

THE EFFECT OF TRANSFORMATIONAL LEADERSHIP ON SHIFTING ATTITUDES AND MOTIVATION OF EXTENSION OFFICERS TOWARDS ICT USE IN AGRICULTURAL EXTENSION IN INDONESIA

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Abstract

The objective of this research is to investigate how transformational leadership influences the shifts in attitudes and motivation of agricultural extension officers (AEOs) regarding the use of Information and Communication Technology (ICT) in agricultural extension. A cross-sectional study was conducted from November 2022 to February 2023 in North Maluku, Indonesia, involving 252 government AEOs as the sample. Data were collected through a survey using a questionnaire that measured transformational leadership, attitudes, and motivation towards ICTs. Linear regression analysis was employed to test the research hypotheses. The results revealed that transformational leadership positively and significantly influenced AEOs' attitudes ($\beta = 0.309$; $p < 0.05$) and motivation ($\beta = 0.416$; $p < 0.05$) towards ICT utilization. However, transformational leadership alone explained a limited portion of the variance in attitudes (14.4%) and motivation (17.6%), suggesting the influence of other factors. These findings highlight the importance of transformational leadership in fostering ICT adoption among AEOs. However, to maximize the potential of ICT in agricultural extension, a multi-faceted approach is necessary, encompassing not only leadership development but also the provision of adequate resources, infrastructure, training, and supportive institutional norms that encourage ICT utilization.

Key words: transformational, leadership, agricultural, extension, officer

INTRODUCTION

In the digital age, the agricultural sector is undergoing a profound transformation driven by the rapid advancement of Information and Communication Technology (ICT) [32]. This technology offers unprecedented opportunities to enhance productivity and sustainability in agricultural practices [24] [33]. However, successful integration of ICT into agriculture hinges on the willingness and ability of extension officers to adopt and utilize these tools effectively [15].

Within the landscape of the Agricultural Knowledge and Innovation System (AKIS), extension officers serve as the frontline, acting as intermediaries between research institutions and farmers [23]. Their role is crucial, not only in disseminating knowledge but also as agents of change in facilitating the adoption of new technologies [23, 28].

However, their capacity to embrace ICT and harness its potential for agricultural development is often hindered by various challenges, including resistance to change and low motivation [13].

Previous research on ICT adoption in agricultural extension has identified several factors influencing extension officers' attitudes and behaviors towards this technology. Individual characteristics such as age, education, and experience [2], as well as organizational factors like resource availability and training [26], have proven to be significant. Furthermore, extension officers' perceptions of ICT's usefulness, ease of use, and compatibility with existing work practices are also critical factors of adoption [35].

Nevertheless, these studies often overlook the critical role of leadership in shaping extension officers' perceptions and behaviors towards

ICT. Transformational leadership (TL), which focuses on inspiring a shared vision, providing individualized support, and encouraging intellectual stimulation[4], has been shown to enhance employee engagement, motivation, commitment, and innovation across various sectors [7, 17, 21]. However, its specific impact on ICT adoption among extension officers remains largely unexplored.

This study aims to address this gap by investigating the influence of transformational leadership on extension officers' attitudes and motivation towards ICT adoption. Specifically, this research seeks to answer the following questions:

- (1) Does transformational leadership (TL) positively influence extension officers' attitudes towards ICT adoption?
- (2) Does transformational leadership (TL) positively influence extension officers' motivation to adopt ICT?

By answering these questions, this study is expected to contribute to policymakers and practitioners striving to enhance ICT capacity in the agricultural sector and promote sustainable digital transformation.

MATERIALS AND METHODS

This study employed a cross-sectional design to examine the relationship between transformational leadership and agricultural extension officers' attitudes and motivation towards ICT adoption. The research was conducted in North Maluku, Indonesia between November 2022 and February 2023. This region was chosen due to its unique archipelagic geographical conditions and socio-cultural diversity.



Map 1. Research location in North Maluku, Indonesia.
Source: Own elaboration based on data from Microsoft Excel (2023).

The study population consisted of civil servant agricultural extension officers working within the North Maluku Province jurisdiction. A sample of 252 extension officers was selected using simple random sampling. Data were collected through self-administered questionnaires. The questionnaire instrument consisted of three main sections:

(1) Transformational Leadership: This section assessed the behavior of agricultural department heads using four measurement item components, namely Idealized Influence (II), Inspirational Motivation (IM), Intellectual Stimulation (IS), and Individualized Consideration (IC) [4]. Items were adapted from instruments developed by Kirkman *et al.* [22] and Chen *et al.* [6]. These items utilized a five-point Likert scale ranging from (1) 'never' to (5) 'Always'.

(2) Attitudes towards ICT Adoption: This section measured extension officers' attitudes towards ICT adoption using items assessing cognitive, affective, and conative aspects. Measurement was conducted using a five-point Likert scale ranging from (1) 'strongly disagree' to (5) 'strongly agree' [29].

(3) Motivation in ICT Adoption: This section measured extension officers' motivation towards ICT adoption using McClelland's theory, through items assessing the need for achievement (n-ach), need for affiliation (n-aff), and need for power (n-pow) [25]. Motivation measurement employed a five-point Likert scale ranging from (1) 'strongly disagree' (lowest) to (5) 'strongly agree' (highest).

Prior to data collection, the questionnaire underwent validity and reliability testing using Corrected Item-Total Correlation (C-ITC) and Cronbach's alpha (α). The results indicated that all items demonstrated acceptable validity (C-ITC > 0.254), and the instrument exhibited high reliability (Cronbach's alpha > 0.7) for each indicator, confirming internal consistency and the questionnaire's suitability for this research [16], as presented in Table 1.

Table 1. Validity and Reliability of Research Instruments

Variable	Validity Test (Number of valid items)	Reliability Test (Cronbach's alpha)
Transformational leadership	18	0.955
Attitude	18	0.899
Motivation	21	0.947

Source: Primary data analysis (2023).

Data were analyzed using IBM SPSS Statistics version 25. Descriptive statistics were employed to characterize the TL, attitudes, and motivation of the respondents. To determine the overall achievement level, individual scores for each indicator were summed and then standardized to a percentage (0-100 scale) of the maximum possible score, calculated as follows:

$$\text{Achievement level (\%)} = (\text{Total Achieved Score} / \text{Total Maximum Score}) * 100$$

Higher percentages indicate greater achievement.

Linear regression analysis was employed to test the hypotheses regarding the influence of transformational leadership on extension officers' attitudes and motivation towards ICT adoption. The level of statistical significance was set at $p < 0.05$.

RESULTS AND DISCUSSIONS

ICT Tools in Agricultural Extension

The study reveals a predominant reliance on smartphones (96.4%) and mobile applications like WhatsApp (95.2%) among agricultural extension workers, highlighting the critical role of mobile technology in their daily tasks (Table 2). The widespread use of smartphones aligns with the global trend of increasing mobile penetration, particularly in developing regions [3]. The versatility of smartphones as multifunctional tools for communication, information access, and data collection makes them invaluable for extension workers serving large numbers of farmers across dispersed areas. The popularity of WhatsApp further

underscores the need for accessible, real-time communication platforms that facilitate efficient interaction and knowledge exchange. While laptops are also utilized to a significant extent (52.8%), likely for more complex tasks such as data analysis and report writing, the limited adoption of other ICT devices like desktop computers and tablets suggests potential barriers to access or perceived relevance. This discrepancy in ICT adoption may hinder the full realization of ICT's potential in agricultural extension.

The observed ICT utilization patterns emphasize the need for transformational leadership to facilitate the broader integration of ICT tools into extension practices. By fostering a culture of innovation and providing support for skill development, transformational leaders can empower extension workers to leverage a wider range of ICT tools, thereby enhancing their effectiveness and contributing to the digital transformation of the agricultural sector.

Table 2. ICT tools used by AEOs

ICT tools	Frequency	Percentage
Smartphone	243	96.4%
Laptop	133	52.8%
Wi-Fi at home	47	18.7%
Computer desktop	18	7.1%
Tablet/Ipad	1	0.4%
WhatsApp (WA)	240	95.2%
Facebook (FB)	194	77.0%
Instagram (IG)	61	24.2%
YouTube	38	15.1%
Telegram	29	11.5%
TikTok	26	10.3%
Twitter	12	4.8%

Sources: primary data analysis (2023).
 Multiple responses allowed

Transformational leadership in agricultural extension

Transformational leadership (TL) plays a crucial role in driving digital transformation within organizations [20], including the context of agricultural extension.

Figure 1 provides a nuanced perspective on the prevalence of transformational leadership (TL) behaviors within the agricultural extension organization, as perceived by its

members. While the leaders demonstrate a strong inclination towards Idealized Influence (II) and Inspirational Motivation (IM), with a majority of respondents indicating these behaviors occur "Often," there is a discernible gap in the consistent application of Individualized Consideration (IC) and Intellectual Stimulation (IS).

The high frequency of "Often" responses for Idealized Influence (43.7%) suggests that leaders are generally successful in embodying the values and ideals they espouse, fostering a sense of respect and trust among their subordinates. Inconsistencies between words and actions, and leaders' lack of adaptability to the digital environment can hinder digital transformation [27]. Similarly, the prominence of "Often" for Inspirational Motivation (42.5%) underscores the leaders' ability to articulate a clear and inspiring vision, motivating their team towards shared objectives. Leaders need to further enhance their ability to transmit positive energy and enthusiasm to extension officers to promote their well-being [18].



Fig. 1. Frequency distribution of Transformational leadership behaviors.

Source: primary data analysis (2023).

However, the distribution for Individualized Consideration reveals a more moderate application of this leadership dimension. While leaders do show consideration for individual needs, the relatively high percentage of "Sometimes" (31%) responses indicates a need for greater consistency in providing personalized support and mentorship. This could involve actively

seeking feedback, tailoring communication styles, and recognizing individual contributions. Improvement in this aspect can significantly enhance employee performance [17].

The pattern for Intellectual Stimulation is somewhat balanced, with a plurality of respondents reporting that leaders "Often" encourage creativity and critical thinking. Nevertheless, there is room for further development in this area. Leaders could foster a more intellectually stimulating environment by actively challenging assumptions, promoting experimentation, and rewarding innovative approaches.

In essence, while the leaders in this agricultural extension organization demonstrate proficiency in certain aspects of transformational leadership, there is a clear opportunity to enhance their overall effectiveness by focusing on individualized consideration and intellectual stimulation. By nurturing a climate that consistently supports individual growth and encourages intellectual exploration, leaders can further empower their subordinates to embrace ICT and contribute to the ongoing digital transformation of the agricultural sector.

AEOs' attitudes towards ICT utilization

In the context of digitalization, attitudes play a pivotal role in predicting ICT usage behavior [11]. The findings reveal that agricultural extension officers possess a positive attitude (agree) towards utilizing ICT in extension services, with an average achievement of 71.8% (Table 3). This positive disposition is multifaceted, encompassing cognitive, affective, and conative dimensions.

Table 3. Descriptive statistics of AEOs' attitudes

Attitude indicators	Achievement (%)	Category
Understanding of benefits and experience using digital ICT (Cognitive)	71.7	Agree
Emotional response/satisfaction using digital ICT (Affective)	70.1	Agree
Commitment to utilizing digital ICT (Conative)	74.3	Agree
Average	71.8	Agree

Source: Primary data analysis (2023).

Extension officers perceive ICT as providing numerous benefits, being useful, and relevant to their work in agricultural extension, particularly in enhancing communication, collaboration, information access, and contributing to their professional careers. This resonates with research highlighting the perceived usefulness of ICT as a key driver of adoption among extension professionals [1].

Affectively, the data reveals a favorable emotional response to ICT. The enthusiasm and interest expressed by extension officers suggest a sense of satisfaction and enjoyment associated with ICT use, with an average score of 70.1%. This positive emotional connection can be instrumental in overcoming potential barriers to adoption, such as anxiety or fear of the unknown [10] [34].

Conatively, the strong commitment to utilizing digital ICT is particularly noteworthy. It signifies a proactive intention to not only maintain current levels of ICT use but also to actively seek opportunities to further develop their ICT competencies (74.3%). This proactive stance suggests a recognition of the evolving digital landscape and the importance of staying abreast of technological advancements to remain effective in their roles [19].

AEOS's motivation in utilizing ICT

Motivation serves as the driving force behind individual behavior [14], particularly in relation to ICT usage behavior among extension officers. The results indicate that the motivation of extension officers is relatively high, with an average achievement of 65.4%, suggesting a strong desire to utilize ICT (Table 4).

Table 4. Descriptive statistics of AEOs' motivation

Motivation indicators	Achievement (%)	Category
Need for Achievement (n-Ach)	68.2	High
Need for Affiliation (n-Aff)	68.3	High
Need for Power (n-Pow)	59.7	Moderate
Average	65.4	High

Source: Primary data analysis (2023).

The findings highlight a commendable level of motivation among extension officers towards ICT utilization, particularly in terms of their need for achievement and affiliation.

This resonates with previous research emphasizing the significance of intrinsic motivation, encompassing the desire for accomplishment and positive social interaction, in driving ICT adoption among professionals [8]. The strong need for achievement observed in this study suggests that extension officers are intrinsically driven to excel in their roles and view ICT as a tool to enhance their performance and achieve desired outcomes. Furthermore, the high need for affiliation underscores the importance of social connections and collaborative work environments in fostering ICT adoption. This aligns with the theoretical underpinnings of Self-Determination Theory, which posits that relatedness, or the sense of belonging and connection with others, is a fundamental psychological need that fuels intrinsic motivation [9].

The impact of transformational leadership on attitudes and motivation towards ICT adoption

Regression analysis revealed that transformational leadership (TL) has a positive and significant impact on agricultural extension officers' attitudes toward ICT utilization. This is evidenced by the regression coefficient β of 0.309 ($p < .05$), indicating that for every one-unit increase in TL, there is a corresponding 0.309-unit increase in positive attitudes towards ICT (Table 5). These findings are consistent with the research by Shal *et al.*, which demonstrated that transformational leadership (TL), known for inspiring, motivating, and fostering innovation, inherently encourages academic librarians to develop capacity, a culture of adaptability, creativity, and openness to change, aligning with the demands of implementing new technologies such as Artificial Intelligence [31]. However, TL only explains 14.4% of the variance in extension officers' attitudes ($R^2 = 0.144$), suggesting the presence of other influential factors in shaping their attitudes towards ICT such as individual characteristics, organizational context, and perceived social norms [34].

Similarly, the positive effect between TL and motivation towards ICT use ($\beta = 0.416$) resonates with theoretical frameworks that

emphasize the motivational power of transformational leaders [4, 5]. By articulating a compelling vision, providing individualized support, and fostering intellectual stimulation, such leaders can ignite intrinsic motivation, empowering individuals to pursue self-determined goals and embrace new challenges [12, 31]. However, the limited explained variance ($R^2 = 0.176$) suggests that motivation is also influenced by a complex interplay of factors, including perceived self-efficacy, perceived benefits, and organizational incentives [30].

While these findings reaffirm the importance of transformational leadership in promoting ICT adoption among extension officers, they also highlight the need for a multi-pronged approach. Cultivating a supportive organizational climate that provides access to resources, training, and recognition for ICT-enabled practices can complement the positive influence of TL. Furthermore, addressing potential barriers such as lack of confidence, fear of technology, and resistance to change through targeted interventions can further enhance the effectiveness of leadership efforts in driving ICT adoption.

Transformational leadership serves as a crucial catalyst in shaping positive attitudes and motivation towards ICT among agricultural extension officers. However, it is essential to recognize the interplay of various factors in influencing technology adoption and to implement a comprehensive strategy that encompasses leadership development, capacity building, and organizational support to facilitate the successful integration of ICT in agricultural extension.

Table 5. Regression analysis

Variables	a	β	R^2	p-value	Sig.
TL ->Attitude	35.154	0.309	0.144	0.000	**
TL >Motivation	33.371	0.416	0.176	0.000	**

Source: Primary data analysis (2023).

Notes: ** indicates significance at the 0.05 level.

CONCLUSIONS

Transformational leadership has been shown to play a significant role in fostering positive

attitudes and motivation among agricultural extension officers towards ICT utilization in North Maluku. While only explaining a portion of the variance in attitudes and motivation, these findings highlight the potential of transformational leadership as a catalyst for ICT adoption.

Therefore, it is recommended that local governments and relevant agencies prioritize the development of transformational leadership training programs for leaders within the agricultural extension sector. Such training would empower leaders to guide their officers through the complexities of technological advancements, ultimately fostering a collaborative environment that maximizes the perceived benefits of ICT in enhancing agricultural extension services and promoting development in emerging economies. Additionally, it is crucial to strengthen supporting factors such as the availability of digital facilities, infrastructure, incentives for extension officers, and supportive norms. Further research is needed to explore other factors that may enhance ICT adoption and develop holistic strategies to maximize the potential of ICT in transforming agriculture in North Maluku, Indonesia.

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