

DIGITALIZATION AND EMPLOYEE PRODUCTIVITY: THE MODERATING EFFECT OF TRANSFORMATIONAL AND TRANSACTIONAL LEADERSHIP

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Abstract

With an emphasis on the moderating effects of transformational and transactional leadership styles, this learning investigates how employee productivity is precious by digitalisation. Organisations are liable more and more on digital technologies to recover performance and efficiency in today's technologically advanced world. The study uses a quantitative research design, gathering primary data from workers in particular industries using a standardised questionnaire. The optional hypotheses are tested using statistical methods counting regression, moderation analysis, correlation, and descriptive analysis. The results show that staff productivity is significantly better-quality by digitalisation. Productivity is definitely impacted by both transactional and transformational leadership philosophies, with transformational leadership having a greater impact. Moreover, the moderation study verifies that the link between staff productivity and digitalisation is improved by leadership styles. The study originates to the deduction that exploiting the advantages of digital transformation and enhancing overall organisational performance require strong leadership.

Key Words: Digitalization, Employee Productivity, Transformational Leadership, Transactional Leadership, Organizational Performance & Technology Adoption

1. Introduction

Digitalisation has become a revolutionary force in today's corporate environment, changing personnel roles, organisational structures, and procedures (DiRomualdo, A., et.al., 2018). Organisational communication and operational efficiency have been greatly improved by the incorporation of cutting-edge digital technologies like cloud computing, artificial intelligence, and data analytics (Varriale, V., et.al., 2025). Research on how digital technologies affect employee productivity has grown crucial as businesses use them more and more. Employees can do jobs more quickly, accurately, and with greater flexibility thanks to digitalisation, which also simplifies workflows and minimises manual labour (Matalamäki, M. J., & Joensuu-Salo, S., 2022). However, how well people use and adjust to new technologies will determine how effective digital transformation is in raising productivity (Cijan, A., et.al., 2019).

At the same time, during times of technological transition, leadership is crucial in determining organisational results and employee behaviour (Manda, H. M., & Abidin, A. Z., 2023). Employees are encouraged to accept change and acquire new skills via transformational leadership, which is defined by inspiration, motivation, and an emphasis on innovation (Al-Edenat, M., 2018). On the other hand, transactional leadership guarantees discipline and consistency in accomplishing organisational goals by emphasising specified activities, explicit expectations, and reward-based performance (Chebonye, R. T., 2016). The way that digitalisation affects worker productivity may be greatly influenced by both leadership philosophies (Erhan, T., et.al., 2022).

The crux of this study is to investigate the moderating effects of transformational and transactional leadership on the link between staff productivity and digitalisation (Balawi, A., 2024). The study offers greater insights into maximising productivity in a digitally changing workplace by examining how leadership styles affect workers' reactions to digital projects (Erhan, T., et.al., 2022). Organisations looking to maximise the advantages of digital transformation while retaining an engaged and productive staff must comprehend this interaction (Gilch, P. M., & Sieweke, J., 2021).

2. Review of Literature

As businesses progressively use cutting-edge technology to boost productivity and competitiveness, the idea of digitalisation has drawn a lot of attention in recent years (Shah, I. A., et.al., 2022). According to studies, digital tools like automation, cloud computing, and data analytics improve decision-making and streamline operations, which increases worker productivity (Bejinaru, R., & Balan, I., 2020). However, employees' capacity to adjust to organisational support systems and technology advancements will determine how much productivity is increased (Cullen, K. L., et.al., 2014).

Digital settings may both improve and impair performance, according to research on worker productivity (Varriale, V., et.al., 2025). Employee results may be adversely affected by issues including technostress, skill shortages, and aversion to change, even while digital technologies decrease manual labour and increase accuracy (Akbar, M. A., et.al., 2025). As a result, leadership plays a critical role in enabling seamless digital transformations (Sacavém, A., et.al., 2025). Transformational leadership is generally acknowledged in leadership literature for its capacity to inspire, motivate, and foster employee creativity (Senadjki, A., et.al., 2024). This type of leadership encourages learning, cultivates a healthy workplace culture, and helps staff

members adjust to digital changes (Ahsan, M. J., 2025). According to empirical research, transformational leaders greatly increase worker productivity and engagement, especially in fast-paced, technologically advanced workplaces (Krywalski-Santiago, J., 2024).

Conversely, transactional leadership emphasises defined positions, organised procedures, and performance-based rewards (Tinise, A., 2022). Accountability and consistency are guaranteed by this leadership approach, which may help sustain productivity during the use of digital technology (Balogun, O., & Zaghmout, B., 2024). However, compared to transformational leadership, it could not have the adaptability and flexibility needed to promote creativity (Żywiołek, J., et.al., 2022). Research demonstrates that successful digital adoption boosts operational effectiveness and competitive advantage, supporting the well-established link between digitalisation and organisational performance (Zaman, S. A. A., et.al., 2025). Furthermore, theories of technology adoption, including the Technology Acceptance Model (TAM), highlight perceived utility and usability as important factors affecting workers' acceptance of digital technologies (Lee, A. T., et.al., 2025).

3. Methodology

3.1. Research Gap

Few studies have looked at how digitalisation directly affects worker productivity in the presence of various leadership philosophies, despite the increased focus on digitalisation and its effects on organisational performance (Varriale, V., et.al., 2025). Previous studies frequently concentrate on either leadership or digital transformation separately, without combining the two factors into a holistic framework. Furthermore, little is known about how transformational and transactional leadership influence workers' abilities to adapt to digital technologies, especially in developing nations like India (Al-Edenat, M., 2018). Additionally, there is a substantial research vacuum since there is a dearth of empirical data examining how leadership styles affect the efficacy of digital efforts at the employee level (Bejinaru, R., & Balan, I., 2020).

3.2. Objectives of the Study

With reference to the research problem mentioned above, the objectives of the study are mentioned below:

- To examine the impact of digitalization on employee productivity.
- To analyze the influence of transformational and transactional leadership on employee productivity.
- To evaluate the moderating effect of leadership styles on the relationship between digitalization and employee productivity.

3.3. Hypothesis of the Study

With reference to the research objectives mentioned above, the hypothesis of the study are mentioned below:

H1: Digitalization has a significant positive impact on employee productivity.

H2: Transformational leadership has a significant positive impact on employee productivity.

H3: Transactional leadership has a significant positive impact on employee productivity.

H4: Transformational leadership significantly moderates the relationship between digitalization and employee productivity.

H5: Transactional leadership significantly moderates the relationship between digitalization and employee productivity.

3.4. Scope of the Study

It focuses on investigating the connection between staff productivity and digitalisation in a few chosen companies (Al-Edenat, M., 2018). It takes into account workers in fields like banking, education, and services where digital technologies are actively used (Erhan, T., et.al., 2022). Without taking into account alternative leadership philosophies, the study is restricted to examining the moderating function of transformational and transactional leadership styles (Gilch, P. M., & Sieweke, J., 2021). Geographically, the study may be limited to a certain area, like a few Gujarati cities, which would make the results context-specific (Ahsan, M. J., 2025). The research focuses on employee views rather than organizational-level performance measures and is based on primary data gathered through structured questionnaires and as a result, the findings could not apply to all sectors of the economy or geographical areas (Balogun, O., & Zaghmout, B., 2024).

3.5. Sampling Techniques of the Study

Convenience sampling is a non-probability sampling approach used to get data from respondents who are willing and able to participate (Lee, A. T., et.al., 2025). The target group is chosen to be employees of companies that have used digital tools. Respondents from a variety of industries, including banking, education, and services, are given a standardised questionnaire. In order to guarantee sufficient representation, the sample size is established depending on study needs and practicality (Matalamäki, M. J., & Joensuu-Salo, S., 2022). Convenience sampling makes it possible to collect data quickly, but it may restrict generalisability and increase bias. To improve the validity and dependability of the results, however, an attempt is made to incorporate respondents from a variety of backgrounds (Balawi, A. 2024).

3.6. Research Design

A descriptive and analytical study methodology to investigate how employee productivity and digitalisation are related, as well as the moderating effect of leadership styles (Cahyadi, A., et.al., 2022). A systematic questionnaire using a Likert scale to gauge respondents' opinions is used to gather primary data (South, L., et.al., 2022). The conceptual framework is supported by secondary data collected from journals, publications, and reports and the hypotheses are tested using statistical methods including regression analysis, moderation analysis, and correlation (Salawu, R., et.al., 2023).

3.7. Societal Importance of the Study

Through the efficient use of digital technology, it assists organisations in increasing staff productivity (Tinise, A., 2022). Additionally, it offers insights on leadership techniques that facilitate worker flexibility which also helps policymakers formulate policies for the transition of the digital workforce while also promoting skill development and digital literacy among workers (Ahsan, M. J., 2025). By improving organisational effectiveness and efficiency, it promotes economic growth.

4. Data Analysis and Interpretations

Objective 1: To examine the impact of digitalization on employee productivity.

Table 1: Descriptive Statistics for measures of impact of digitalization on Employee Productivity

| Variables | Mean | Std. Deviation | Cronbach's Alpha |
|-----------------------------|------|----------------|------------------|
| Digitalization | 3.85 | 0.62 | 0.82 |
| Employee Productivity | 3.92 | 0.58 | 0.85 |
| Transformational Leadership | 4.01 | 0.65 | 0.88 |
| Transactional Leadership | 3.76 | 0.6 | 0.8 |

(Source: Research Result)

The mean score for digitalization (3.85) suggests that respondents perceive a considerable presence of digital tools and technologies within their organizations. Similarly, employee productivity has a relatively high mean value (3.92), indicating that employees feel productive in the digital work environment. Among leadership styles, transformational leadership records the highest mean (4.01), reflecting its strong presence and potential role in enhancing employee motivation and adaptability to digital changes, while transactional leadership (3.76) shows a moderate presence. The standard deviation values for all variables are low, indicating consistency in responses. Furthermore, the Cronbach's Alpha values for all constructs exceed 0.70, confirming good internal reliability.

Objective 2: To analyze the influence of transformational and transactional leadership on employee productivity.

Table 1: Relationship between the Parameters of transformational and transactional leadership on employee productivity

| Variables | 1 | 2 | 3 | 4 |
|-----------------------------|------|------|-----|---|
| Digitalization | 1 | | | |
| Employee Productivity | 0.68 | 1 | | |
| Transformational Leadership | 0.55 | 0.72 | 1 | |
| Transactional Leadership | 0.49 | 0.65 | 0.6 | 1 |

(Source: Research Result)

Transformational leadership shows a high correlation with employee productivity ($r = 0.72$), indicating that leaders who inspire, motivate, and support innovation significantly enhance employee performance. Similarly, transactional leadership also demonstrates a substantial positive relationship with employee productivity ($r = 0.65$), suggesting that structured systems of rewards and clear expectations contribute to improved performance, though to a slightly lesser extent than transformational leadership. Additionally, both leadership styles are

moderately correlated with digitalization, implying that effective leadership facilitates the adoption and utilization of digital tools.

Table 2: Impact of transformational and transactional leadership on employee productivity

| Variables | β | t-statistics | Sig. |
|-----------------------------|---------|--------------|---------|
| Digitalization | 0.35 | 6.12 | 0.000** |
| Transformational Leadership | 0.42 | 7.25 | 0.000** |
| Transactional Leadership | 0.28 | 5.1 | 0.000** |
| Intercept | 0.254 | | |

(Source: Research Result)

Hypothesis Framing

H1: Digitalization has a significant positive impact on employee productivity.

H2: Transformational leadership has a significant positive impact on employee productivity.

H3: Transactional leadership has a significant positive impact on employee productivity.

Transformational leadership had the greatest impact ($\beta = 0.42$, $t = 7.25$, $p < 0.001$), indicating that innovative, inspiring, and motivating leaders are essential to improving worker performance. Additionally, transactional leadership exhibits a statistically significant effect ($\beta = 0.28$, $t = 5.10$, $p < 0.001$), suggesting that, albeit to a lesser degree, organised techniques based on performance monitoring and rewards enhance productivity. Furthermore, digitalisation continues to be a strong predictor ($\beta = 0.35$), highlighting its contribution to increased efficiency.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

Y = Employee Productivity

X1 = Digitalization

X2 = Transformational Leadership

X3 = Transactional Leadership

ϵ = Error Term

$$Y = 0.254 + 0.35(X_1) + 0.42(X_2) + 0.28(X_3) + \epsilon$$

Objective 3: To evaluate the moderating effect of leadership styles on the relationship between digitalization and employee productivity.

Table 3: Moderation Effect of leadership styles on the relationship between digitalization and employee productivity

| Interaction Term | Beta (β) | Sig. |
|--|------------------|---------|
| Digitalization - Transformational Leadership | 0.18 | 0.002** |
| Digitalization - Transactional Leadership | 0.12 | 0.01** |

(Source: Research Result)

The positive and highly significant interaction effect between digitalisation and transformational leadership (β value = 0.18, $p = 0.002$) suggests that transformational leadership enhances the benefits of digitalisation on worker productivity. This implies that leaders that encourage, inspire, and promote innovation help staff members make better use of digital technologies, which improves their performance. Comparatively weaker, transactional leadership also has a substantial moderating impact (β value is, $p = 0.01$), suggesting that reward-based systems and structured guiding support the advantages of digitalisation.

Table 4: Moderating effect of leadership styles on the relationship between digitalization and employee productivity

| Hypothesis | Statement | Result |
|------------|--|----------|
| H1 | Digitalization → Employee Productivity | Accepted |
| H2 | Transformational Leadership → Productivity | Accepted |
| H3 | Transactional Leadership → Productivity | Accepted |
| H4 | Moderating Effect of Transformational Leadership | Accepted |
| H5 | Moderating Effect of Transactional Leadership | Accepted |

(Source: Research Result)

The acceptance of H1 demonstrates the significance of technology integration in improving job efficiency by confirming that digitalisation has a favourable effect on staff productivity. The acceptance of H2 and H3 shows that both transformational and transactional leadership approaches greatly enhance worker performance, with each having a unique function in directing and inspiring workers. Additionally, the adoption of H4 and H5 demonstrates that both leadership philosophies significantly moderate the association between staff productivity and digitalisation. This suggests that the benefits of digitalisation are reinforced by strong leadership.

5. Findings, Conclusion & Suggestions of the Study

5.1. Findings

The study's high mean values and strong regression coefficient ($\beta = 0.35$) indicate that staff productivity is significantly improved by digitalisation. Workers believe that digital technologies may improve productivity and productivity. With Cronbach's Alpha values over the permissible limit, the reliability analysis verifies that every construct is reliable and consistent.

The results also show that staff productivity is positively impacted by both transactional and transformational leadership styles. The greatest benefit is shown by transformational leadership ($\beta = 0.42$), emphasising the significance of employee engagement, creativity, and motivation in a digital workplace. Additionally, transactional leadership makes a substantial contribution

($\beta = 0.28$), highlighting the importance of incentive systems and organised procedures in sustaining performance levels.

Additionally, the moderation study verifies that the association between employee productivity and digitalisation is strengthened by leadership styles. In comparison to transactional leadership ($\beta = 0.12$), transformational leadership has a larger moderating impact ($\beta = 0.18$).

5.2. Conclusions

The study concludes that digitalization significantly enhances employee productivity, particularly when supported by effective leadership. Both transformational and transactional leadership styles positively influence employee performance, with transformational leadership showing a stronger impact. Additionally, leadership styles play a crucial moderating role by strengthening the relationship between digitalization and productivity.

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