

Confirmatory Factor Analysis of the Communications Climate in the Industrial Organizations during the Second Wave of the COVID-19 Pandemic

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ABSTRACT

Communication climate is a significant contributing factor to the quality and effectiveness of communication and the satisfaction and well-being of the participants in the workplace, especially during crises. This study aimed to analyze a confirmatory factor and verify the convergence of factors related to the communication climate of industries during the second wave of the COVID-19 pandemic. The data from 500 questionnaires were answered by the workers in the industrial organization in Thailand. The questionnaire comprised 30 items of five rating Likert's scale with Cronbach alpha reliability of 0.814. The confirmatory factor analysis (CFA) uses AMOS version 24 to detect the underlying latent variables that significantly determine the communications climate in organizations. The findings confirmed six components correlated to communications climate in the industry section during the second wave of the COVID-19 pandemic: trust, leadership, message, supportiveness, collaborative decision-making, and media. The components converged with empirical evidence and indexes consisting $\chi^2 = 49.944$, $df = 39$, $P\text{-value} = 0.113$, $CMIN/df = 1.281$, $GFI = 0.984$, $RMSEA = 0.024$. The standardized factor loading of every indicator shows a high criterion with a statistical significance of 0.001. It can be utilized to communicate the climate in the industry section organization to handle situations similar to the pandemic crisis.

Keywords: *Confirmatory factor analysis, communication climate, COVID-19 pandemic, Thailand, industrial sector.*

INTRODUCTION

The World Health Organization (WHO) defined the SARS-CoV-2 virus outbreak as a severe global threat, and its risks are interconnected to global stability (WHO, 2020). The COVID-19 pandemic has created havoc worldwide, demonstrated clearly in the tremendous global impacts on economies, businesses, schools, employment, and the way of life. This human coronavirus reflected how critical information diffusion is in a disintermediated news cycle (Quattrociocchi, 2017). Communication can be realistically viewed as the most fundamental of all managerial activities and as the core process of organizational behavior. The incident during the second wave of the COVID-19 pandemic is a significant global crisis that has continued in 2019 for years and has affected all parts of society, especially in an industry with many employees who are human capital in the economic system. In Thailand, the number of businesses terminated in December 2020 was 6,013, with a registered capital value of 16,726 million baht, a significant financial loss (Department of Business Development Ministry of Commerce, 2020). In 2020, the impact of the COVID-19 pandemic on the Thai economy was a slow economic recovery; in the second quarter (April-June 2020), the economy shrunk by 12.2%, the worst in 22 years (Brandinside, 2020). The chaotic incidents also affect the industrial workers.

Du Preez and Bendixen (2015) found that for service staff, internal brand management (IBM) significantly contributes to job satisfaction (JS), brand commitment (BC), and intention to stay (IS). Internal brand communication is the most crucial contributor to internal brand management. Goodwin et al. (2021) found that anxiety, perceived control, and trust in information sources have all been shown to influence the health and social behaviors of Thai people during pandemics significantly. Komwong et al. (2022) identified 21.1%, 22.5%, and 15.3% of all respondents who were healthcare workers in Thailand had mild to extremely severe depression, anxiety, and stress, respectively.

Communication climate is important because it affects the quality and effectiveness of communication and the satisfaction and well-being of the participants. A positive communication climate can foster trust, respect, collaboration, creativity, productivity, and motivation among employees, while an adverse communication climate can breed conflict, resentment, stress, and turnover. Therefore, the findings *about what* determines employee stay or retirement intention in the second wave of the COVID-19 pandemic are essential. Moreover, communication can powerfully motivate and persuade employees to understand organizational problems and build loyalty. So, it is interesting to study the affirmative factor, the communication climate factor in the organization, that will benefit the organization and can be applied to create a more efficient communication environment.

Polit and Beck (2008) have defined Factor analysis as a statistical method used to describe variability among observed, correlated variables in

terms of a potentially lower number of unobserved variables called factors. The factor analysis intends to find independent latent variables divided into two types of factor analysis: expected variations in response to unobserved latent variables. The observed variables are modeled as linear combinations of the potential factors plus error terms—exploratory factor analysis (EFA) was used to identify complex interrelationships among items and group items that are part of unified concepts. The researcher makes no prior assumption about relationships among factors. Confirmatory factor analysis (CFA) is a more complex approach that tests the hypothesis that the items are associated with specific elements. CFA uses structural equation modeling (SEM) to try a measurement model whereby loading on the factors allows for evaluating relationships between observed and unobserved variables. Structural equation modeling approaches can accommodate measurement error and are less restrictive than least-squares estimation. Hypothesized models are tested against actual data, and the analysis would demonstrate loadings of observed variables on the latent variables (factors) and the correlation between the latent variables.

Thus, this research aimed to analyze a confirmatory factor and verify the convergence of factors related to communications climate in the organization of the industry section in the second wave of the COVID-19 pandemic.

LITERATURE REVIEW

Communication climate is an emotional and psychological relationship environment influenced by communication behaviors and attitudes. The organizational communication climate is part of a corporate culture that includes values, traditions, and norms bound by trust, intimacy, and responsibility (Sone, 2020). It can significantly affect psychological safety in a work environment and is a critical factor in job satisfaction and the organizational culture and performance, contributing to the effectiveness and achievement of the organization.

The corporate environment can make an excellent performance at the individual level either more accessible or harder to attain (Wynia et al., 2010). The cooperative's communication climate may influence the organization's atmosphere, which either encourages or hinders horizontal, upward, or downward communication among the employees (Nordin et al., 2014). The communication climate is a combination of perceptions (a macro evaluation) of communication events, messages, and events related to organizational news, human behavior, employee responses to other employees, expectations, interpersonal conflicts, and growth opportunities. It affects how people perceive, interpret, and react to messages and how they relate to each other and their work.

Several factors affect the quality of organizational communication

climate. Pace and Faules (1994) suggested six criteria to evaluate communication climate: trust, joint decision-making, honesty, openness in downward communication, ability to listen in upward communication, and attention to high-performance goals. Earlier studies have shown that perceived external prestige and communication climate influence organizational identification at various organizational levels of a regional police organization. (Bartels et al., 2007).

The crisis generally arises at short notice and causes significant disturbances in the workplace. In times of crisis, such as health risks during the pandemic, proactive leadership is critical to maintain a positive communication climate. It's about how an organization or team prepares for a crisis. Crisis management is a challenge for leadership as it tests the quality and character of leaders, including their communication skills. How leaders respond to situations and their leadership styles will set the tone for the organization. This factor has highlighted the importance of analyzing leadership traits and the leaders' qualities in an organizational crisis context (Meng & Berger, 2013; Schoenberg, 2005).

Strong leadership during a crisis gives employees and other stakeholders the confidence to respond because they believe in the plan and have received clear communications. This trust can endure beyond the immediate crisis as the workforce feels empowered to flag future crises earlier. Trust is sometimes conceived of having two components: performance or credibility and benevolence trust (Ganesan, 1994). Performance or credibility trust is vital in business-to-consumer relationships (Ball et al., 2004). Members at all levels of the organization should strive to develop and maintain trustworthy relationships, beliefs, and credibility supported by statements and actions. Constant, fluid, transparent communication with employees to avoid surprises and explain why the steps are taken helps prevent rumors that might lead to an estranged work climate and produces an environment of trust (Susaeta et al., 2013).

Communication climate is conveyed through words, actions, and non-action and is perceived and determined by social and relational needs. Messages contain relational subtexts that can be felt, and relational messages that create an atmosphere are multi-leveled. Despite the compelling lack of instructional risk, crisis communication messages include verbal and nonverbal language (body language). The speakers (lead option) often prioritize scientific explanations and information about the threat, a continuous tally of the number of people harmed, and projections about how high the total number of people injured could grow. Clear and concise messages create a positive communication climate. It was observed that news reports of disaster events often do not include information on necessary actions to help people navigate their risks (Frisby et al., 2014; Wickline & Sellnow, 2013). Dyck and Zingales (2002) have proposed that the media affects managers' reputational capital in two ways. First, the

press disseminates news of managers' actions, increasing the fraction of participants in the managerial labor market who learn of them. Second, the media characterize managers' efforts and help shape perceptions of those actions.

Communication climate can be positive or negative, supportive or defensive, open or closed, etc. Supporting communication climate entails various dimensions such as respectful and empathetic interactions, constructive and supportive feedback and responses, open and honest, transparent and authentic actions and words, etc. In addition to generating and perceiving meaning in communicative interactions, we also subtly (and sometimes not so subtly) convey and perceive how we feel about each other. (Vithayathawornwong et al., n.d.)

Pace and Faules (2006) indicated that a particular communication climate provides individual decisions and behavior guidelines. The communication climate influenced members of the organization to carry out their work effectively, bind themselves to the organization, be honest at work, seize opportunities in the organization enthusiastically, support colleagues and other members of the organization, carry out their tasks creatively, and offer innovative ideas for improving the organization and its operations. The physical work environment of an organization, in terms of support of dynamism and support of freedom, is perceived to be most conducive to creativity. Personalization—the decoration, modification, or rearrangement of a territory by its occupants to reflect their identities—expresses the amount of freedom and control the organization allows the individual to exert over the workspace. (Vithayathawornwong et al., n.d.)

Panzarasa et al. (2002) proposed a collaborative decision-making concept of employees in an organization as a multi-agent socio-cognitive process. Thus, they incorporate beliefs, goals, desires, intentions, and preferences in mental modeling. The authors also adopt a prescriptive approach to give a set of possible actions at every step of collaborative decision-making. The model is developed using social and mental shaping, the process by which agents' mere social nature may impact their mental states and motivate their behavior. (Ruliana et al., 2018)

As a subset of organizational climate, communication climates in the form of employee interactions is a factor that influences the quality of work life and effectiveness of executive functioning. The concepts of communication climate, leadership, trust, message, media, supportiveness, and co-making decision form a conceptual framework for this study as follows.

Figure 1*The Conceptual Framework*

METHODOLOGY

A quantitative study involving the administration of a survey was conducted to empirically validate the identified communications climate factors in the industry section during the Second Wave of the COVID-19 Pandemic.

The target population consisted of 25,279,240 employees who worked in Thailand's manufacturing industry during data collection (Department of Industrial Works, 2021). A multistage sampling technique was used to determine the sample. Comrey and Lee (2013) suggested a sample size of 500 is suitable for factor analysis calculation. Within this sample size, quota sampling, 100 samples were selected from each region of Thailand: north, south, east, west, and central areas. The actual samples, manufacturing employees, were reached using a convenient sampling technique. The target samples were informed of the project's objectives and the confidentiality of the private data. Only the consented-answered online questionnaire was analyzed.

The survey instrument consisted of 30 items identified to measure six dimensions: leadership, trust, message, media, supportiveness, and co-making decisions—a comprehensive review of the communication climate literature and interviewing data from key human resource department personnel. There are five statements on each dimension. Each section

represented a group of items measuring a particular factor using five interval rating scales of the Likert method, as detailed in Table 1.

Before empirical testing, the expert panel and the chief executive officer of the industrial manufacturer reviewed the questions to confirm the item's validity. The Index of Item Objective Congruence (IOC) is between 0.60-1.00, which is acceptable quality (Nunnally & Bernstein, 1994). The result of the Power analysis using Corrected Item – Total Correlation is between 0.31-0.85. The Alpha Coefficient is 0.958. The qualified questionnaire was distributed online to the targeted samples.

Table 1
Items for Each Communication Climate Dimension

Critical dimensions	Related items
1. LEADERSHIP	<ol style="list-style-type: none"> 1. Provide practical information according to the situation. 2. Do not ignore the crisis. 3. Manage problems in time 4. Respect everyone's advice. 5. Give employees the freedom to communicate.
2. TRUST	<ol style="list-style-type: none"> 1. Focus on the critical issue 2. Practical 3. Open the information 4. Admit your mistakes and dare to apologize 5. Stay in touch with the organization.
3. MESSAGE	<ol style="list-style-type: none"> 1. Clear information and complete evidence 2. A sufficient additional explanation is provided. 3. Review the information that is an important issue. 4. Use positive and polite words. 5. Tell me the reasons and the results that will arise from the performance.
4. MEDIAS	<ol style="list-style-type: none"> 1. Arrange announcements to be seen thoroughly. 2. Send urgent information via mobile phone. 3. Make a formal letter for information related to the law. 4. Use a pivotal person to distribute information to employees. 5. Invite speakers to give the knowledge to increase work efficiency.
5. SUPPORTIVENESS	<ol style="list-style-type: none"> 1. Turn on healing music during work breaks. 2. Continuous monitoring of performance results. 3. Appreciate and reward employees regularly. 4. To ensure the persistence of employees. 5. Provide a place to exercise for employees.
6. COLLABORATIVE DECISION MAKING	<ol style="list-style-type: none"> 1. Provide opportunities for employees to express their ideas. 2. Have employees attend meetings with the Executive Committee. 3. Open to suggestions on both online and offline channels. 4. Put the employee's proposals into the corporate policy. 5. Employees of all levels can express their opinions freely.

Data analysis employed descriptive statistics using SPSS. The multivariate statistical analysis used AMOS with six criteria according to the evaluation of data-model fit in Arbuckle (2010), which are 1) the Chi-square Probability Level is more significant than 0.05, 2) the Relative Chi-square is less than 2, 3) the Goodness of fit Index is more significant than 0.90 and, 4) Root Mean Square Error of Approximation less than 0.08 (Silpcharu, 2020). Once the exploratory factor analysis knows the structure of the reduced factors, to get an idea about the effect of each of the observed variables on the extracted factor, the Confirmatory Factor Analysis (CFA) was used. The inferential CFA estimates the impact of the observed variables on the estimated latent factors and Tests the Goodness of Fit of the CFA. Model testing follows a recommended procedure by Arbuckle (2010), who suggests a combination of Chi-square (χ^2), GFI (Goodness of fit), and Root Mean Square Error of Approximation (RMSEA). When CMIN has a chi-square distribution, assuming the fitted model is correct, the ICMIN/df must be reported.

RESULTS

Following the framework in Figure 1, the data analysis shows the statistical values and evaluates the consistency of the confirmatory factor analysis model and communication climate in the industrial sector. After model improvements by modifying from the Modification Indices, $\chi^2 = 49.944$, $df = 39$, $P\text{-value} = 0.113$, $CMIN/df = 1.281$, $GFI = 0.984$, $RMSEA = 0.024$. Therefore, the confirmatory factor analysis model for communications climate in the organization of the industry section in the second wave of the COVID-19 pandemic. After the improvement, it is in harmony with the empirical data. The communications climate component in the organization of the industry section in the second wave of the COVID-19 pandemic consists of 6 latent variables: 1) Trust, 2) Leadership, 3) Message, 4) Supportiveness, 5) Co-making decisions, and 6) Media. Data in Table 2 reveals the loadings associated with each variable, with the latent factor indicating the variation they explain; the correlations among the latent factors indicate the nature of linear changes with the change of other variables. Its findings revealed that latent factors are bi-directionally significantly correlated and have the highest covariance between problems and benefits.

Table 2

Covariance and Correlation Structure Analysis of the Latent Factors

Latent variables relations			Estimate
TRUST	<-->	LEADER	.602
LEADER	<-->	MESSAGE	.499
SUPPORTIVENESS	<-->	DECISION	.616
DECISION	<-->	MEDIA	.536
MESSAGE	<-->	SUPPORTIVENESS	.415
SUPPORTIVENESS	<-->	MEDIA	.721
MESSAGE	<-->	DECISION	.549
LEADER	<-->	SUPPORTING	.621
TRUST	<-->	MESSAGE	.523
MESSAGE	<-->	MEDIA	.401
LEADER	<-->	DECISION	.608
TRUST	<-->	SUPPORTIVENESS	.709
LEADER	<-->	MEDIA	.598
TRUST	<-->	DECISION	.668
TRUST	<-->	MEDIA	.725

The Goodness fit parameters of the estimated model are detailed in Table 3.

Table 3

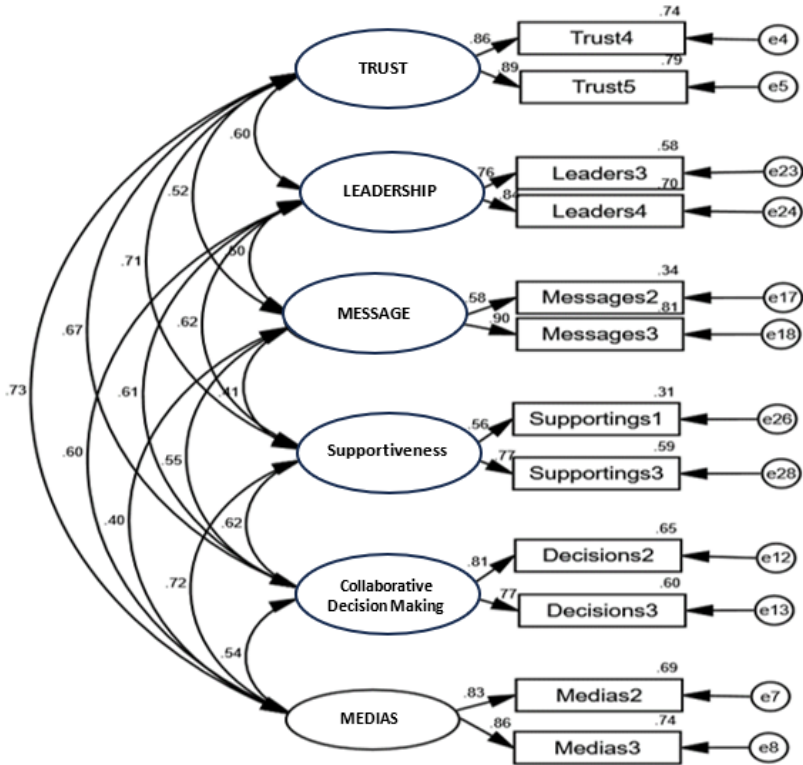
Model Fit Indicates Value

Fit Indices	Measurement	Reference
GFI	0.984	Arbuckle, 2010
P-value	0.113	Arbuckle, 2010
CMIN/df	1.281	Arbuckle, 2010
RMSEA	0.024	Arbuckle, 2010

All Goodness of fit indices indicates the estimated model’s Goodness of fit. It confirms that if the value of the Goodness of Fit Index (GFI) is higher, the better the Goodness of fit of the estimated model is likely. The Adjusted Goodness of Fit Index (AGFI) is sufficiently large, again ensuring the model’s Goodness of fit. The Root Mean Square Error of Approximation (RMSEA) is less than 0.1, which is a good notion of better predictability of the fitted model, as detailed in Figure 2.

Figure 2

Confirmatory Factor Analysis of Communications Climate in Organization of the Industry Section in the Second Wave of the COVID-19 Pandemic



Chi-square = 49.944 ,df = 39, p=.113
 CMIN/DF = 1.281, GFI = .984, RMSEA = .024

DISCUSSIONS AND CONCLUSIONS

The findings confirmed that trust, leadership, message, support, collaborative decision-making, and media led to a discussion about how important it is to a healthy communication climate. Communication within modern organizations is vital because effective communication will help build efficient work teams and create understanding and good relationships between management and employees, resulting in mutual support and good labor relations. Mohammed and Hussein (2013) also found that the

communication dimensions—trust, subordinate interaction, openness in downward communication, listening in upward communication, and supportiveness—contribute 52 percent to the communication climate.

As Nordin et al. (2014) indicated, the communication climate sets an organization's atmosphere that encourages or discourages communication. Supportive environments promote worker participation, free and open exchange of information, and constructive conflict resolution. On the contrary, defensive climates silence employees to keep their views to themselves, make only guarded statements, and suffer from reduced morale. Employees at all levels in the organization should communicate and consult on all issues in all areas of the organization's policies relevant to their position (Ruliana et al., 2018). Thus, effective communication is essential for establishing a collaborative communication climate. In addition, communication can help strengthen the corporate culture as well as being able to build the organization into a learning organization. If the organization has to be changed, internal communication and the organization will be essential tools to help manage change to succeed. Pace (2002) develops his ideas from a theory of credibility consisting of three dimensions: expertise or competence, trust or confidence, and dynamism or enthusiasm. Critical to the success of any organization is a characteristic called dynamism, which is identified with intensity, enthusiasm, and motivation, qualities that enable people in organizations to get things done.

Most target employees can quickly understand the information they receive, have better listening skills, and can think, analyze, and understand the meaning of the information that has been heard. The receiver's ability to quickly understand the information received is due to their qualifications. The key factor in communication and management roles is that communication technology allows personnel to access knowledge more quickly and conveniently, including communicating with specialists in different fields. Find the information and knowledge they need through the network—intranet, extranet, or internet. Jaelani and Yulianti (cited in Nainggolan & Toni, 2022) found that despite the shifting from face-to-face to online during COVID-19 and limited physical interaction, six organizational communication climate indicators of Pace and Faules (1994) during the COVID-19 pandemic were acceptable, except that joint decision-making is low. This finding shows that the vertical flow of communication is still very satisfactory because the indicators of trust and honesty are still well maintained even though the communication process has been interrupted. The communication dimensions- trust, subordinate interaction, openness in downward communication, listening in upward communication, and supportiveness contribute 52 percent to the communication climate. The coronavirus situation affects the economy, society, and the industrial sector.

As a result, management within the organization is complex. Employee retention for the organization needs to rely on an essential factor: internal communication. The communication environment must include honesty, sincerity, acceptance of ideas between each other using the art of persuasion by leaders, and presentation and communication techniques. Pilot studies delve into specific elements where results can be incorporated into the contingency crisis plan as a precautionary measure. Although Van Teijlingen and Hundley (2001) caution that conducting a pilot study does not guarantee success in the primary research, it is a crucial element of a good study design or plans to lessen the risk impact. Adopting some communication strategies and skills can improve the communication climate.

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