

Engineering Success: Training as a Catalyst for Performance in Automotive R&D

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To Link this Article: <http://dx.doi.org/10.6007/IJARBSS/v15-i2/24618>

DOI:10.6007/IJARBSS/v15-i2/24618

Published Date: 08 February 2025

Abstract

Automotive businesses propelled by rapid technical progress and market requirements need comprehensive training and development (T&D) programs to improve employee performance and mitigate skill deficiencies. This study underscores the need of integrating training and development programs with corporate objectives, using contemporary techniques such as e-learning and practical simulations to cultivate technical competencies and address varied learning requirements. Ongoing assessment is emphasized as essential for sustaining the pertinence of training and development programs in a dynamic industry. This study offers a systematic framework for enhancing training and development activities, illustrating how successful initiatives may elevate employee engagement, flexibility, and organizational competitiveness. Ultimately, cultivating a culture of perpetual learning and innovation is seen as a strategic need for sustained success in the industry of automotives.

Keywords: Training & Development, Employee Performance, Training Need Assessment, Training Quality, Training Method, Training Evaluation

Introduction

Today's business world is marked by rapid change, globalization, and technology breakthroughs. This means that organizations need competent employees to be successful (Goswami, 2018). Employee performance which includes professional skills, problem-solving, flexibility, and communication, is one of the most important parts of a competent workforce. As part of their regular duties, employees also have to deal with problems that come up out of the blue and easily move into new roles.

Businesses need to encourage employees to keep learning to make sure their skills are up-to-date and useful as technology changes (Oztemel and Gursev, 2020). The skill demand by manufacturing industry must align with the nature of the company need and the skill as the ticket for the employees to get promotion in their career (Saleh, 2019). Training and development (T&D) programs have emerged as important method to help employees

become better at their jobs so they can meet these needs and help the business grow (Karim et al. 2019).

Driven by fast technology breakthroughs, the automotive industry is experiencing a dramatic shift. Electric vehicles (EVs), self-driving cars, and smart systems that are connected to the internet of things (IoT) are changing the way people think about cars and the automotive industry as a whole (Sotnyk et al. 2020). As these new ideas challenge established ways of doing things, the industry needs to change by allocating budget into research and development (R&D) and working on making employees wiser (Llopis et al. 2021). As modern automotive systems are complicated, employees need to be skilled in areas like data analytics, software development, and innovative equipment. This change shows how important it is to have strong training programs to fill the skill gaps and encourage a mindset of lifelong learning in the field (Brunello and Wruuck, 2021).

Even though training is becoming more and more important, the automotive industry has a hard time making training plans that work. Often, standard Training Need Assessments (TNA) can't keep up with how quickly technology is changing which causes training programs to be mismatched with skill gaps (Cascio, 2019). Different job roles in the industry like production and software development, need different training methods which consume a lot of time and resources. Also, training programs are not encouraging due to financial factors, outdated methods, and training modules are not based on real-world experience. Hence, agile frameworks and frequent updates are necessary to guarantee training's effectiveness and relevance in order to satisfy the industry's changing demands (Nosratpour and Nazeri, 2018).

Given the wide range of skills needed for various positions in the automotive industry, assessing the efficacy of training initiatives is difficult. People-machine contact, safety compliance, and technological skill are just a few of the many aspects of employee performance that are hard for traditional evaluation methods to capture (Park et al. 2018). A complete evaluation method that includes both developmental and final tests, real-world performance metrics, and continuous feedback loops needs to be established. In this quickly changing business environment, addressing these issues is essential to enhance training results and to make sure staff members are equipped to contribute towards organizational success (Sung and Choi, 2018).

Literature Review

Training Need Assessment

Training Needs Assessment (TNA) is a procedure used to detect discrepancies between existing employee performance and the established performance benchmarks (Diamantidis and Chatzoglou, 2018). It guarantees that training is congruent with both personal and corporate objectives. In the automotive industry, where trends and technology are always evolving, TNA is essential for controlling performance goals and enhancing capabilities.

The procedure starts with the assessment of employee's existing performance in relation to established criteria. Performance reviews and evaluations assist in identifying areas where employees need more training, including both technical and interpersonal abilities such as communication and problem-solving (Hamidi, 2020). Frequent evaluations

ensure that training remains relevant and adaptable to industry developments, including digital transformation and innovative manufacturing techniques. Effective TNA enables firms to concentrate on targeted skill enhancement, elevate employee performance, and maintain competitiveness in the rapidly evolving market (Ali et al. 2019).

Training Quality

Training Quality is essential in the automotive industry, because skill demands are always changing. Essential components of superior training programs include current content, proficient instructors, practical exercises, and applicable real-world scenarios. Training materials must be explicit, relevant, and consistent with industry standards to guarantee that employees acquire precise information (Karabulut et al. 2018). Instructors must elucidate topics proficiently and use practical examples to render the subject approachable.

Practical exercises enable employees to refine new abilities in a regulated environment which leads to minimizing mistakes in actual work settings. The ongoing enhancement of training programs is crucial for adapting to technology changes and industry trends such as electric cars and artificial intelligence. Input from learners enhances the program, guaranteeing its efficacy and pertinence. Superior training enhances employee engagement, elevates skills, and fosters the organization's long-term success (Moeuf et al. 2020).

Training Method

Training method are essential in the automotive industry, where ongoing skill enhancement is necessary to adapt to emerging technology and evolving work requirements. A range of techniques accommodates diverse learning styles and obligations. Interactive workshops promote engagement via collaborative conversations and problem-solving exercises (Ritter and Mostert, 2018). Simulation exercises provide a secure setting for practicing activities such as operating equipment or diagnosing vehicle problems, therefore mitigating real-world dangers (Binois et al. 2019).

On-the-job training (OJT) enables individuals to acquire knowledge during their employment, under the guidance of experienced mentors, facilitating rapid adaptability and the development of practical skills (Chen, 2018). Peer learning sessions facilitate cooperation and sharing of best practices. Meanwhile, role-playing assists employees in honing interpersonal skills, which includes customer service and negotiating skills (Gagne et al. 2018). Cross-functional training enhances employees' competencies and promotes adaptability (Ali, et al. 2019). Collaborative projects build cooperation, leadership, and problem-solving skills. Employees are able to acquire the skills needed for their positions by using a combination of these methods (Aldabbus, 2018).

Training Evaluation

Training must be evaluated in order to make sure that programs achieve their objectives. Apart from that, training evaluations also can be used as a platform to provide suggestions for further improvement. Post-training questionnaires enable employees to provide feedback on the training's efficacy, whilst peer evaluations facilitate the evaluation of participants' application of acquired knowledge (Makransky et al. 2019). In the meantime, self-evaluations

enable employees to assess their learning advancement, while resource reviews pinpoint areas requiring supplementary tools or resources (Wiyono, 2018).

Alterations in behaviour post-training are critical signs of its efficacy and consistent follow-up assessments facilitate the monitoring of long-term skill retention (Everson et al. 2021). Organizations may maintain their competitiveness by comparing their training results to industry standards and best practices. An extensive assessment procedure that integrates input from many sources is able to enhance training programs and guarantee that the organization aligns with industry requirements (Saleh and Ainiah, 2024).

Employee Performance

Performance of employees is crucial to the success and sustainability of a firm. It indicates the extent to which personnel fulfil job criteria and advance the company's goals. Organizations must prioritize training initiatives, employee engagement, and foster positive work atmosphere in order to improve performance. Time management training assists employees in job prioritization, alleviate stress, and enhance productivity. Collaboration via team-oriented activities enhances work quality and interpersonal connections. Recognition and awards, like commendations or promotions, incentivize employees to enhance their performance and maintain engagement at work (Guinan et al. 2019).

Problem-solving training improves critical thinking and decision-making abilities, which results to employees to become more robust and flexible (Ali et al. 2019). Employees may offer fresh ideas and aid in the expansion of the company by participating in innovative training programs that foster creativity. Employee self-confidence significantly influences performance. This is because when employees see themselves as skilled workers, they approach challenges at work with confidence. Organizations may enhance employee performance, adaptability to obstacles, and long-term success by offering training in essential areas such as time management, collaboration, and creativity (Karim et al. 2019).

Skill Gaps in Technology Advancement

Innovation in the automotive industry is greatly aided by technological improvements, but employee performance is also negatively impacted by the large skill gaps caused by technological advancements (Brunello and Wruuck, 2021). For instance, there have been issues of significant talent gap in regards to electric vehicles (EVs). Environmentally friendly transportation choices are becoming more popular, and organizations need additional employees who know how to handle batteries, build charging stations, and work with electric drivetrains. However, many employees lack the technical skills necessary to operate these systems, preventing them from adjusting to changing market trends (Arslan et al. 2022). As the automotive industry becomes more networked, the skill gaps associated with digitization and connectivity are also widening.

Employees must possess the competencies to comprehend data analytics, navigate digital interfaces, and resolve software issues related to linked automotive technology. However, many employees are unable to master the skills related to these systems due to insufficient digital competency. Other than that, as cars increasingly depend on software, the susceptibility to cyber assaults increases. Businesses need employees with cybersecurity knowledge to safeguard private information and prevent car systems from being

compromised, but a large number of employees are not equipped with these abilities (Khoiriyah and Husamah, 2018). Automotive organizations must emphasize training programs centered on developing technology to ensure that staff are always equipped with information on latest innovations.

Skill Gaps in Budget Allocation

Deficiencies in budget allocation and financial management skills may profoundly impact employee performance and organizational effectiveness within automotive industry. Employees tasked with budget management may lack essential financial knowledge and skills, leading to overspending, inefficiencies, and missing cost-saving possibilities (Hamid and Loke, 2021). Furthermore, several firms have difficulties with strategy planning and resource allocation. Due to constrained financial resources for diverse initiatives, organizations must judiciously manage cash. Nevertheless, insufficient competence in this domain may result in mismatched priorities, inefficient budget use, and lost development possibilities.

Project management skills are crucial for maintaining budgetary constraints, adhering to timelines, and fulfilling specifications. In the absence of proficient project managers, automotive firms may encounter delays, budget overruns, and subpar outcomes (Ansah and Sorooshian, 2018). Furthermore, several organizations have difficulties in vendor management and negotiations, which directly influence procurement costs and contract conditions. Employees may lack the requisite abilities to negotiate successfully with suppliers and partners, resulting in disadvantageous agreements and increased expenses. Organizations can engage in training programs that emphasize financial literacy, strategic planning, project management, and negotiating skills to mitigate these skill shortages. This will guarantee that personnel are proficient in budget management and contribute to the business' financial prosperity (Saha et al. 2018).

Skill Gaps in Schedule and Duration

Deficiencies in scheduling and time management skills may significantly impair staff performance and productivity within the automotive industry. The rapid tempo of the industry necessitates that personnel efficiently manage their time, prioritize activities, and adhere to deadlines (Pei et al. 2023). However, many employees have difficulties with time management, resulting in missed deadlines, incomplete tasks, and heightened stress levels. Alongside time management, there exists a deficiency in planning and coordinating abilities.

Employees must possess the ability to strategize, assign resources, and synchronize activities across departments to guarantee seamless operations and maximal performance. In the absence of these talents, businesses encounter delays, bottlenecks, and communication failures that impede production (Brunello and Wruuck, 2021). Organizations should engage in training programs that emphasize time management, planning, coordination, and communication to rectify these skill deficiencies. This will assist staff in optimizing their calendars, collaborating efficiently, and enhancing overall productivity (Ali et al. 2019).

Methodology

Population and Sampling

The study examines executive personnel within Malaysia's automotive industry, since they are directly engaged in training and development initiatives. Their insights are essential for comprehending the influence of training needs assessments, training quality, methodologies, and evaluations on employee performance. A simple random sampling technique was used to guarantee that each member in the population had an equal probability of selection, hence reducing bias and improving the generalisability of the results to the larger population.

Sampling Size

According to Krejcie and Morgan's (1970) guidelines for statistical reliability, the study selected 175 executive employees from a population of 330 in Malaysia's automotive industry. A sample frame facilitated systematic random selection, and standardised questionnaires were used to collect insights into training and development. The emphasis on executives, along with a straightforward random sample technique, guaranteed representativeness, dependability, and reduced bias. This methodology provides a robust foundation for examining the correlation between training programs and employee performance.

Validity

The study's validity is essential for obtaining precise and significant results (Lim et al. 2024). Construct validity was attained by correlating the questionnaire with recognised theories and frameworks, assuring it to accurately assess the targeted constructs, including training needs assessment, training quality, and employee performance. Content validity guaranteed thorough coverage of all elements by expert evaluations and continuous enhancement of the questionnaire.

Respondents were given enough time to carefully complete the survey, and anonymity was preserved to promote candid comments in order to increase validity. Pilot testing clarified and rectified ambiguities in the questionnaire prior to comprehensive data gathering. The study's methodology for validity guarantees precise data gathering and practical insights that successfully respond to the study's objectives (Bedford et al. 2018).

Location

XYZ company, located in Perak, Malaysia, is crucial to this study since it is a primary site for collecting data on staff training programs and their effects on performance. XYZ company a significant entity in Malaysia's automotive industry, provides a valuable framework for examining how organised training programs improve staff competencies and performance.

Facility's varied workforce and its function as a centre for innovation and training provide an optimal setting for assessing the efficacy of training methodologies across different job positions. The proximity to employees enhances effective data collecting via surveys and interviews, while the company's focus on employee development guarantees informed replies.

The findings of this study are pertinent to XYZ company and other entities within the automotive industry, providing insights for the development of successful training programs

that correspond with technical progress and industrial requirements. This study also enhances scholarly discourse about the correlation between employee training and organisational effectiveness, particularly in developing countries such as Malaysia.

Data Analysis

This study's data analysis approach is essential for interpreting questionnaire answers and elucidating the links between training factors and employee performance in the Malaysian automotive industry. The study uses version 29 of the Statistical Package for the Social Sciences (SPSS) software to provide a systematic, trustworthy, and robust examination of the acquired data. This method bolsters the reliability of the results and facilitates significant conclusions that advance both scholarly research and practical implementations in the domain (Richards et al. 2018)

Findings and Discussion

Correlation Analysis

Table 1 investigates the correlations among training variables which are Training Needs Assessment (TNA), Training Quality (TQ), Training Method (TM), and Training Evaluation (TE)—and Employee Performance (EP). Robust correlations were observed between TNA and EP ($r = 0.617$), TQ and EP ($r = 0.701$), TM and EP ($r = 0.742$), and TE and EP ($r = 0.645$), all demonstrating substantial positive associations. This indicates that augmenting these training factors results in enhanced employee performance.

The training variables TNA and TE ($r = 0.509$) and TQ and TE ($r = 0.540$) had moderate correlations, but TM and TE ($r = 0.664$) showed a high association. Correspondingly, robust relationships were identified between TNA and TM ($r = 0.621$), TQ and TM ($r = 0.748$), and TNA and TQ ($r = 0.749$). These results underscore the interrelatedness of training factors, stressing the need for a comprehensive approach to training design and assessment.

Table 1

Correlation coefficient

Variable	TNA	TQ	TM	TE	EP
Training Need Assessment (TNA)	1				
Training Quality (TQ)	0.749**	1			
Training Method (TM)	0.621**	0.748**	1		
Training Evaluation (TE)	0.509**	0.540**	0.664**	1	
Employee Performance (EP)	0.617	0.701**	0.742**	0.645**	1

** Correlation is significant at the 0.01 level (2-tailed)

Regression Analysis

Table 2 shows regression analysis which indicates that Training Method, Training Quality, and Training Evaluation substantially affect Employee Performance, however Training Need Assessment has an insignificant and little effect. The standardised coefficients (β) indicate that Training Method is the most significant predictor ($\beta = 0.339$), followed by Training Quality ($\beta = 0.241$) and Training Evaluation ($\beta = 0.236$). The Training Need Assessment, with $\beta = 0.106$, exhibits the minimal impact.

P-values validate the importance of the predictors: Training Method ($p < 0.001$), Training Evaluation ($p < 0.001$), and Training Quality ($p = 0.004$) are all below the 0.05 threshold, indicating statistically significant associations with Employee Performance. Nonetheless, the Training Need Assessment ($p = 0.139$) is above the threshold, indicating no meaningful effect.

The t-values emphasise the impact of these factors, with Training Method exhibiting the greatest t-value ($t = 4.305$), followed by Training Evaluation ($t = 3.773$) and Training Quality ($t = 2.906$). The Training Need Assessment, exhibiting the lowest t-value ($t = 1.486$), indicates a diminished significance. The research finds Training Method, Training Quality, and Training Evaluation as the most crucial aspects influencing Employee Performance, whereas Training Needs Assessment is deemed less significant.

Table 2
Coefficients of Multiple Regression Analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	β	Std. Error	Beta		
(Constant)	0.328	0.217		1.517	0.131
1 Training Need Assessment	0.104	0.070	0.106	1.486	0.139
Training Quality	0.243	0.083	0.241	2.906	0.004
Training Method	0.353	0.082	0.339	4.305	<.001
Training Evaluation	0.229	0.061	0.236	3.773	<.001

Dependent Variable: Employee Performance

Hypothesis Analysis

Table 3 shows the overall hypothesis testing of the multiple regression analysis according to the research framework of this study. The regression coefficients indicate the impact of each independent variable on Employee Performance. The Training Method has the most significant correlation with Employee Performance ($\beta = 0.353$), followed by Training Quality ($\beta = 0.243$) and Training Evaluation ($\beta = 0.229$). The correlation between Training Needs Assessment and Employee Performance is minimal ($\beta = 0.104$). These coefficients indicate the differing levels of influence that each training variable has on employee performance in this research.

Table 3
Overall results of hypothesis testing

Code	Hypothesis	Result
H1	There is a positive significant relationship between Training Need Assessment and Employee Performance.	Accepted
H2	There is a positive significant relationship between Training Quality and Employee Performance.	Accepted
H3	There is a positive significant relationship between Training Method and Employee Performance.	Accepted
H4	There is a positive significant relationship between Training Evaluation and Employee Performance.	Accepted

Findings

Practical Implication

This research highlights the critical role that training and development (T&D) plays in improving employee performance and organisational competitiveness, particularly in technologically advanced industry like the automotive industry (Ali et al. 2019). Organisations must synchronise their HRD plans with future developments such as electric cars, autonomous driving, and innovative manufacturing procedures.

Key results underscore the significance of Training Needs Assessment (TNA) in pinpointing skill deficiencies to guarantee that training is relevant and efficacious. In the absence of adequate Training Needs Analysis (TNA), organisations jeopardise operational efficiency and performance, especially as the industry transitions to digital technology. Organisations must assess employees' proficiency with emerging technology such as electric automobiles and autonomous systems to avoid skill deficiencies.

Training quality is essential for enhancing employee performance, necessitating organisations to invest in contemporary, engaging training programs conducted by skilled trainers who are capable of elucidating complicated subjects. Frequent revisions of training materials are essential to remain aligned with industry developments.

Training methodologies, especially interactive approaches such as simulations and on-the-job training, are crucial for technical positions. Employees get the most advantage from practical experience, such as training on electric cars or autonomous systems, in real-world environments that enhance confidence and proficiency.

Training Evaluation ascertains that training programs fulfil their goals. Ongoing assessment enables organisations to evaluate immediate results and long-term enhancements, optimising programs to remain in accordance with workforce requirements.

Theoretical Implications

This study enhances the theoretical comprehension of training and development by illustrating its beneficial effect on employee performance within a technology-driven industry (Ali et al. 2019). By detecting skill shortages and coordinating organisational and employee demands, the research offers proof of the value of TNA in developing training programs that work.

This study broadens the definition of training quality, highlighting that superior training necessitates proficient trainers, current contents, and captivating delivery techniques. Additionally, it supports experiential learning theories that emphasise the importance of firsthand experience in skill development and verifies the efficacy of immersive, hands-on teaching methods, especially in technical domains.

This study underscores the significance of Training Evaluation in preserving training efficacy, endorsing continuous improvement theories by promoting continual assessment to guarantee relevance and sustained performance enhancements.

This study provides practical insights and theoretical validity, establishing a basis for improving training and development methods in dynamically moving industries such as automobile manufacturing.

Conclusion

This study took a critical look at how well Training and Development (T&D) improves employee performance in the automotive industry's R&D departments. This research showed how important it is to figure out what training is needed, how good the training is, how the training is done, and how well the training is evaluated. Effective training can influence the success of an organization, the output of its employees, and their ability to change. The results of this study show that well-planned T&D programs are able to fill in skill gaps, acquire employees involvement, and keep up with the fast-changing technology needs of the automotive industry. Using both quantitative and theoretical tools, this study was able to determine the extent to which T&D techniques work.

One main point is that thorough Training Needs Assessments are necessary to make sure that T&D programs are in line with the goals of the organisation. E-learning and hands-on exercises are two examples of advanced learning methods that have been very helpful in meeting the different learning needs of employees. Also, ongoing review ensures that training programs stay useful, current, and capable of providing solutions in the business.

The study's practical consequences give organisations a way to improve their training and development (T&D) efforts and encourage an atmosphere of constant learning and new ideas. Companies can improve their employees' skills, keep them motivated, and stay competitive in a market that is changing quickly by putting an emphasis on high-quality training and modern teaching methods. This study also stresses how important it is for automotive industry to strategically focus on research and development (R&D) as a method to keep the industry growing and coming up with new ideas.

Acknowledgment

Special gratitude is extended to all personnel and individuals who contributed to this research. The author also would like to thank Universiti Teknikal Malaysia Melaka (UTeM) for all the support.

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