

## GENERATIVE AI-DRIVEN PRODUCTIVITY AND SHADOW AI USAGE IN THE WORKPLACE: AN EMPIRICAL STUDY, TAMIL NADU

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**Abstract**—Generative Artificial Intelligence is a burgeoning technology transforming workplace practices, including content generation, summarisation, problem-solving, and information retrieval. In fact, they are more efficient and easier to handle. Evidence links the use of Gen AI in the workplace to improvements in productivity and job performance. However, these publicly available tools have paved the way for the emergence of Shadow AI, which involves employees' use of AI tools. Emerging research shows that efficiency-related perceptions can encourage workplace AI use while organizational awareness and governance remain important concerns. "In 2025, enterprises generated nearly one trillion AI/ML transactions across the Zscaler cloud—expanding the enterprise attack surface and making scalable AI security a practical necessity. (ZScaler Industry report, 2026)" This study examines the relationship between employees' perceived productivity benefits of Generative AI and their usage of Shadow AI. This study adopts a quantitative, cross-sectional research design. Data were collected from employees who had used Gen AI tools in the past 6 months, and a structured questionnaire using a 5-point Likert scale was administered. Independent variable will be perceived productivity benefits, and the dependent variable will be Shadow AI usage. A total of 250 respondents were selected for the study, and data were analyzed using SPSS, descriptive statistics, Cronbach's alpha, Pearson correlation, and simple linear regression. The findings indicate that the B coefficient is 0.669 and positive, meaning that as employees' perceived productivity benefit increases, the use of Shadow AI also increases. The p-value is  $< .001$ , so the relationship between the two variables is statistically significant. The t-value is 57.120, providing strong evidence that the perceived productivity benefit of Gen AI usage is a statistically significant predictor of Shadow AI. The standardized coefficient  $\beta = 0.964$  indicates a much stronger positive relationship between the two variables in this study. The regression equation  $SA = 1.249 + 0.669(PP)$  reveals that for every one-unit increase in perceived productivity, predicted Shadow AI usage increases by approximately 0.669 units. The confidence interval values indicate that the entire interval is above zero and, hence, the estimated relationship is positive. Hence, it is clearly evident that higher perceived productivity benefits from Generative AI are associated with higher levels of Shadow AI usage among the respondents.

**Keywords:** Generative AI, Shadow AI, Organizational Behavior, Productivity, Job Performance.

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### Introduction

"Generative AI, sometimes called *gen AI*, is artificial intelligence (AI) that can create original content such as text, images, video, audio, or software code in response to a user's prompt or request" (IBM, n.d.). Gen AI has emerged as a workplace tool for a wide range of activities, and the growing availability of tools like Gemini, ChatGPT, Copilot, and Claude has lowered the barriers to adoption. A 2025 systematic review of 74 studies "found that GAI has been used across seven industries. The main benefits of GAI were automating work, improving work processes, helping employees make decisions, improving communication, and supporting interaction between humans and machines" (Daniel Caamaño-Gordillo, 2025). Shadow AI is an emerging organizational phenomenon in which employees use AI tools without sufficient organizational approval, oversight, or governance.

But workplace Gen AI adoption is not occurring uniformly across the organization. “A Deloitte survey of **25,000 working adults in the UK across 22 industries** found About **one-third of employees who use Generative AI do so without their employer's knowledge, 63% of respondents had used Generative AI**, while around **half of these users had not received any training from their employers** on how to use AI properly. These findings suggest that organizations need to pay greater attention to unofficial AI use, employee training, **and AI governance**. Clear policies and proper training may help organizations better understand and manage Shadow AI” (CFO, 2026)

Shadow AI: Employees are independently accessing publicly available GenAI tools without clear organizational guidance or approval. “Sebastian's 2026 Digital Shadow AI Risk Theory (DART) identifies data disclosure, privacy, governance, and other organizational risks associated with informal AI use. Importantly for the present study, the research reports that perceived efficiency increases AI use and data sharing.” (Sebastian, 2026) . Hence, this raises an important question: Does the perceived productivity benefit of Generative AI encourage employees to engage in Shadow AI use? The present study focuses on this relationship.

### **Research problem**

The main problem is the stigma surrounding productivity-driven Gen AI adoption and the organization's control over its use. Employees may think of Gen AI as a friendly way to complete tasks more quickly and efficiently. But AI systems approved by the organization may not be available at all times; a few may appear available; existing AI tools may not work efficiently; or they may not cater to employees' needs. Gradually, employees may start using their own publicly available Gen AI applications. This creates a significant gap between Employee-level AI adoption and Organization-level AI governance. On the other hand, a few recent studies highlight that Shadow AI may lead to data disclosure, privacy breaches, and governance issues. Still, there remains scope to analyze employee-level motivation for using Shadow AI, particularly whether perceived productivity benefits are associated with this behavior. Hence, this study sheds light on the relationship between employees' perceived productivity benefits from GenAI and their use of Shadow AI.

### **Research Gap**

The literature provides evidence that GenAI can improve workplace productivity and job performance. For example, Li and colleagues' field study demonstrated productivity gains among customer-support workers using a GenAI assistant, while Liu et al. (2025) found a significant positive relationship between Generative AI literacy and job performance.

At the same time, emerging research has begun to examine Shadow AI and its organizational risks. Sebastian's 2026 DART framework specifically identifies informal and often unregulated AI use as a source of disclosure, privacy and governance risks.

However, these two strands of research can be brought together more directly:

There is scope to empirically examine whether employees' perceived productivity benefits from GenAI are associated with their engagement with Shadow AI.

The present study, therefore, addresses this gap by examining the **relationship between productivity and Shadow AI** among employees.

"Limited empirical attention has been given to the relationship between perceived productivity benefits of Generative AI and Shadow AI usage at the employee level."

### **Research Question**

The main research question is whether the perceived productivity benefit of Generative AI is significantly associated with employees' use of Shadow AI.

### **Research Objective**

**Main Objective:** To study the relationship between perceived productivity benefits of Generative AI and Shadow AI usage among employees.

### **Supporting Objective**

1. To assess the level of employees' perceived productivity benefits from Generative AI.
2. To assess the level of Shadow AI usage among employees.

3. To analyze if perceived productivity benefits significantly predict Shadow AI usage.

### **Hypothesis**

**H1: Perceived productivity benefits of Generative AI have a significant positive influence on Shadow AI usage among employees.**

### **Literature Review**

Gen AI is becoming highly relevant to organizations, as it can support both routine activities and knowledge-intensive tasks. Employees are widely using these tools for tasks such as summarising, drafting, retrieving information, coding, and other brainstorming activities.

Li et al., in their study, found that among 5,172 customer support agents, access to a Gen AI assistant improved their productivity by 15% on average (Erik Brynjolfsson, 2025)

“A separate 2025 systematic review examined 74 studies concerning GenAI's effects on workload, efficiency, and labor productivity across industries, demonstrating the growing academic interest in the productivity implications of GenAI” (Daniel Caamaño-Gordillo, 2025)

Silic and Kind Truller (2025), in their study on shadow AI, found that among 140 professionals and 10 executives, employees often use AI because they believe it helps them work more productively and faster, yet organizational policies do not support the use of these AI tools (Mario Silic, 2025)

### **Research Methodology**

This is a quantitative study and uses a cross-sectional research design. This study was conducted across Tamil Nadu and includes employees across sectors such as IT, Banking, Marketing, BPO, and Education. The sample includes respondents who have used Gen AI in the past 6 months and comprises 250 employees, selected through purposive sampling, across the above-mentioned sectors. A structured questionnaire using a 5-point Likert scale was administered to the study's respondents, and the results were analyzed and interpreted in SPSS.

### **Data Analysis and Interpretation**

**Table 1: Demographic Variables of the Employees perceived productivity benefits of Gen AI usage and Shadow AI**

| <b>Demographic variables</b>     | <b>Details</b> | <b>Frequency</b> | <b>Percentage</b> |
|----------------------------------|----------------|------------------|-------------------|
| <b>Age</b>                       | 20- 30 Years   | 125              | 50.0              |
|                                  | 31-40 years    | 75               | 30.0              |
|                                  | > 41 years     | 50               | 20.0              |
|                                  | Total          | 250              | 100.0             |
| <b>Gender</b>                    | Male           | 75               | 30.0              |
|                                  | Female         | 175              | 70.0              |
|                                  | Total          | 250              | 100.0             |
| <b>Educational Qualification</b> | Diploma        | 50               | 20.0              |
|                                  | Undergraduate  | 125              | 50.0              |
|                                  | Post Graduate  | 75               | 30.0              |
|                                  | Total          | 250              | 100.0             |
| <b>Work experience</b>           | < 2 years      | 70               | 28.0              |
|                                  | 2 to 5 years   | 90               | 36.0              |
|                                  | > 5 years      | 90               | 36.0              |

|                                  |                         |     |       |
|----------------------------------|-------------------------|-----|-------|
|                                  | Total                   | 250 | 100.0 |
| <b>Industry</b>                  | IT professionals        | 100 | 40.0  |
|                                  | Banking                 | 30  | 12.0  |
|                                  | HR Professionals        | 20  | 8.0   |
|                                  | Marketing Professionals | 20  | 8.0   |
|                                  | BPO Employees           | 30  | 12.0  |
|                                  | Administrative Staff    | 50  | 20.0  |
|                                  | Total                   | 250 | 100.0 |
| <b>Job level</b>                 | junior employee         | 70  | 28.0  |
|                                  | supervisor              | 55  | 22.0  |
|                                  | manager                 | 65  | 26.0  |
|                                  | senior Management       | 35  | 14.0  |
|                                  | top management          | 25  | 10.0  |
|                                  | Total                   | 250 | 100.0 |
| <b>Organizational size</b>       | < 20 employees micro    | 125 | 50.0  |
|                                  | 21- 50 employees small  | 65  | 26.0  |
|                                  | 51- 250 medium          | 30  | 12.0  |
|                                  | 251-500 employees large | 30  | 12.0  |
|                                  | Total                   | 250 | 100.0 |
| <b>Frequency of Gen AI usage</b> | daily                   | 140 | 56.0  |
|                                  | several times a day     | 110 | 44.0  |
|                                  | Total                   | 250 | 100.0 |

*Source: primary data*

The table above describes the demographic variables of the 250 respondents in the study. The majority of respondents, 50%, are aged 20-30 years, 30% are aged 31-40 years, and only 20% are aged 41 and above. The majority, 70% of them, 50% are female, and 30% male. Almost half of the respondents (50%) are undergraduates, 30% are postgraduates, and 20% are diploma holders. 36% of respondents have 2-5 years of experience, 36% have more than 5 years, and only 28% have less than 2 years. IT professionals contribute the largest proportion (40%) of the study; administrative staff contribute 20%; banking and BPO contribute 12% of respondents; HR professionals and Marketing Professionals contribute 8% of respondents. Junior-level employees represent 28%, managers 26%, senior management 14%, supervisors 22%, and top management the least at 10%. The majority, 50% of the employees, are from microorganizations with fewer than 20 employees, 26% from small organizations, 12% from medium organizations, and 12% from large organizations. The study highlights that 56% of respondents use Gen AI daily, while 44% use it several times a day, indicating that these groups are relevant to the study of the relationship between the variables.

**Table 2: Descriptive statistics of the level of employees' perceived productivity benefits of Gen AI usage and Shadow AI**

| Descriptive statistics                                                                                        | n   | Minimum | Maximum | Mean   | Standard Deviation |
|---------------------------------------------------------------------------------------------------------------|-----|---------|---------|--------|--------------------|
| Gen AI makes me complete my work more easily                                                                  | 250 | 3.00    | 5.00    | 4.2000 | .87353             |
| Gen AI reduces the time required to complete routine work tasks                                               | 250 | 3.00    | 5.00    | 4.5000 | .80784             |
| Gen AI helps me manage my workload more efficiently                                                           | 250 | 3.00    | 5.00    | 4.5000 | .80784             |
| Gen AI improves my work efficiency                                                                            | 250 | 3.00    | 5.00    | 4.5000 | .80784             |
| Gen AI enables me to accomplish work tasks with less effort                                                   | 250 | 3.00    | 5.00    | 4.5000 | .80784             |
| I use Gen AI tools for work that are not formally approved by my organization                                 | 250 | 2.00    | 4.00    | 3.1000 | .94529             |
| I have used a personal Gen AI account for my work-related tasks                                               | 250 | 3.00    | 5.00    | 4.5000 | .80784             |
| I use the policy Available Gen AI tools. When organizationally approved tools are unavailable or Inconvenient | 250 | 3.00    | 5.00    | 4.5000 | .80784             |
| I have used Gen AI tools without knowing whether it was approved by my organization                           | 250 | 3.00    | 5.00    | 4.5000 | .80784             |
| I sometimes use Gen AI outside my organization's formal procedures                                            | 250 | 3.00    | 5.00    | 4.5000 | .80784             |
| Gen AI makes me complete my work more easily                                                                  | 250 | 3.00    | 5.00    | 4.2000 | .87353             |

Source: primary data

The table above shows the mean scores for perceived productivity benefits of Gen AI usage, ranging from 4.20 to 4.50, indicating that respondents agreed that Gen AI reduces the time required to complete routine work tasks, helps manage workload more efficiently and easily, and completes tasks with less effort. The mean scores for shadow AI usage range from 3.10 to 4.50, the lowest mean score of 3.10, suggests a more moderate level of agreement with using explicitly unapproved AI tools. Furthermore, the higher scores reflect personal accounts, and the use of tools without clear evidence of organizational approval indicates informal GenAI use among respondents. The final results reveal that perceived productivity benefits of Gen AI usage raise the Shadow AI usage in organizations.

### Reliability analysis

The questionnaire was tested, and Cronbach's alpha values are .987 for perceived productivity benefits of Gen AI usage, indicating excellent internal consistency over the items, and .823 for the Shadow AI questionnaire, indicating good internal consistency.

**Table 3: Correlation analysis between employees' perceived productivity benefits of Gen AI usage and Shadow AI**

| PP |                     | PP   | SA   |
|----|---------------------|------|------|
|    | Pearson Correlation | 1    | .964 |
|    | Sig. (2-tailed)     |      | .000 |
|    | N                   | 250  | 250  |
| SA | Pearson Correlation | .964 | 1    |

|  |                 |      |     |
|--|-----------------|------|-----|
|  | Sig. (2-tailed) | .000 |     |
|  | N               | 250  | 250 |

Source: primary data

The table above shows the Pearson correlation between perceived productivity benefits and employees' use of Shadow AI. The results show that the  $r$  value ( $r = .964$ ) indicates a very strong positive relationship between the two variables ( $p < .001$ ), so the relationship is statistically significant. This shows that employees who perceive greater productivity benefits from Gen AI also use Shadow AI more.

### Hypothesis

H01: Perceived productivity benefits of Generative AI do not significantly positively influence Shadow AI usage among employees.

H11: Perceived productivity benefits of Generative AI significantly positively influence Shadow AI usage among employees.

**Table 4: Regression Model Summary between employees' perceived productivity benefits of Gen AI usage and Shadow AI**

| Model | R                 | R Square | Adjusted R-Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | .964 <sup>a</sup> | .929     | .929              | .14800                     |

Source: primary data

The table above shows that the  $R$  value of .964 indicates a very strong positive relationship between perceived productivity benefits and shadow AI usage among the study's selected employees. The model explains 92.9% of the variance in shadow AI usage, with an  $R^2$  of .929 and an adjusted  $R^2$  of .929. The standard error estimate value is .148, which means the predictive error is trivially low. Overall, the findings indicate that perceived productivity benefits account for a substantial proportion of the variation in respondents' Shadow AI usage.

**Table 5: ANOVA Results between employees' perceived productivity benefits of Gen AI usage and Shadow AI**

| Model      | Sum of Squares | df  | Mean Square | F        | Sig.              |
|------------|----------------|-----|-------------|----------|-------------------|
| Regression | 71.468         | 1   | 71.468      | 3262.685 | .000 <sup>b</sup> |
| Residual   | 5.432          | 248 | .022        |          |                   |
| Total      | 76.900         | 249 |             |          |                   |

Source: primary data

The table above presents ANOVA results indicating that the regression model is statistically significant,  $F(1, 248) = 3262.685$ ,  $p < .001$ . Since  $p < .05$ , the null hypothesis that the regression model has no significant predictive relationship is rejected. Therefore, Perceived Productivity (PP) significantly predicts Shadow AI Usage (SA). The significant  $F$ -value confirms that the regression model provides a statistically significant explanation of variation in Shadow AI usage.

**Table 6: Regression Coefficients between employees' perceived productivity benefits of Gen AI usage and Shadow AI**

| Model |          | Unstandardised coefficients |           | Unstandardised coefficients |        |      | 95% confidence interval for B |             |
|-------|----------|-----------------------------|-----------|-----------------------------|--------|------|-------------------------------|-------------|
| 1     |          | B                           | Std error | Beta                        | t      | sig  | Lower bound                   | Upper bound |
|       | Constant | 1.249                       | .053      |                             | 23.630 | .000 | 1.145                         | 1.353       |
|       | PP       | .669                        | .012      | .964                        | 57.120 | .000 | .646                          | .692        |

Source: primary data

The table above shows that the B coefficient is 0.669, which is positive, indicating that as employees' perceived productivity benefit increases, the use of Shadow AI also increases. The p-value is  $< .001$ , so the relationship between the two variables is statistically significant. The t-value is 57.120, providing strong evidence that PP is a statistically significant predictor of SA. The standardized coefficient  $\beta = 0.964$  indicates a much stronger positive relationship between the two variables in this study. The regression equation  $SA = 1.249 + 0.669(PP)$  reveals that for every one-unit increase in perceived productivity, predicted Shadow AI usage increases by approximately 0.669 units. The confidence interval lower bound is .646 and the upper bound is .692, indicating that the entire interval is above zero and, hence, the estimated relationship is positive. Hence, it is clearly evident that higher perceived productivity benefits from Generative AI are associated with higher levels of Shadow AI usage among the respondents. Therefore, the hypothesis H11 is that perceived productivity benefits of Generative AI significantly and positively influence Shadow AI usage among employees, and this is statistically supported.

### **Recommendations**

Organizations must adopt a balance in Gen AI usage. Clear organizational guidelines must be developed to govern the use of Gen AI tools and data protection requirements. As the findings indicate a strong relationship between perceived productivity benefits and Shadow AI usage, Organizations must provide Gen AI tools that are secure, approved, and meet employees' needs. Periodic training can be provided to employees on responsible Gen AI use, information verification, data privacy, and the organization's AI policies. Organizations must focus on the productivity benefits of Gen AI rather than relying solely on restricted usage. Appropriate AI tools can be integrated into workplaces. Regular review of AI policies and employee involvement in AI governance can further help organizations manage Shadow AI while supporting productive and responsible use of Generative AI.

### **Conclusion**

The study concludes that there is a very strong positive relationship between the perceived productivity benefits of Gen AI usage and Shadow AI among the employees. The employees perceive that Gen AI reduces the time required to work, improves efficiency, and lowers the effort required. These findings reveal that employees' perceived productivity benefits from GenAI are closely associated with their use of AI tools outside formal organizational systems. This sets a challenge for organizations: restricting the use of GenAI alone may not be sufficient when employees find these tools highly useful in their work. Therefore, organizations need to balance productivity opportunities with appropriate governance, employee training, data protection, and clear guidelines for responsible AI use. Overall, the study contributes to the emerging discussion on Shadow AI in the workplace by highlighting the importance of considering employees' perceptions of productivity when developing organizational GenAI policies.

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