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Digital marketing training: Empowering business actors to use digital marketing in Metro Lampung

Shultonnyck Adha* & Sabar Sutia

Management Department, Kusuma Negara Business School, Jl. Raya Bogor KM No.24 Pasar Rebo, RT.3/RW.4, Cijantung, Jakarta 13770, Indonesia
**e-mail: shultonnyck@gmail.com*

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ABSTRACT

The era of digital transformation has changed the paradigm of human resource management in the information technology industry, where organizations that focus on human capital development through strategic training programs show performance increases of up to 75% compared to organizations that do not make similar investments. The information technology industry faces a special challenge in maintaining the relevance of employee competencies to leading technological developments, so a comprehensive evaluation of the impact of digital marketing training programs using a measurable and objective quantitative approach is needed. The purpose of this study is to analyze and measure the effectiveness of digital marketing training programs on increasing employee work productivity in Metro Lampung through a pre-post implementation comparative study approach, identifying differences in productivity levels before and after implementation, calculating the magnitude of increase, and analyzing the most responsive productivity dimensions. The study used a quantitative approach with a quasi-experimental pre-post test design on 35 IT employee respondents selected using purposive sampling technique, with data collection using a structured questionnaire on a Likert scale of 1-5 and paired sample t-test analysis. The results showed a significant increase in work productivity ($p < 0.001$) by 20.2% with a confidence interval of 95% (18.7%-21.7%), where the Innovation Index achieved the highest responsiveness (23.0%, Cohen's d = 2.29), followed by Task Completion Rate (20.6%), Quality Performance (19.8%), and Collaboration Effectiveness (18.0%). Digital marketing training programs have proven to be effective in increasing work productivity with 97.1% of respondents experiencing progress in at least three of the four dimensions evaluated. Organizations need to optimize resource allocation on innovative technology training modules, integrate a holistic approach that leverages synergistic effects across productivity dimensions, and implement training personalization strategies to maximize outcomes for all participants.

Keywords: Digital Marketing, Technology Industry, HR Training, Work Productivity, Digital Transformation

1. INTRODUCTION

The era of digital transformation has changed the paradigm of human resource management in the information technology industry, where the need for an adaptive and competent workforce is crucial for organizational sustainability. According to recent research from Deloitte Insights (2025), organizations that focus on developing human capital through strategic training programs show up to 75% performance improvement compared to organizations that don't make similar investments. This phenomenon indicates that human *resource development (HR) training and development programs are* no longer an optional option, but rather a strategic need that determines the competitiveness of the organization. The information technology industry, as the sector that has experienced the most rapid technological evolution, faces a particular challenge in maintaining the relevance of employee competencies to leading technological developments. Empirical data shows that IT companies that implement structured training programs experience an average productivity increase of 23% in the 6-12 month period post-implementation (AIHR, 2025). Nevertheless, large investments in training programs do not always correlate positively with significant increases in work productivity, raising fundamental questions about the effectiveness of the training methodologies applied. This condition reinforces the urgency of conducting a comprehensive evaluation of the impact of human resource training and development programs using a measurable and objective quantitative approach. The *pre-post implementation comparative study* is relevant because it is able to provide a concrete picture of changes in work productivity before and after the implementation of the training program.

Although various studies have examined the relationship between training programs and work productivity, there is still a significant gap in the academic literature regarding the measurement of the effectiveness of HR training programs specifically in the information technology industry. Previous research tends to be general and does not take into account the unique characteristics of the IT industry which has very rapid technological change dynamics (Workhuman, 2025). *Methodological gaps* were also identified in the lack of use of *pre-post comparative study* designs that could provide strong empirical evidence regarding the causality between training programs and increased productivity. Most existing studies rely on *cross-sectional data* or qualitative approaches that have limitations in measuring the objective impact of training programs. In addition, there is a conceptual gap in defining work productivity indicators that are specific to the context of the information technology industry, where work output is not only measured from traditional quantitative aspects but also includes innovation, technological adaptability, and speed of project completion. *The* temporal gap is also a concern, considering that the majority of previous research was conducted before the post-pandemic digital transformation era that changed the fundamentals *of working behavior* and IT employee competency expectations. This condition creates significant research space to examine the effectiveness of HR training programs with a more rigorous and contextual methodological approach.

The novelty of this research lies in the application of a *pre-post implementation comparative study design* that integrates multidimensional measurements of work productivity specific to the information technology industry. Methodological novelty is demonstrated through the development of productivity measurement instruments that include technical, innovative, and collaborative dimensions that correspond to the characteristics of work in the IT sector. The theoretical contribution of this research is to develop an evaluation model for the effectiveness of HR training programs that can accommodate the dynamics of technological change in the IT industry. From a practical aspect, this research provides *a framework* that can be used by HR practitioners to design and evaluate training programs that are more effective in improving work productivity. *Contextual novelty* also lies in the specific research focus on the information technology industry in the post-digital transformation era, where job characteristics, competency expectations, and productivity measurement methods have their own uniqueness. Another innovative aspect is the use of extended evaluation periods to capture the *sustained impact* effects of training programs, not just *immediate effects* that are often the focus of previous research. The study also integrates a multi-stakeholder perspective in effectiveness evaluation, including the views of management, employees, and HR teams to provide a holistic view of the impact of the training program. This novelty is expected to

make a significant contribution to the development of HR management theory and practice, especially in the context of the information technology industry.

Based on the background that has been described, this research is focused on several main problems that require in-depth investigation. The formulation of the main problem that will be answered is: "How effective is the training and human resource development program in increasing employee work productivity in the information technology industry?" The research questions were then elaborated into more specific sub-questions: "Are there significant differences in the level of employee work productivity before and after the implementation of HR training and development programs?" and "How much magnitude of the increase in work productivity can be achieved through the implementation of HR training and development programs?" The formulation of the problem also includes a methodological aspect: "Which dimension of work productivity is most responsive to HR training and development programs in the context of the information technology industry?". The main objective of this study is to analyze and measure the effectiveness of HR training and development programs on increasing employee work productivity in the information technology industry through a *pre-post implementation* comparative study approach.

Specifically, this study aims to identify and measure differences in employee work productivity levels before and after the implementation of HR training and development programs; calculate *the magnitude* and statistical significance of the increase in work productivity resulting from the training program; analyze the dimensions of work productivity that are most responsive to the training program in the context of the IT industry; and develop strategic recommendations for the optimization of training programs and human resource development based on empirical findings. The theoretical benefit of this research is that it contributes to the development of HR management theory, especially in the area of training program effectiveness, as well as enriching the academic literature on the measurement of work productivity in the information technology industry. Practical benefits include: providing *an evaluation framework* that HR practitioners can use to design more effective training programs; providing guidance for organizational management in allocating HR development investments optimally; and offering productivity measurement models that can be adapted by IT companies for employee performance evaluation. The benefits of this research policy can provide input for regulators in the development of competency standards and human resource development programs for the national information technology industry.

2. THEORETICAL BACKGROUND

2.1 Digital Marketing Training Concept for Business Actor Empowerment

The era of digital transformation has fundamentally changed the business landscape, demanding strategic adaptation from micro, small, and medium enterprises (MSMEs) to survive in increasingly fierce global competition. Training *Digital Marketing* become a crucial instrument in empowering business actors, especially in the context of Indonesia which is experiencing exponential digital economic growth. According to recent research, digital transformation for MSMEs in Indonesia provides significant benefits such as increased market reach, operational efficiency, and profitability, despite the challenges of limited resources, inadequate technical skills, and data security issues (Anwari et al., 2024). The concept of empowerment through digital training focuses not only on the transfer of technical knowledge, but also on transformation *Mindset* business actors to adopt technology as a *Competitive Advantage*. Training implementation *Digital Marketing* which has been proven to be able to improve the ability of MSMEs to create attractive promotional content and significantly expand the reach of product marketing. Empirical studies show that this training provides scalable support for small industries, allowing them to market their products or services to consumers more easily and effectively.

The modern empowerment paradigm emphasizes the importance of integration between technology learning and capacity building *Entrepreneurial*, creating an ecosystem that supports sustainable growth. The success of an enablement program is determined by the ability of participants to internalize digital knowledge and apply it in a comprehensive and adaptive marketing strategy. A geographical context such

as Metro Lampung has unique characteristics that require a training approach that is tailored to local conditions, but still refers to global standards *Digital Marketing* effective.

2.2 Human Resource Development in the Digital Era

Human resource development in the digital era requires a holistic approach that integrates technical competencies with adaptive capabilities to dynamic technological changes. Research shows that the gap between the supply and demand of the digital workforce in Indonesia in the period 2021-2025 requires strategic interventions through structured and sustainable training programs (Gayatri et al., 2023). Digital transformation has changed the paradigm of human resource development from a conventional approach to technology-based learning that emphasizes on *Digital Literacy* and innovation capabilities. Identification of HR management approaches in training includes *E-learning*, job rotation, cross-functional teams, and hybrid learning methodologies that can improve the skills of sustainable public service administration in Indonesia (Fade, 2023). The effectiveness of learning and development programs, digital communication platforms, and performance management systems shows a positive impact on employee productivity in a digital work environment, with measurable improvements through objective performance indicators (Syamsulbahri & Bardai, 2025).

The development of HR competencies as the key to organizational success in Indonesia requires a strong theoretical framework based on HR management literature, especially the concept of HR competencies that have an impact on overall organizational performance (Wijaya et al., 2024). Analysis of Indonesia's human resource productivity shows that the productivity level is still relatively low compared to neighboring countries such as Thailand and Malaysia, which is confirmed by Indonesia's Gross Domestic Product (GDP) data for the 2019-2023 period which shows a position that tends to be stable but not optimal (Syamsulbahri & Bardai, 2025). HR development strategies must take into account the characteristics of the digital generation that have different learning expectations and preferences, so it requires an innovative approach and *learner-centric*. Investments in human resource development through digital training programs have been proven to yield *return on investment* significant in the medium and long term. The integration of technology in the learning process allows for the personalization of learning experiences that can accommodate individual differences in learning abilities and styles. The success of human resource development in the digital era depends on the organization's ability to create *Learning Culture* that encourages innovation and collaboration across disciplines.

2.3 Work Productivity and Digital Transformation

Work productivity in the context of digital transformation is undergoing a fundamental redefinition that measures not only quantitative efficiency, but also the quality of innovation and adaptability to rapid technological change. The digitalization of MSMEs in Indonesia has been shown to drive productivity increases and market reach expansion substantially, with the adoption of existing digital solutions able to increase national productivity by up to $120 billion by 2025 (World Economic Forum, 2022). Empirical research shows that structured training programs result in an average productivity increase of 23% in the 6-12 month period post-implementation, indicating a strong positive correlation between investment in human resources development and *Output* organization. The concept of modern productivity integrates technical, innovative, and collaborative dimensions that correspond to the characteristics of work in the information technology sector and the digital economy.

Digital transformation in HR management affects organizational performance and workforce productivity in MSMEs and *Startup* in Indonesia through various dimensions that interact and strengthen each other (Alexander, 2025). Measuring productivity in the digital age requires comprehensive indicators, including *Task Completion Rate*, *Quality Performance*, *Innovation Index*and *Collaboration Effectiveness* which can provide a holistic picture of individual and team performance. The use of digital technology in business operations not only increases internal efficiency, but also creates *Value proposition* more competitive through product and service innovation. The correlation analysis between productivity dimensions shows

a synergistic effect that indicates that an increase in one aspect tends to catalyze a change in another dimension. Implementation of a data-driven productivity measurement system *Real-time* enable more accurate monitoring and evaluation of the effectiveness of training and development programs. Optimal work productivity in the digital age requires a balance between process automation and the development of human capabilities that cannot be replaced by technology, such as creativity, *Critical Thinking*and *emotional intelligence*.

2.4 Effectiveness of Training Programs in the Context of the Technology Industry

The effectiveness of training programs in the technology industry is determined by the program's ability to transform participants' competencies in a measurable and sustainable manner, with a focus on adaptability to exponential technological change. Training *Digital Marketing* proven to have a transformative impact on the capabilities of MSMEs in various regions of Indonesia, with an increase in knowledge reaching 129.4% and a turnover growth of 38.6% in business actors who participated in a structured training program (Alexander, 2025). Evaluation of training effectiveness requires design *Pre-post comparative study* that can provide strong empirical evidence regarding the causality between training programs and performance improvement, using objective and measurable quantitative methodologies. Research on community empowerment through training *Digital Marketing* showed that the training intervention involving 50 participants consisting of youth and MSME workers resulted in a significant increase in product marketing capabilities through digital platforms (Al-Amin, 2025).

An effective training program should integrate theoretical learning with hands-on practice, providing *hands-on experience* which allows participants to apply knowledge in real-world situations. Utilize training *Digital Marketing* to increase the marketing reach and performance of MSMEs in the Yogyakarta Palace shows that activities carried out through training and mentoring with lectures, discussions, and direct practice methods have resulted in measurable improvements (Community Empowerment, 2025). The development of the training curriculum should consider *Learning curve* which varies between participants, so it requires a learning approach that can be tailored to individual abilities and experiences. The sustainability of the effectiveness of the training program depends on the implementation *Follow-up* mentoring programs and systems that allow participants to continue developing their skills after the training ends. Integration of technology in the training process, such as the use of the platform *E-learning* and digital simulations, proven to improve *Commitment* participants and accelerate the learning process. Long-term evaluation of the effectiveness of the training program requires *Tracking* systematic to the participant's development in an extended period to capture *sustained impact* from learning interventions. Collaboration between educational institutions, government, and the private sector in the development of training programs can optimize *resource allocation* and ensuring curriculum relevance to dynamic industry needs.

3. METHODOLOGY

3.1 Research Approach and Design

This study uses a quantitative approach with a design *Quasi-Experimental Pre-Post Test* to analyze the effectiveness of training programs and human resource development on increasing work productivity. The design of this study was chosen because of its ability to provide strong empirical evidence regarding the causal relationship between training interventions and changes in work productivity (Bhandari, 2020). The research uses a positivist paradigm with a deductive approach that aims to test hypotheses based on existing theories. Design *Pre-post test* allows researchers to measure the changes that occur in the study subjects before and after the provision of training program interventions. The internal validity of the research was strengthened through control of the confounding variables and the use of validated measurement instruments.

3.2 Population and Sample

The research population is all employees in information technology companies who participate in HR training and development programs during the 2024-2025 period, with an estimated population of 120 employees. The research sample consisted of 35 respondents who were selected using *purposive sampling* techniques based on inclusion criteria: permanent employees with a minimum tenure of 1 year, full training programs with a minimum attendance rate of 90%, willing to participate in the research, and have access to the company's performance evaluation system. Exclusion criteria include employees who are on long leave, experiencing job rotation during the research period, or having special conditions that may affect work productivity. This sample size is considered adequate for comparative statistical analysis based on *power analysis* with a confidence level of 95%, *effect size* medium (d=0.5), and *statistical power* of 80% (ActivTrak, 2025).

3.3 Data Collection Techniques

Work productivity data was collected in two periods: before the implementation of the training program (*pre-test*) and 3 months after the completion of the program (*post-test*) to provide sufficient time for the effects of the training to be internalized in daily work behavior. The data collection instrument used a structured questionnaire with a Likert scale of 1-5 that had gone through an expert validation process and a reliability test with a Cronbach's Alpha ≥ value of 0.70. Work productivity measurement is carried out through triangulation methods that include direct observation of employee performance, supervisor assessment using *performance appraisal forms*, and employee *self-assessment* to ensure data objectivity. Secondary data in the form of monthly performance reports and *key performance indicators* (KPIs) are also collected from the company's management information system to strengthen the validity of the construct.

3.4 Data Analysis Techniques

The data analysis technique used inferential statistics with *a paired sample t-test* to test the significance of differences in work productivity before and after the training program intervention. Before conducting the hypothesis test, a prerequisite test was carried out which included a normality test using *the Shapiro-Wilk test* and a variance homogeneity test. Descriptive analysis was used to describe respondent characteristics and data distribution using measures of central tendency and dispersion. *Effect size* is calculated using Cohen's d to determine the practical magnitude of the difference found. Additional analysis in the form of bivariate correlations was conducted to explore the relationship between work productivity indicators. Data processing using SPSS software version 26 with a significance level of $\alpha = 0.05$.

3.5 Operational Definition

Table 1. Operational Definition

Variable	Conceptual Definition	Operational Definition	Indicators	Scale
HR Training and Development Program	A series of structured learning activities to improve employee competence	Learning activities include the latest technology training, project management, and leadership development with a minimum duration of 40 hours for 3 months	1. Training duration 2. Types of competencies 3. Learning method 4. Participation rate	Nominal
Work Productivity	The ratio between the output produced and the input used in	Ability of employees to produce quality output in an efficient time	1. Task Completion Rate 2. Quality Performance 3. Innovation Index 4. Collaboration Effectiveness	Likert 1-5

Variable	Conceptual Definition	Operational Definition	Indicators	Scale
	the context of IT work			

4. RESULT AND DISCUSSION

4.1. Results

4.1.1. Respondent Characteristics

Based on data analysis from 35 study respondents, demographic characteristics show a representative distribution for the IT employee population. The majority of respondents were male (65.7%) and 12 female (34.3%). The age range of respondents ranged from 25-36 years with an average of 29.8 years (SD=3.2), illustrating the profile of relatively young and productive IT employees. In terms of education, 28 respondents (80%) have a S1 background, 4 respondents (11.4%) have a S2 education, and 3 respondents (8.6%) are D3 graduates. Respondents' tenure varied between 1-6 years with an average of 3.1 years (SD=1.4), reflecting a combination of junior and senior employees that is optimal for evaluating training effectiveness. The distribution of respondents' positions includes Programmer (8 people, 22.9%), Backend Developer (7 people, 20%), UI/UX Designer (6 people, 17.1%), Digital Marketing (5 people, 14.3%), Project Manager (4 people, 11.4%), IT Support (3 people, 8.6%), and Frontend Developer (2 people, 5.7%). This composition shows a good representation of the various functions of information technology in the organization.

4.1.2. Pre-test and Post-test Work Productivity Analysis

4.1.2.1. Descriptive Statistics

Table 2 presents the results of descriptive statistical analysis for the four dimensions of work productivity before and after the implementation of the training program:

Table 2. Descriptive Statistics of Pre-test and Post-test Work Productivity

Productivity Dimension	Pre-test		Post-test		Increased
	Mean	SD	Mean	SD	(%)
Task Completion Rate	3,55	0,25	4,28	0,21	20,60%
Quality Performance	3,64	0,27	4,36	0,23	19,80%
Innovation Index	3,35	0,28	4,12	0,24	23,00%
Collaboration Effectiveness	3,72	0,26	4,39	0,22	18,00%
Overall Average	**3,57**	**0,27**	**4,29**	**0,23**	**20,20%**

The data shows consistent improvements across all dimensions of work productivity. The Innovation Index experienced the highest increase (23.0%), followed by Task Completion Rate (20.6%), Quality Performance (19.8%), and Collaboration Effectiveness (18.0%). A lower standard deviation in the post-test period indicates a convergence of performance among employees after training.

4.1.2.2. Normality and Homogeneity Test

The Shapiro-Wilk test showed that the pre-test and post-test data for all dimensions of distributed productivity were normal ($p > 0.05$). The results of the normality test were: Task Completion Rate (pre:

p=0.234; post: p=0.198), Quality Performance (pre: p=0.186; post: p=0.271), Innovation Index (pre: p=0.142; post: p=0.203), and Collaboration Effectiveness (pre: p=0.256; post: p=0.189). Levene's test for variance homogeneity also showed homogeneous variance ($p > 0.05$), meeting the prerequisites for the paired sample t-test analysis.

4.1.3. Uji Paired Sample T-test

Table 3. Paired Sample T-test Results

Productivity Dimension	Mean Difference	t-value	Df	p-value	Cohen's d	Interpretation
Task Completion Rate	0,73	12,84	34	< 0.001***	2,17	Large Effect
Quality Performance	0,72	11,96	34	< 0.001***	2,02	Large Effect
Innovation Index	0,77	13,52	34	< 0.001***	2,29	Large Effect
Collaboration Effectiveness	0,67	10,88	34	< 0.001***	1,84	Large Effect

$p < 0.001$

The results of the paired sample t-test analysis showed significant differences ($p < 0.001$) in all dimensions of work productivity between the pre-test and post-test periods. All dimensions showed large effect size (Cohen's $d > 0.8$), with the Innovation Index having the highest effect size ($d = 2.29$), followed by Task Completion Rate ($d = 2.17$), Quality Performance ($d = 2.02$), and Collaboration Effectiveness ($d = 1.84$).

4.1.4. Productivity Dimension Responsiveness Analysis

To identify the productivity dimensions that are most responsive to the training program, an analysis of the percentage increase and effect size is performed. The Innovation Index showed the highest responsiveness with an increase of 23.0% and an effect size of 2.29. This indicates that training programs focused on the latest technologies and innovative methodologies are very effective in improving the innovation capabilities of IT employees. The Task Completion Rate took second place with an increase of 20.6% and effect size of 2.17, indicating that project management training and workflow optimization successfully improved task completion efficiency. Quality Performance increased by 19.8% with an effect size of 2.02, reflecting the increased ability of employees to produce high-quality output. Collaboration Effectiveness, although showing a significant increase (18.0%), has the lowest relative responsiveness with an effect size of 1.84.

4.1.5. Correlation Between Productivity Dimensions

Pearson's correlation analysis showed a significant positive relationship between productivity dimensions in the post-test period. The Innovation Index was strongly correlated with Task Completion Rate ($r = 0.742$, $p < 0.001$) and Quality Performance ($r = 0.689$, $p < 0.001$). Quality Performance was moderately correlated with Collaboration Effectiveness ($r = 0.623$, $p < 0.001$). These findings indicate that an increase in one dimension of productivity is likely to be followed by an increase in the other, demonstrating the synergistic effect of a comprehensive training program.

4.1.6. Magnitude of Productivity Increase

Overall, the HR training and development program succeeded in increasing employee work productivity by 20.2% with a confidence interval of 95% (18.7% - 21.7%). The magnitude of this increase is categorized as a substantial improvement based on IT industry standards. Trend analysis showed that 97.1% of respondents (34 out of 35) experienced increased productivity in at least three of the four

dimensions measured. The distribution of improvements showed interesting individual variations: 8 respondents (22.9%) experienced very high improvements (> 25%), 19 respondents (54.3%) experienced high improvements (15-25%), 7 respondents (20%) experienced moderate improvements (10-15%), and only 1 respondent (2.8%) experienced a low improvement (< 10%). This distribution pattern shows the effectiveness of a training program that is consistent across different individual characteristics and job functions. The findings of this study provide strong empirical evidence that structured and comprehensive HR training and development programs are able to produce significant and sustainable increases in work productivity in the context of the information technology industry, with the Innovation Index being the most responsive dimension to training interventions.

4.2. Discussion

4.2.1. The Effectiveness of HR Training and Development Programs in Increasing Employee Work Productivity

Empirical findings show that the implementation of training and human resource development programs results in a transformative impact on employee work productivity in the information technology industry. Based on descriptive statistical analysis, the overall productivity dimension experienced a consistent escalation with an average increase of 20.2%. These results confirm the research (Maszudi, 2023) that emphasises the importance of a structured digital strategy for sustainable empowerment, as well as in line with the findings (Hendra et al., 2024) which identified that digital training programs resulted in increased knowledge in 86% of participants and transformation of marketing practices in 76% of business actors. (Kusuma et al., 2022) Reinforcing these findings by showing that digital marketing provides easy access to information and efficiency of internet-based transactions. The magnitude of the increase achieved indicates that structured training interventions are able to optimize the individual capacity of employees in adopting the latest technologies and innovative methodologies. Consistency of improvement *across different job functions* demonstrate the universality of the effectiveness of the training program in the context of an information technology organization, where each job function derives substantial benefits from *Knowledge Transfer* and *Skill Enhancement* given.

4.2.2. Significance of Differences in Work Productivity Levels Before and After Program Implementation

Inferential analysis through *Paired Sample T-Test* confirms the existence of significant differences ($p < 0.001$) across productivity dimensions between periods *Pre-test* and *Post-test*. The results of the statistical test show that *Task Completion Rate* Experiencing an increase with *mean difference* 0.73 and *t-value* 12.84, while *Quality Performance* show progress with *mean difference* 0.72 and *t-value* 11,96. These findings are corroborated by research (Alexander, 2025) who reported an increase in knowledge scores reaching 129.4% and a turnover growth of 38.6% in MSME actors who participated in digital training. (Dewi et al., 2025) confirming the significance of this transformation by showing that the digitalization of MSMEs drives productivity and expands market reach substantially. (Ruscitasari et al., 2022) Strengthening empirical evidence by reporting on the positive impact of digital training on business financial management and financial literacy of business actors. Consistent statistical significance indicates that training programs are not a phenomenon *Accidental*, but rather systematic interventions that result in measurable transformations in work productivity. Convergence of performance between employees, as indicated by lower standard deviations in the period *Post-test*, showing that the training program successfully reduces performance variability and creates a more homogeneous standardization of competencies.

4.2.3. The Magnitude of Increased Work Productivity Through Training Programs

Quantification of the magnitude of productivity increase revealed that 97.1% of respondents made progress on at least three of the four dimensions evaluated, with the distribution of improvements showing significant individual variation. The study identified that 22.9% of respondents achieved very high improvement (>25%), 54.3% experienced a high improvement (15-25%), and 20% achieved moderate improvement (10-15%). This magnitude is in line with the findings (Fionita et al., 2024) which reported significant improvements in market reach and operational efficiency through the implementation of digitalization and structured training. (Femberianus Sunario Tanggur et al., 2024) Strengthening this perspective by showing that strengthening digital literacy provides community capacity to access and disseminate information through digital platforms. (Afiffah et al., 2022) Confirm the effectiveness of the training model by reporting on participants' ability to develop engaging promotional content and expand the reach of product marketing. *Confidence interval* 95% (18.7% - 21.7%) indicate reliable consistency of results for generalizations of the broader IT employee population. Improved distribution *positively skewed* demonstrate that the training program does not only result in marginal improvements, but substantial transformations that are categorized as *substantial improvement* based on contemporary information technology industry standards.

4.2.4. Responsiveness of the Productivity Dimension to Training Programs

A comparative analysis of responsiveness reveals that *Innovation Index* showed the highest sensitivity to training interventions with a 23.0% increase and *effect size* 2.29 (Cohen's d). These findings are reinforced by research (Vicky Yoga Satria et al., 2025) which shows that local potential-based digital marketing training is effective in increasing the competitiveness and independence of business actors through a significant increase in digital marketing skills. The superior responsiveness of the innovation dimension indicates that the training program is focused on the latest technologies and methodologies *Cutting-edge* produce the most significant transformative impact. *Task Completion Rate* occupying second place with an increase of 20.6% and *effect size* 2.17, demonstrating the effectiveness of project management training and *Workflow Optimization*. Significant positive correlations between productivity dimensions, especially between *Innovation Index* with *Task Completion Rate* (r = 0.742) and *Quality Performance* (r = 0.689), indicating a synergistic effect demonstrating that innovative capacity building tends to catalyze improvements in other productivity dimensions. These findings were confirmed by (Afiffah et al., 2022) that report an increase in the ability to create promotional content and the expansion of marketing reach simultaneously, while (Kusuma et al., 2022) emphasizing that digital marketing strategies provide effectiveness and efficiency without the need for intensive mobilization, creating synergies between mutually reinforcing productivity components.

5. CONCLUSIONS

Digital marketing training programs implemented for business actors in Metro Lampung have been proven to produce a transformative impact on work productivity with a significant increase of 20.2% (CI 95%: 18.7%-21.7%). Based on the analysis of 35 IT employee respondents with representative demographic characteristics, the training program succeeded in increasing all four dimensions of productivity consistently, with the Innovation Index showing the highest responsiveness (23.0%, Cohen's d = 2.29), followed by Task Completion Rate (20.6%, Cohen's d = 2.17), Quality Performance (19.8%, Cohen's d = 2.02), and Collaboration Effectiveness (18.0%, Cohen's d = 1.84). Consistent statistical significance ($p < 0.001$) across all dimensions confirms that digital marketing training programs are not an accidental phenomenon, but rather a systematic intervention that results in measurable transformation. Significant positive correlations between productivity dimensions demonstrate a synergistic effect indicating that improvements in one aspect tend to catalyze improvements in others, with 97.1% of respondents making progress on at least three of the four dimensions evaluated. The convergence of performance between employees demonstrated by the lower standard deviation in the post-test period

indicates the program's success in reducing performance variability and creating a homogeneous standardization of competencies.

Based on empirical findings that reveal the superior responsiveness of the Innovation Index dimension to training programs, organizations need to optimize resource allocation on the development of training modules that focus on the latest technologies and innovative methodologies to maximize transformative impact. The next training program should integrate a holistic approach that leverages synergistic effects between productivity dimensions, in particular the strong correlation between the Innovation Index and Task Completion Rate and Quality Performance, through curriculum design that connects innovative technology learning with project management practices and quality assurance. Given the increased distribution which shows that 22.9% of respondents reached the very high category (>25%) while 2.8% were still in the low category (<10%), the implementation of training personalization strategies based on individual characteristics and baseline competency needs to be implemented to optimize outcomes for all participants. The sustainability of the program can be improved through the development of a continuous mentoring system and periodic refresher training that utilizes digital technology to maintain the momentum of long-term productivity increase, as well as the expansion of programs to other MSME sectors in Lampung by adapting content in accordance with specific industry characteristics.

Ethical Approval

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Formal ethical approval was not required, as the research involved minimal risk to participants and did not collect sensitive personal data.

Informed Consent Statement

All participants were informed about the purpose, procedures, and voluntary nature of the study. Written informed consent was obtained from each participant prior to data collection, ensuring that they understood their rights, including the right to withdraw at any time without penalty. Data confidentiality and anonymity were maintained throughout the research process

Authors' contributions

Shultonnyck Adha was responsible for the conceptualization of the study, methodology design, data collection, and drafting of the manuscript. He also contributed to the interpretation of findings and the refinement of the research framework. Sabar Sutia supervised the overall research process, provided theoretical and strategic insights, contributed to data analysis, and critically revised the manuscript for academic rigor and clarity. Both authors reviewed and approved the final version of the manuscript.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

The data presented in this study are available on request from the corresponding author due to privacy reasons.

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Notes on Contributors

Shultonnyck Adha

https://orcid.org/0000-0001-8750-4663

Shultonnyck Adha is a Doctor in Marketing and currently serves as a Lecturer at the Management Department, Kusuma Negara Business School. His research interests include consumer behavior, digital

marketing strategies, and marketing management. He has published in several national and international journals and is actively engaged in teaching and research in the field of marketing.

Sabar Sutia
https://orcid.org/0000-0001-8519-1624
Sabar Sutia is a Doctor in Strategic Management and an Associate Professor at the Management Department, Kusuma Negara Business School. His academic work focuses on corporate strategy, organizational performance, and strategic innovation. He has extensive experience in research and academic collaboration, with contributions in high-ranking journals and conference proceedings.

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