lean Warehousing and Agility
Developed is where the lean principles were applied to the warehousing environment to cut logistics expenses and shorten delivery lead times. A case study in a large retail supermarket supermarket identified and proved that the application of lean to the transport process could deliver up to 16% cycle time saving and 25% labour cost saving. Agility is a prime example of advanced industrial engineering in the retail context and Apple's iPhone construction system is a good example of that. The system is designed and developed in a global network; the lines are deliberately flexible to be reconnected easily for new product launches. The flexibility is a combination of automation (these AI cameras for inspection, robots for repetitive tasks) with skilled manpower for delicate assembly.

R. Omni-channel Supply Chain Design
Designing Omni-channel supply chains is a key consideration in the merging of retail units, like the Great Deal and New Chicken case. These networks are optimized by industrial engineers to provide a uniform service across physical locations, online and mobile channels. The relevant KPIs in this area are order fulfilment cycle time, inventory levels (which can be reduced by up to 75% in SCM 4.0) and delivery-in-full-on-time (DIFOT) rates.

S. Measuring Service Productivity and Performance
A major difficulty for service managers is to increase knowledge and service worker productivity. Traditional manufacturing productivity looks at productivity as a measure of efficiency, whereas service productivity has to be viewed as a "profitability concept", where quality and internal efficiency are taken into account.

T. The Efficiency-Effectiveness Trade-off
Productivity of services has an interplay of effectiveness (doing the right thing) and efficiency (doing things right). Research has shown that just targeting operational efficiency will result in a decrease in the quality of the services delivered while only focusing on quality will result in overspending. Industrial engineering offers guidelines to manage this trade-off by proposing antecedents that include process management, human resource management, and customer education (value co-design)..

U. Comprehensive Key Performance Indicators Frameworks
Different Key presentation Indicators (KPIs) are used by industrial engineers for monitoring health of service systems.

KPI Category	Metric Example	Target/Direction
Sales & Marketing	Customer achievement Cost (CAC)	Minimize
Sales & Marketing	Lead Conversion %	Maximize

KPI Category	Metric Example	Target/Direction
Project Management	Schedule Performance Indicator (SPI)	Target = 1.0
Project Management	Cost Performance Indicator (CPI)	Target = 1.0
Finance	Return on Assets (ROA)	Maximize
Finance	Net Profit Margin	Maximize
Operations	Labour Utilization Rate	Optimize (70-85%)
Operations	Order Fulfilment Cycle Time	Minimize
Customer Service	First Contact Resolution Rate	Maximize
Customer Service	Net Promoter Score (NPS)	Maximize
IT & Systems	Mean Time Between Failures (MTBF)	Maximize
IT & Systems	Average Resolution Time	Minimize
Human Factors	Employee Engagement Score	Maximize
Human Factors	Safety Incident Rate	Target = 0

V. Strategic Barriers and Implementation Challenges in Service 4.0

There are critical challenges to the move to an optimized Service 4.0 model. There are multiple barriers, which have been recognized in the literature, that may impact the effectiveness of scientific and engineering intervention.

Organizational and Human Issues

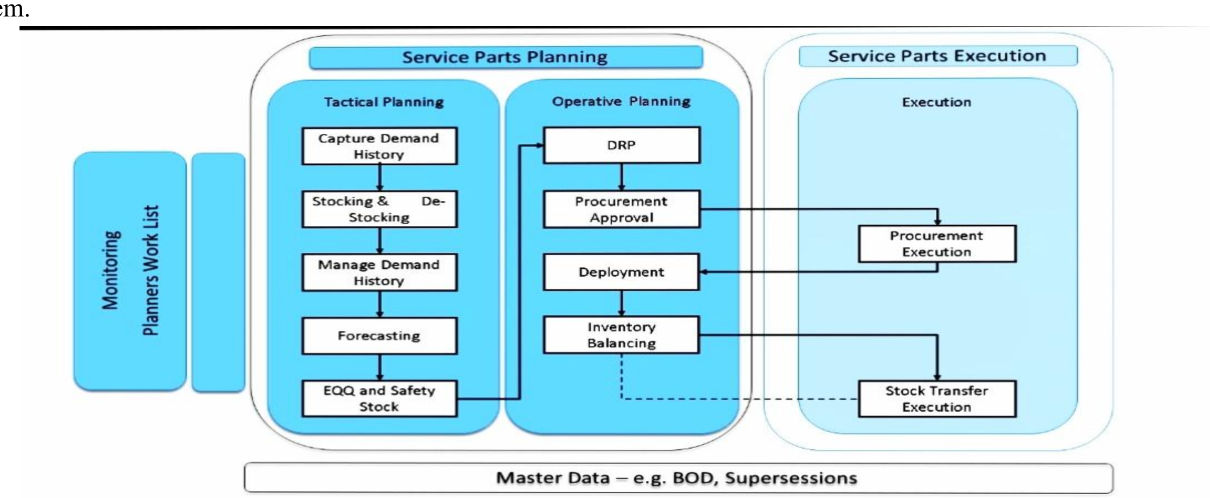
The main human barrier is resistance to change which has to be overcome in the framework of management culture and management. Many service workers could be worried about job security as a result of automation and AI and require a transition of shift towards Industry 5.0 principles which focus on human-AI collaboration. Furthermore, qualified workers and expertise in data science and systems engineering are still a critical challenge for most organizations, especially SMEs.

III. RESEARCH METHODOLOGY

From product-centric to service-oriented, the Indian commercial vehicle industry is moving towards a lifecycle support and uptime assurance ecosystem. VE Commercial Vehicles Limited (VECV) is at the forefront of this transformation process as it brings in the global expertise of engineering with the local knowledge of the market.

VECV's after-sales network, with 990+ service points, is renowned for its leadership, with structured industrial engineering methods and digital monitoring systems maximizing vehicle uptime. Tools used to support the performance of this network include work sampling, time studies, predictive analytics and root cause analysis.

VECV's service centres have been able to greatly improve after-sales efficiency and set new benchmarks for services in the heavy duty and light-to-medium commercial vehicle sectors by combining the workshop with a fully connected "100% Connected" digital ecosystem.



A. Data Collection (Work Sampling & Time Study)

1) Data Collection through Work Sampling and Time Study

The first step in doing performance research in service operations is data collection. It is usually used in a business environment where the work is carried out in a vehicle and involves a mixture of macro work sampling and micro work study, and provides a way of identifying whether activities are value added or non value added activities like waiting, unnecessary movement or administrative delays.

Work sampling is a statistical method which estimates the percentage of time spent on each work activity of technicians, without observation. It is based on many random observations over a specified time, so it gives a good representation of the workshop's behavior. Managers can use it to answer important questions like percentage of time used for actual repair work and percentage of time used for parts search, job card, etc.

Time studies, on the other hand, involve the creation of standard repair times (SRTs). Repair activities are broken down into elemental steps (e.g., clutch replacement) and each activity is timed by observation or video analysis. The performance ratings and allowance factors (fatigue, environmental conditions and personal needs) are then used to make the necessary adjustments for skilled technicians to produce a correct standard time.

Data Collection Metric	Work Sampling (Macro)	Time Study (Micro)
Primary Objective	Identify time share across broad categories (Productive vs. Idle).	Set up precise standard times for specific repair operations.
Observation Type	casual, irregular observations over a long duration.	Incessant timing of a specific process from start to finish.
Statistical Basis	Laws of chance and confidence intervals (typically 95%).	Performance rating, normal time, and allowance calculations.
Key Output	Utilization rates and identification of systemic bottlenecks.	Standard Repair Times (SRT) used for billing and scheduling.

These studies have a solid numerical foundation. The number of description (n) needed in a work sample study to be accurate within a given limit is often determined in the following way: These values are very important for VECV's service network; forecasting of vehicle go around time (TAT) is possible and the regulars are billed fairly according to an industry accepted normal value, instead of a slanted estimate.

2) Software Tools Used

Software Tools and Digital Integration

These research approaches and the management of day-to-day operations are aided by a comprehensive range of software solutions that are part of the Eicher digital ecosystem. These tools guarantee that the data runs flawlessly from the vehicles on board diagnostics to the dealer administration system in the workshop and finally to VECV's central Uptime Centre.

3) My Eicher: The Fleet Management and Uptime Portal

- My Eicher is an industry first digital display place that brings together fleet owners, drivers and service centres. It acts as a single point of access to uptime management, with real-time vehicle health monitoring with highly sophisticated telemetric capabilities. Some of the important modules in the app are: Uptime Management: Real-time tracking of the repair stages between "booking" and "gate-out" give the fleet operator maximum simplicity.
- Predictive Maintenance: Identifies potential future technology problems before they occur, prioritizes alerts as "Critical," "Visit Soon" and "DIY".
- Fuel and DEF Analytics: monitor use patterns and identify difference like fuel theft or strength of Diesel tire out Fluid with water

4) E-DMS (Dealer Management System)

A Dealer operating System (DMS) handles aspects of the internal operation of the workshop, including the creation of job cards, inventory management, and financial understanding. Many Eicher dealers use windows-based custom made DMS software such as AutoBooom which compile different modules:

- The Service Module is used to manage the workflow of T0-T6, technician homework and labour hour recording.
- Inventory/Spares Module: This is responsible for managing thousands of part numbers (SKUs), procurement from VECV regional parts centres and maintaining optimum stock levels for high demand mechanisms.
- CRM & Billing: manage the consumer history, service reminders (Service Reminder Module) and tax-compliant invoice.
- CRM & Billing: handle consumer history, service reminders (Service Reminder Module), and tax-compliant invoice.

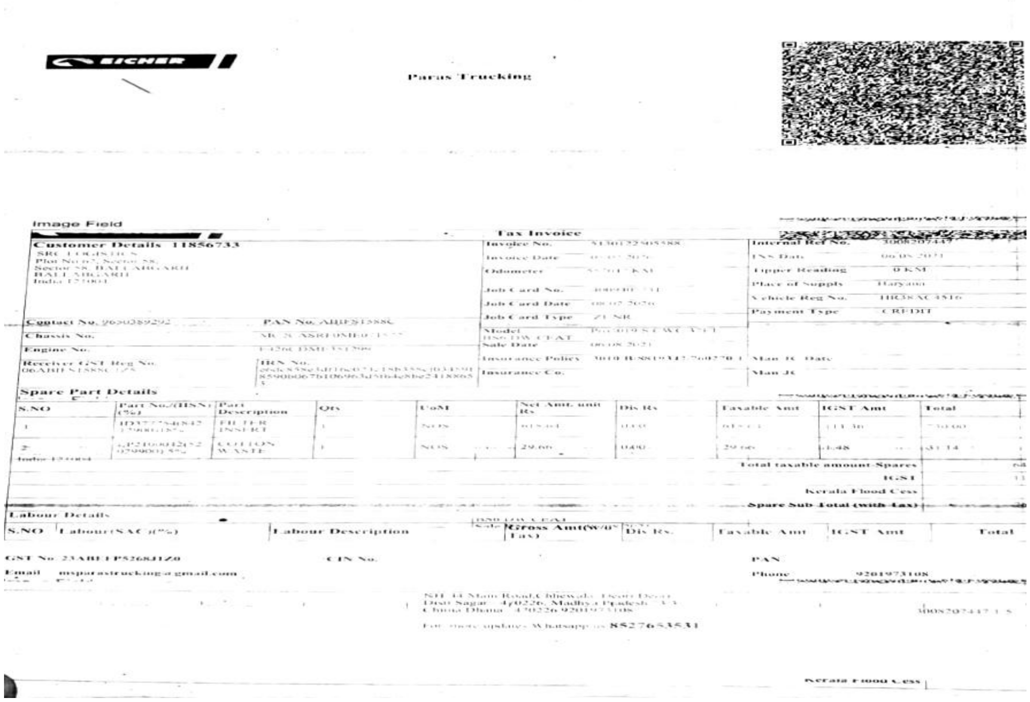

Paras Trucking

Image Field

Tax Invoice

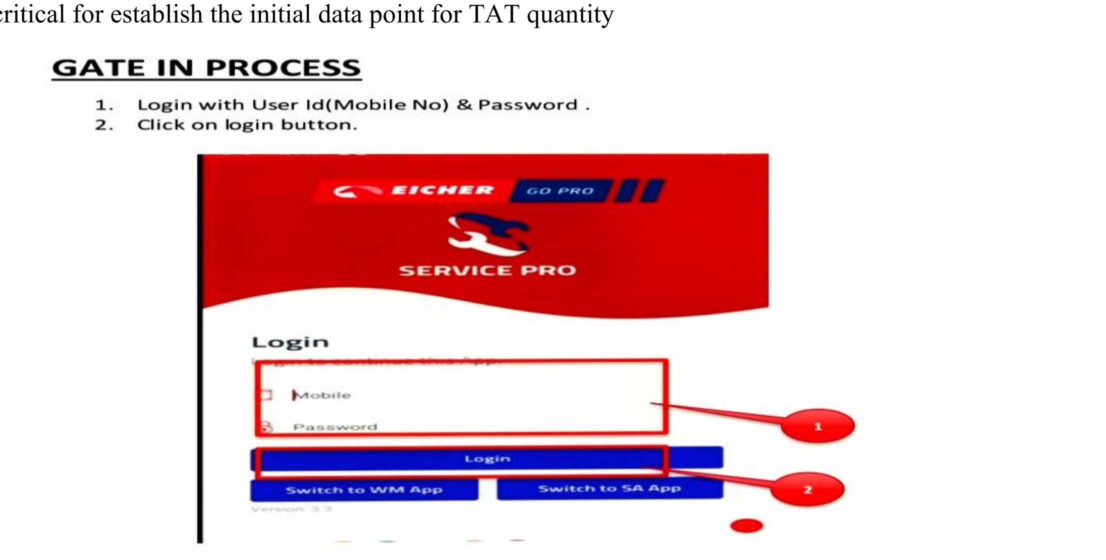
Customer Details 11856733

Spare Part Details

Labour Details

B. Standardized Service Workflow: The T0-T6 Protocol

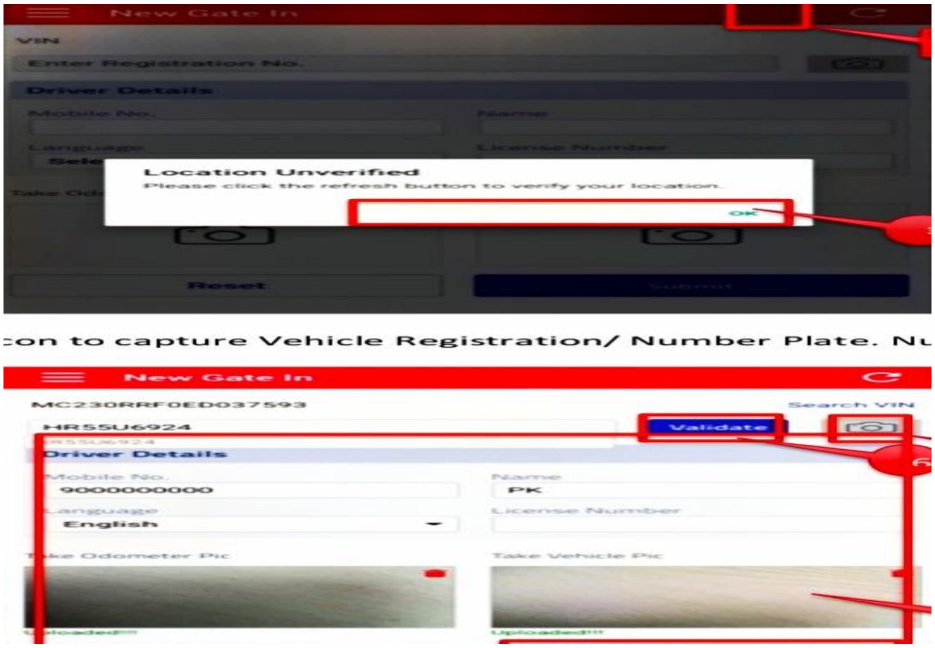
The process begins at the intensive course entrance. The Security Guard uses the Eicher Service Pro App to "Gate-In" the vehicle. This stage is critical for establish the initial data point for TAT quantity



1) T1: Job Card Creation and Customer Voice

Once inside, the Service Advisor takes over. The primary goal of T1 is "Real Time buyer Voice capture".

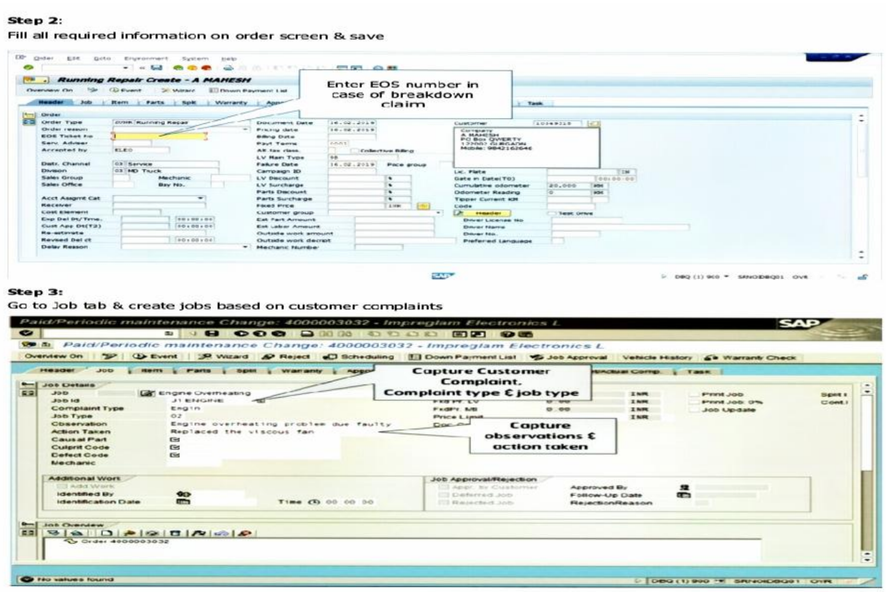
- Activities: The advisors navigate the Eicher Service App to check the vehicle's history, existing AMC (Annual upholding Contract) status, and any active service campaigns (recalls or proactive updates).
- Diagnostic Tools: The "Vehicle check Sheet" (VIS) is used to methodically identify secondary defects that the driver might have ignored, such as worn brake pads or minor fluid leaks.
- Target Time: 60 minutes.



2) T2: Customer Approval

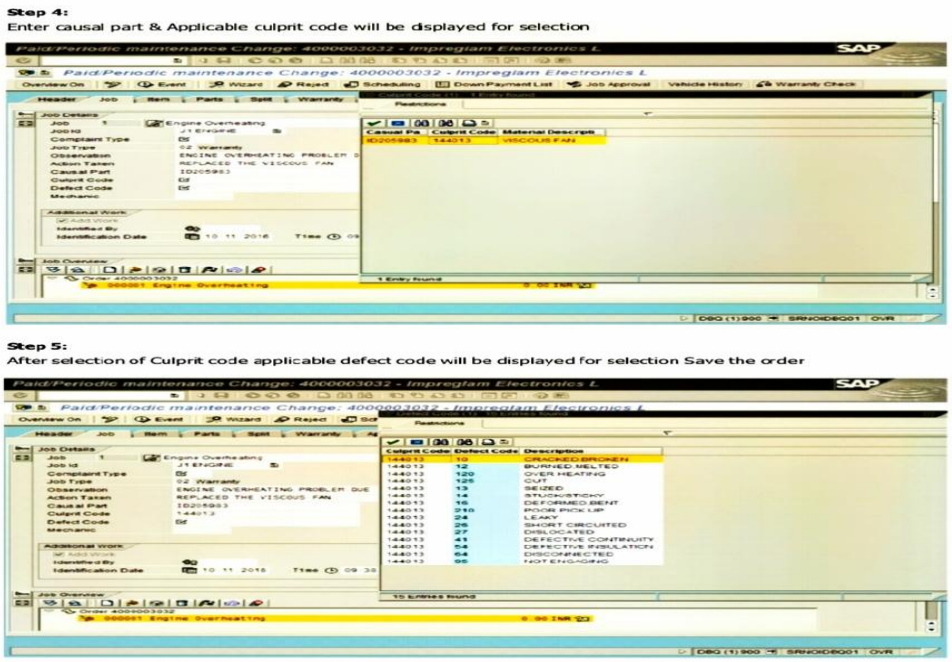
The repair work cannot begin without the customer's approval. This is addressed through the app in a digitalized environment to minimize waiting time.

- Activities: Approximation is done by considering the faults recognized and labour costs normal rates. The customer is notified on their MyEicher app or through SMS/email to approve the work order.



3) T4: Work Completion and Quality Control

The material repair takes place during this stage. In Eicher's "Uptime authorized Workshops," this involves observance to 5S values (Sort, Set in Order, Shine, Standardize, Sustain) to ensure an well-organized and safe working surroundings.



4) T5: Job Card Invoicing

The managerial closure of the job occurs in the DMS.

- Activities: Parts and labour are reconciled. Final billing is generate, and any AMC or service contract claims are process.

5) T6: Vehicle Gate-Out

The final stage mirror T0. The security protector verifies the gate pass against the digital record and releases the vehicle.

- Activities: Final check of the vehicle release status and video recording the exit time to finalize the TAT data.

This T0-T6 structure is more than a workflow; it is a research device By capturing timestamps at each stage, VECV can perform grainy study on where delays occur. If the time between T1 and T2 is time after time high across a region, it indicates a need for better customer statement strategies or a more user-friendly authorization interface in the app.

IV. MANAGEMENT & OPERATIONS STRATEGY

In the commercial vehicle (CV) sector, the service centre is not just a repair shop; it is a critical node in the logistics supply chain. For an Eicher truck owner, every hour of downtime translates directly to lost proceed. Therefore, the management strategy of an Eicher Service Centre must pivot from straightforward "repair" to "uptime assurance." This article outlines a data-driven operations line of attack focus on three core pillars: record accuracy (Material), Technician

A. Classification Logic

- ABC Analysis (Cost-Based):
  - Class A (High Value): high-priced total like Crankshafts, Turbochargers, ECU (Engine Control Units), and Differential assembly. These constitute ~70% of inventory value but only ~10% of the shelf space.
  - Class B (Moderate): Brake drums, Clutch plates, Alternators.
  - Class C (Low Value): Consumables like washers, O-rings, split pins, grease nipples, and standard fastener.
- VED Analysis (Criticality-Based):
  - Vital (V): Parts with no which the vehicle cannot move. Examples: Fuel Injection Pump (FIP), Starter Motor, Fan Belts.

- Essential (E): Parts that allow the vehicle to run but with concentrated show or safety. Examples: Headlights, Wiper motors, AC Compressors.
- Desirable (D): Non-functional parts. Examples: Mud flaps, cabin trim, seat covers.

fficiency (Manpower), and transportation reliability (Machine).

TPM Pillar (Manufacturing)	Eicher Service Adaptation	Key Metric
Jishu Hozen (Autonomous Maintenance)	Driver Empowerment: Training drivers to perform daily checks (tires, fluids, lights) to put off minor issues from escalating.	Reduction in roadside breakdowns.
Kobetsu Kaizen (Focused Improvement)	Process Optimization: Continuous analysis of diagnostic data to shorten repair times and streamline workshop flow.	Reduction in Turnaround Time (TAT).
Planned Maintenance	Scheduled Service (PM-A/B/C): Rigidly scheduled intervention based on mileage (e.g., 8,000 km checks) rather than failure.	Schedule Adherence %.
Quality Maintenance (Hinshitsu Hozen)	Pro-Service Standards: Use of indisputable parts and calibrated tools to ensure the vehicle returns to factory specs.	Repeat Repair Rate (RRR).
Education & Training	Competency Development: Certification of technicians at institutes like the Eicher Academy or area training centres.	Technician Certification Levels.
Office TPM	Administrative Efficiency: Streamlining job cards, warranty processing, and billing to release the vehicle faster.	Gate-Pass Generation Time.
Safety, Health & Environment	Workshop Safety: 5S implementation, fire retardant communications, and ergonomic bays.	Lost Time Injuries (LTI).
Early Equipment Management	New Product Readiness: Preparing workshops for new technologies (e.g., BSVI, EVs) before launch.	Readiness Index for New Models.

B. Tiered Service Agreement Structure

The Eicher Freedom program is divided to accommodate the different levels of risk and maintenance requirements, and precise planning of the consumption of supply is possible.

Agreement Type	Scope of Coverage	Revenue Impact for Dealer
LC	Labour and Consumables.	High-frequency, low-variance revenue.
LCC	Comprehensive Labour and Consumables.	Increased service absorption rate.
LCC-XL	LCC plus Parts for Clutch and Brake Systems.	Higher-margin parts turnover.
LCP	Comprehensive Labour, Consumables, and Parts.	Maximum lifecycle monetization.

V. CONCLUSIONS AND RECOMMENDATIONS

The Indian heavy commercial vehicle (HCV) market has evolved from a product-oriented business to a service-oriented business with workshops serving as strategic uptime partners. Global engineering standards and a local understanding of operation is exemplified with the development of VECV Limited (VE Commercial Vehicles) which is a company that demonstrates this transformation. Eicher service centres are benchmarked for approximately 400 job cards per month and have to be closely integrated with manpower, digital system and workshop processes. The "Partnering Prosperity" concept and "Eicher Promise" of heavy-duty vehicles restoring them within 48 hours of breakdown makes operational timing a key performance driver This results in a high-pressure situation introducing takt time as the main balancing point between demand and service capacity. Under extreme loads (18/22 hours a day and up to 40/55 tonnes GVW), a modern vehicle needs a diagnostics-first, fully connected approach, with advanced engines such as VEDX5 and VEDX8, helping to detect fault quickly and improve uptime.

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A. For Eicher Uptime Centre The 4-Tier Preventive Maintenance Hierarchy

A service center needs to classify its load to maximize bay utilization if it wants to support 400 job cards/month. This categorisation is provided by Eicher's 4 tier Preventive Maintenance (PM) schedule for the managers to accurately forecast labour and parts needs.

PM Tier	Service Scope	Key Components	Interval (Long Haul)	Estimated Time
PM-A	Basic Safety Check	Brakes, Tires, Fluids, Lights	8,000-12,000 km	45-60 min
PM-B	Intermediate Service	Oil & Filter, Fuel Filter, Diagnostics	20,000-25,000 km	2-3 hours
PM-C	Comprehensive	DPF Cleaning, Wheel Alignment, Coolant Flush	50,000-60,000 km	4-6 hours
PM-D	Major Overhaul	Engine Rebuild, Transmission Service, Axle Check	150,000-200,000 km	1-2 days

The proportion of these tiers determines the daily flow for a 400-job card workshop. City driving conditions raise the stress on the clutch, and cause wear on the brakes - so for regional fleets, PM intervals can be reduced to 6,000-8,000 km. However, the operational manager needs to take care to balance these regular regional trips with the demands of the intensive long-haul PM-C and PM-D roles.

High Volume Throughput, for example, a 400 job card per month requirement is an average of about 15.4 vehicles per day on a 26 day working month. This segment is very heavy on the traditional workshop layouts and capacity based scheduling becomes a must. To find the capacity required for 400 jobs, we will use the following capacity formula: Mathematical Modeling of Workshop Capacity:

A typical Eicher service centre would have the following flow of work:

- 40% Minor/Safety Checks (PM-A): 160 jobs @ 1 hour = 160 hours.
- 35% Intermediate (PM-B): 140 jobs @ 3 hours = 420 hours.
- 15% Comprehensive (PM-C): 60 jobs @ 5 hours = 300 hours.
- 10% Major Repair/Overhaul: 40 jobs @ 12 hours = 480 hours..

Total Monthly Hours Required: 1,360 billable hours.

The workshop has already accumulated 1360 hours and based on the average productivity rate of 85%, the technician requirement has been calculated. 208 hours per month for each technician and 135% efficiency from standardized processes equals about 280 hours of billable time per technician. This indicates that it requires at least 5 good technicians but 8 to 10 are recommended to deal with peaks and contingencies.

B. Infrastructure and layout optimization

The physical design of the processing operation is based on the "continuous flow" model to process 16 vehicles per day without congestion. Common bottlenecks are at the diagnostic approval or parts sourcing stage, which are typically the “resource R3” level. To remove these, it is necessary to move away from the traditional central office approach and from carts which must be operated from there to mobile carts where technicians can record service, place orders for parts and generate invoices from the side of the vehicle. Main layout interventions that are present for high throughput are:

High turnover jobs don't get stuck – EXO zones are areas for PM-A services that can be done in under 90 minutes.

Vertical solutions: Wall-mounted organizers and tiered shelving to keep the technicians' frequently used filters and lubricants in their “reach area.”

Diagnostic Staging: An independent area with Eicher Live diagnostic equipment to detect faults before the service bay.

How to grow profit by 50% using Financial Engineering?How to double your profit with Financial Engineering?

Two main levers can be optimized for achieving a 50% increase in profit for an Eicher service centre – the Effective Labor Rate (ELR) and the Gross Profit Margin (GPM) on parts and value-added services.

The Effective Labour Rate (ELR) Strategy

The actual revenue that is generated per hour of technician labour is the ELR. Most workshops experience "labour leakage" – time that technicians spend on non billable tasks waiting for parts or administrative processes. The closer the ELR is to the posted labour rate, the higher the profitability can be – without raising the price to the client.

Labour Performance Indicator	Industry Standard	Targeted 50% Growth Goal
Technician Productivity	80%	95%
Technician Efficiency	100%	135%
Labour Margin	65%	75%
Non-Billable Time	20%	<5%

Profit margins for spare parts and value added services are usually quadruple those of new car sales. In the case of wheel alignment services, the profit margin can be between 60% to 70%, because the wheel alignment costs will remain almost entirely to be paid for labour after the equipment cost. Incorporating these services into a "complete lifecycle package," a service workshop can boost the average value of repair orders. For instance, when the customer enters into an annual maintenance contract like the "Eicher Freedom" contract, he gets a predictable income, as well as a high-margin spares system.

Spare Part / Service	Average Margin (OEM)	Strategic Importance
Filters (Oil, Fuel, Air)	35-40%	High Volume, Quick Turnover
Clutch Plate & Kits	30%	High Wear, Essential Repair
Brake Liners & Pads	25-30%	Safety Critical, High Frequency
Wheel Alignment	65-70%	VAS, Low Material Cost

Digital Transformation and Integration of Information and Communication Systems

The eicher platform is the digital nervous system of the modern service centres. If you have 400 business cards to track in a facility, it's impossible to avoid administrative hassles without going digital. My Eicher offers real-time status of repairs on the vehicle so fleet managers can make plans for their next trip while the vehicle is in the service area.

Uptime and Remote Diagnostics Eicher Uptime Centre of Pithampur keeps a constant check on the exhaust, engine and energy management systems of the vehicle. This way, the classification can be done "predictively." The centre is alerted to an "imminent visit" rather than having to wait for the vehicle to break down, so that parts can be ordered before the vehicle arrives. Proactive approach has real profit implications: Unplanned downtime is decreased: This decreases service center wait time. Fleet owners are 95% more likely to approve Escher-recommended repairs with the benefit of real-time data from the Escher Live system. Predictive Demand: Inventory Management: Inventory rules can be defined using predictive demand from the telemetries data for local fleets.

PROPOSAL

There are a lot of changes that need to happen – both physically and digitally – to accommodate the 400 job cards per month. The data reveals that it is not technician skills that cause the bottleneck at workshops but administrative problems and parts availability. If a service center converts over to a capacity-based scheduling solution, and leverages the My Eicher platform to gain quicker approvals, it can enhance its profit margins by up to 50% and gain the required throughput.

C. Proposed Action Plan for Eicher Service Centre (30 Days)

The action plan below outlines a structured and four-week rollout addressing the "400 job card problem" which prioritizes flow, efficiency and revenue maximization.

Week 1: Audit and Infrastructure Alignment – First week to be spent on physical limitations on the shop floor. Technicians should participate in a "value stream mapping" exercise that will help management determine where technicians waste time. Daily Capacity Setting: Each bay has an hour allowable for billing for a day. The workshop will have to work about 20 hours a day for 400 jobs. Express Lane Setup: Set up two bays for 90 minute "Speed-O-Service" jobs and PM-A safety checks. Mobile Tooling: Place the most frequently used wrench sizes and oil filters on a mobile cart and have a tablet for digital entry of job cards in each bay.

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Week 2: Digital Integration & Training Week 2 is dedicated to moving towards a paperless system to accelerate approvals and documentation. All job cards will be initiated digitally, with the aim of adopting My Eicher. The Service Advisors are trained to showcase the importance of OEM Parts to their customers using the My Eicher "Marketplace". DVI Mandate: Digital Vehicle Inspection (DVI), at least five high-resolution photos of component wear are taken of every vehicle that comes to the workshop. These are submitted directly to the fleet owner on the app for instant approval. Technician Huddles: Brief 10-minute huddles in the morning to discuss at the start of the day why a job is late and what the previous day's MTTR was.
The "missing ₹100 bolt" is the conclusion of Week 3: Inventory Optimization and Supply Chain Throughput. Parts flow is stabilized in week three. Min/Max Levelling: Apply historical data of the 400-job-target to establish new minimum and maximum values for specific high-wear components such as brake liners, clutch kits and oil filters. Pre-packaged service kits: assemble the PM-B kit (oil, filter, gasket). A PM-B job card opens with a box filled with parts for the technician to put together, rather than waiting at the parts counter. Vendor alternatives: Ensure that 100% fill rate of consumables (lubricants, cleaning agents) on all jobs by setting up secondary sourcing. Week 4: Up selling & high volume flow stabilization. VAS campaign: Make use of "Complete Wheel Care" package on all PM-C job card. With a 60% margin, this significantly increases the net profit per vehicle.
Funnel activation review: If a customer gets an SMS review request when they get their vehicle, it is an automated message. Rate of response is monitored to make sure the desired rate of improvement of 50% is achieved. Motivate mechanics with “Eicher Connect” points during the busy season with incentive payouts for meeting productivity goals.

D. Future Scope of Research

AI, IoT, and electric vehicle (EV) technologies will be crucial to shaping the future of VE Commercial Vehicles Limited (Eicher service centres).
Predictive maintenance and AI diagnostics will not stop at the fault detection stage, but will expand to prognostics, which will allow for the estimation of remaining useful life (RUL) and a “near zero downtime” service model based on just-in-time part replacement.
The rollout of new EV platforms such as the Eicher Pro 2055 EV will necessitate many changes in the service world, including the high-voltage safety infrastructure, battery health (SOH) analytics through My Eicher and mobile/remote battery refurbishment units. Additionally, EVs will generate new services lines that generate high value added services as batteries wear out.
Meanwhile, ongoing improvements to mechanical parts (steering, braking, suspension etc.) with the use of cutting-edge materials will likely result in greatly extended service periods and less workload in workshops.
A strategy that will increase the profitability and customer satisfaction up to 50%, as a result of digital transformation, predictive systems and re-designed workshop operations.

Perspective	Key Performance Indicator (KPI)	Current Baseline	6-Month Target	Improvement %
Financial	Labour Gross Profit Margin	65%	75%	+15%
Financial	Average Repair Order (ARO) Value	1 core	1.35 core	+35%
Financial	Net Profit per Job Card	6000	9000	+50%
Operational	Mean Time to Repair (MTTR)	12 Hours	6 Hours	-50%
Operational	First Time Right (FTR) Ratio	85%	98%	+15%
Operational	PM Compliance Rate	75%	95%	+27%
Customer	Google Rating (Avg. Stars)	3.2	4.8	+50%
Customer	Review Response Rate	13%	100%	+669%
Customer	Service Acceptance Rate	60%	90%	+50%
Team	Technician Efficiency	100%	135%	+35%

This all-in-one solution guarantees that quality (400 job cards) is not sacrificed for volume. The service center can boost efficiency and technicians, gain a better understanding of the value, and improve the overall customer experience to justify a higher price point and achieve a 5-star rating. The Eicher Service Centre of the future is more than a repair shop for trucks; it's a logistics reliability data center driving the growth of the entire Indian transport sector.

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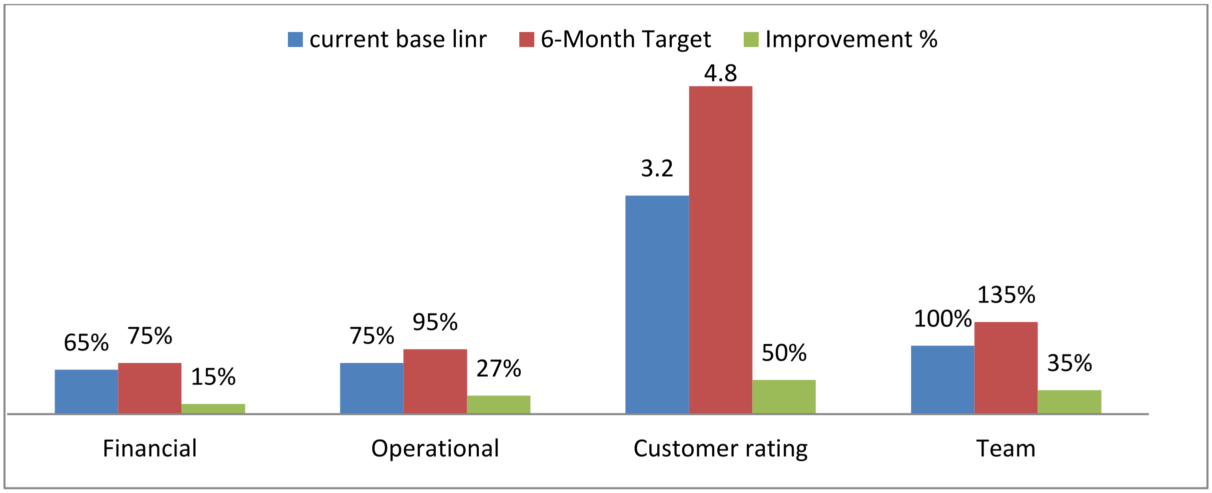

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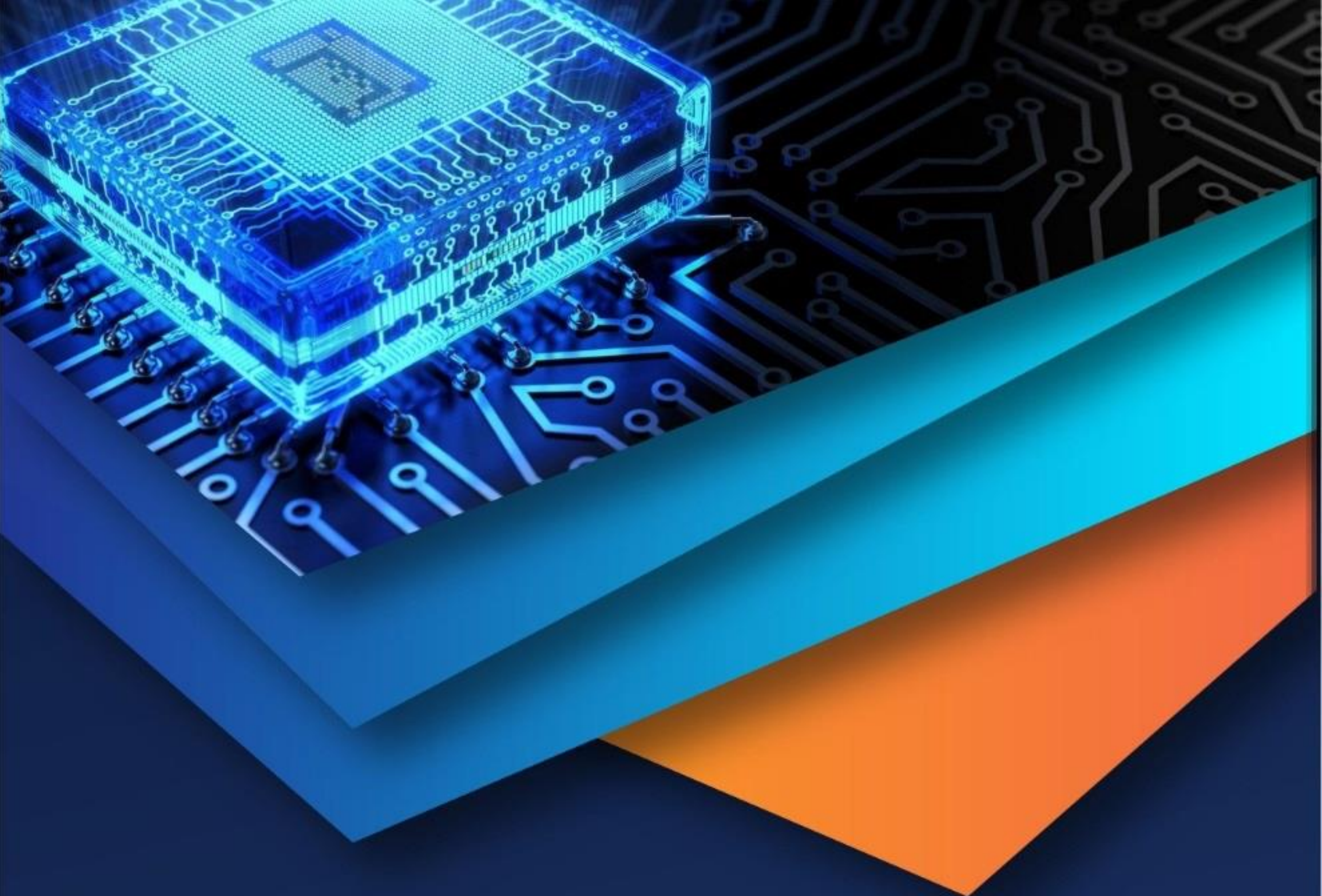

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