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SILENCED IN CYBERSPACE: HOW DIGITAL OSTRACISM AND SOCIAL UNDERMINING ERODE ORGANIZATIONAL IDENTITY IN THE AGE OF REMOTE WORK

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<p>Engr Dr Muhammad Rizwan Sabir* Deputy Director, National Cyber Crime Investigation Agency (NCCIA) Pakistan Email: Justrizig@gmail.com</p> <p>Dr. Muhammad Bilal Majid Lahore Business School, The University of Lahore, Pakistan Email: bilalmajid34@gmail.com</p>	<p>Abstract</p> <p>Purpose: This study examines the influence of social undermining and cyber ostracism on organizational identity through the mediating role of dimensional employee silence. Additionally, it investigates organizational virtuousness as a moderating factor in these relationships, focusing on Pakistani organizations.</p> <p>Design/methodology/approach: The research employs a novel hybrid methodology combining PLS-SEM with machine learning approaches to analyze data collected from Pakistani organizational employees. This integration enables both relationship testing and predictive modelling to validate the hypothesized causal links.</p> <p>Findings: Results reveal significant negative influences of cyber-ostracism and social undermining on organizational identity, mediated by employee silence dimensions. Organizational virtuousness showed mixed moderating effects. ML modelling confirmed these findings, highlighting cyber-ostracism and undermining as destructive elements that amplify employee silence.</p> <p>Research limitations: The study was limited to Pakistani organizations, potentially affecting generalizability. The cross-sectional nature of data may limit causal inferences. Reliance on self-reported measures could introduce common method bias.</p> <p>Practical implications: Organizations should recognize and address cyber-ostracism and social undermining as toxic elements that foster employee silence. Results suggest that organizational virtuousness alone is insufficient to counter these negative influences, indicating a need for more comprehensive interventions.</p> <p>Social implications: Findings highlight the growing impact of digital workplace behaviours on organizational dynamics and employee well-being. Understanding these relationships can help create more inclusive and psychologically safe work environments.</p> <p>Originality/value: The study pioneers the integration of ML with PLS-SEM in organizational behaviour research. It provides novel insights into the interplay between digital workplace behaviours, social undermining, and organizational identity in an emerging economy context.</p>
<p>Keywords:</p>	<p>Cyber Ostracism, Social undermining, Employee silence, organizational identity, Machine learning, Employees, Organizational environment, Pakistan.</p>

INTRODUCTION

With the rapidly evolving organizational dynamics of Pakistan, remote work is prevailing rapidly. In this regard, new forms of interpersonal challenges have also emerged. Therefore, cyber ostracism is an important phenomenon in the study's context. The term "cyber-ostracism" refers to the experience of being deliberately ignored, left out, or excluded in the virtual workplace where interactions take place through digital platforms of communication (Yang et al., 2022). Cyber-ostracism negatively influences human needs and results in destructive individual behaviours (Abdel Hadi et al., 2022). During the time of COVID-19, lockdown was imposed in different countries, and cyber-ostracism aggravated the situation (Bielicki et al., 2020). This also impacted the overall workplace culture, leading to the promotion of a virtual work environment. This has largely contributed to the remote work. In this regard, it is crucial to develop a culture of trust by implementing effective leadership strategies (Newman & Ford, 2021). This is crucial to ensure the alignment between the cultural values of an organization and virtual employees' performance. However, this problem is not specific to Pakistan but a lot of countries, whether developed or underdeveloped, are going through a similar situation. Employees feel abandoned while working from their homes, which leads to a noticeable lack of interest in the ongoing projects (Anjum et al., 2022). Unfortunately, inaction from one individual can cause a decline in the overall growth, reputation, and goodwill of the entire organization. It further exacerbates problems, which include challenges in integrating into organizational groups and participating in work-related activities (Giorgi et al., 2020; Ravindran et al., 2020). Within the context of Pakistan, an ostracized person without the proper cognitive support produces devastating outcomes for the organization (Ali et al., 2020). An ostracized person also fails to help other individuals in the organization who are in need (Anjum et al., 2022). These individuals are often so consumed by their feelings of loneliness that they find it difficult to engage with other employees.

Similar to cyber-ostracism, social undermining also has profound effects on workplace culture (Dar et al., 2023). Social undermining involves deliberate actions that are designed to obstruct the development and maintenance of positive interpersonal relationships, which hinder professional success and damage one's reputation (Fayzullaev & Shin, 2024). These behaviours (workplace ostracism and social undermining) lead to employee silence, where employees refrain from voicing their ideas or concerns (Jung & Yoon, 2019; Yao et al., 2022). Employee silence manifests in four distinct dimensions which include relational silence (remaining quiet to avoid damaging relationships, not wanting to harm a relationship or general relationship concerns) (Brinsfield, 2013), prosocial silence (withholding information for the perceived benefit of others), acquiescent silence (passively holding back due to resignation) and defensive silence (withholding to protect oneself due to fear) (Dyne et al., 2003). According to social exchange theory (SET), social relationships and interactions at the workplace are largely influenced by the rewards or other transactions (Cook et al., 2013). Therefore, unfair treatment, workplace bias, and cyber-ostracism can contribute to employee silence, impacting his/ her overall performance. However, when these forms of silence permeate an organization, they may significantly undermine the identity of an organization. It can also influence the collective sense of an organization regarding who it is and what it represents.

These days, many organizations have shifted towards remote working (Adekoya et al., 2022). Organizational identity is significant for its optimal reputation and overall performance (Le, 2023). However, the negative behaviours prevalent in any organization can have a devastating influence on its identity. In this regard, the remote work environment has fostered an environment where digital exclusion and undermining behaviours can go unnoticed. It allows the employee's silence to prevail and ultimately erodes organizational identity (Hosseini & Ferreira, 2023; Story et al., 2023). In such an environment, employees may feel disconnected, underappreciated, and voiceless, which affects their performance. However, it also damages the cohesion and integrity of the organization as a whole. Without addressing these digital behaviours, organizations risk losing the culture through which their members are bound together.

The research problem of this study centers on the escalating challenges posed by negative behaviors in an organization. It includes cyber ostracism and social undermining (Gök, 2020; Mostafa et al., 2021; Yang et al., 2022) in the context of remote work environments, particularly in Pakistan. These behaviors significantly contribute to the silence of employees (Afshan et al., 2022; Yao et al., 2022). It also manifests in relational, prosocial, acquiescent, and defensive dimensions, which can ultimately undermine the organizational identity. The novelty of this study lies in its comprehensive approach regarding the evaluation of the interaction of cyber ostracism and social undermining with employee silence, moderated by organizational virtuousness, and their collective impact on the organizational identity. Moreover, the incorporation of advanced machine learning models to explore these interrelationships also offers a unique and innovative contribution to the existing literature. Consequently, the study seeks to address gaps in understanding these dynamics within remote settings of an organization.

However, there are numerous studies in which the influence of negative organizational behaviours, such as cyber ostracism and social undermining (Gamian-Wilk & Madeja-Bien, 2021; Mostafa et al., 2021; Sacino et al., 2024; Zhang, 2020) has been observed in distinct contexts. But to the best of the researcher's knowledge, the existing literature lacks a comprehensive analysis of the way in which social undermining and cyber ostracism interact with employee silence in its four dimensions (relational, prosocial, acquiescent, and defensive). Almost no prior study has addressed the way through which these dynamics are moderated by organizational virtuousness and ultimately impact the organizational identity. Furthermore, there is also a scarcity of research that investigates remote organizational identities through such negative organizational behaviours. This research aims to fill this gap by exploring the way in which these factors collectively affect organizational identity in the remote work environment. Moreover, the study also employs the usage of advanced machine learning models to understand the interlinkage among organizational virtuousness, cyberostracism, social undermining, employee silence, and organizational identity. Thus, the key aim of this research is to investigate the impact of cyber-ostracism and social undermining on organizational identity, with a focus on the mediating role of employee silence and the moderating effect of organizational virtuousness. The researcher has answered the following research question;

How do cyber-ostracism and social undermining affect organizational identity, and what role do employee silence and organizational virtuousness play in this relationship?

To address this research question, the following objectives are devised for this study (a) to determine the impact of social undermining and cyber-ostracism on organizational identity, (b) to evaluate the mediating role of employee silence in association between social undermining, cyber-ostracism and organizational identity and (c) to assess the moderation of organizational virtuousness between social undermining, cyber-ostracism and employee silence.

The remainder of the paper is structured to provide a comprehensive analysis of the research process and findings. Following the introduction, the review of literature covers the associations between variables, underpinning theory, and conceptual framework, The methodology section outlines the research context, sampling techniques, data collection methods, and measurement of key variables. The results section presents the outcomes of statistical analyses, highlighting key relationships between cyber-ostracism, social undermining, employee silence, and organizational identity. The discussion interprets these findings in the context of existing literature, offering insights into the theoretical and managerial implications. Finally, the last section summarizes the main findings, suggests directions for future research, and emphasizes the practical applications of the study.

2.3. Moderated Mediation of Organizational Virtuousness

Organizational virtuousness refers to the culture of the workplace that emphasizes moral excellence, integrity, compassion, and support (Naseem et al., 2020). When organizational virtuousness is high, employees feel more supported and valued (Ho et al., 2023; Sun & Yoon, 2022). However, it can change the way in which silent behaviours impact their sense of belonging and identification with the organization.

In the case of **social undermining**, organizational virtuousness can act as a barrier that mitigates the negative effects of relational, prosocial, acquiescent, and defensive silence. For example, even if employees engage in **relational silence** to protect workplace relationships (Srivastava et al., 2023), a virtuous organizational environment can provide a supportive atmosphere (Sharma & Goyal, 2022) where silence does not harm their organizational identity as strongly. **Social exchange theory** posits that employees are more likely to reciprocate with positive attitudes and behaviours when they perceive their organization as just and supportive (Ahmad et al., 2023; Bahadır et al., 2024). Thus, in an organization with high virtue, employees are more likely to feel valued and connected despite remaining silent in response to social undermining. A similar moderating effect can be considered within the context of **prosocial silence** (Mujeeb et al., 2022). In this regard, virtuousness can provide employees with confidence that their silence is respected. However, in the **acquiescent silence** (Mashile, 2021), feelings of helplessness might be alleviated by the moral support of an organization. Similarly, **defensive silence** (Millender et al., 2023) though typically protective. However, it may not lead to the same level of disconnect if the organization emphasizes ethical values and integrity.

For **cyber ostracism**, the same moderating effect of organizational virtuousness can be observed. When employees experience exclusion in digital communication (Gkinopoulos & Galanaki, 2022; Oktar et al., 2021). In this context, **relational silence** is less damaging to organizational identity in a virtuous environment (Ain et al., 2023). This is because the organization promotes inclusion and ethical behaviour. **Prosocial silence** can also be more positively interpreted when organizational virtuousness is high. This is because the employees believe that their silence is appreciated and aligns with organizational goals (Imam & Kim, 2023). Employees who perceive high levels of support and care from their organization respond with stronger organizational commitment. In cases of **acquiescent silence**, feelings of resignation may be softened when organizational virtuousness is high (Raju, 2023). Since the employees are likely to still feel that their silent stance does not entirely disconnect them from the organization. Furthermore, in situations where **defensive silence** is adopted to avoid risks or conflicts, virtuousness can potentially help maintain trust within the organization. It can aid in reducing the negative impact of this silence on organizational identity (Özdemir, 2024).

In summary, **organizational virtuousness** acts as a moderator by strengthening or weakening the mediating effect of silence behaviours between “social undermining and cyber ostracism” and organizational identity. In a highly virtuous environment, the negative influence of silence on organizational identity is reduced. This is because the moral climate and perceived support foster a sense of belonging despite the persistent silence of employees. Based on the above discussion, the following hypothesis can be formulated:

H5a-d: Organizational virtuousness moderates the mediating effect of silence types (relational, prosocial, acquiescent, defensive) on the relationship between social undermining and organizational identity, strengthening the effect at higher OV levels.

H6a-d: Organizational virtuousness moderates the mediating effect of silence types (relational, prosocial, acquiescent, defensive) on the relationship between cyber ostracism and organizational identity, strengthening the effect at higher OV levels.

Figure 1 shows the conceptual framework for this study.

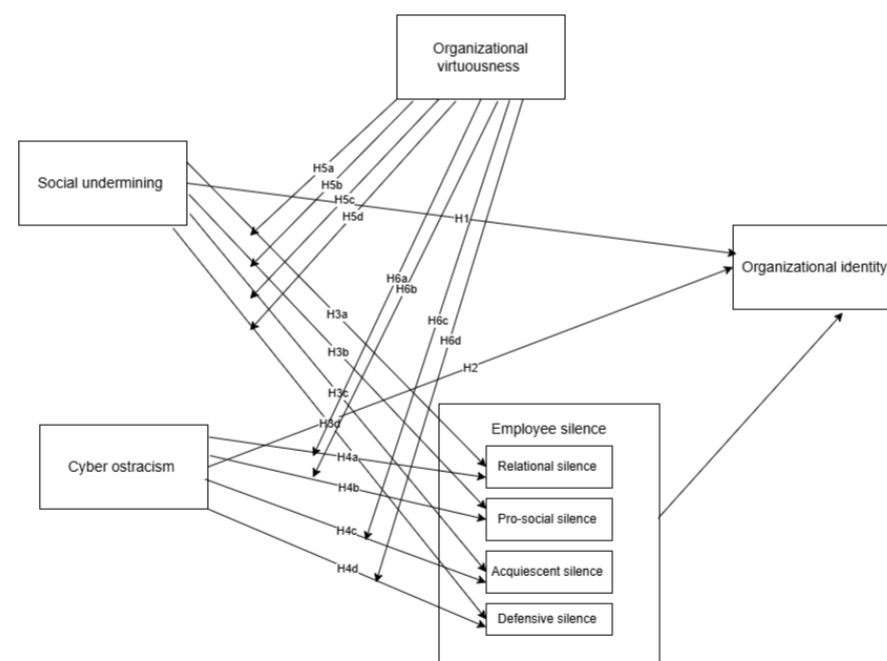


Figure 1. Conceptual Framework Source: Author’s Work

Methodology

Research Approach

This study mainly focuses on determining the role of cyber ostracism and social undermining in impacting organizational identity. It also incorporates the mediating role of employee silence and the moderation of organizational virtuousness. Therefore, to determine the correlations between these constructs, positivist philosophy is applied (Maretha, 2023), followed by a deductive approach. This leads to the integration of a primary quantitative research method. Another past study by Rastgar et al. (2022) used this approach for determining the association between “social undermining and deviant organizational behaviors,” incorporating the mediation of emotional exhaustion and organizational silence. This emphasizes the implementation of a similar research methodology for this study.



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However, machine learning (ML) is also applied in this study for testing the performance of the formulated conceptual model. This adds novelty to current research Quantitative Phase

Empirical Strategy

The study utilized a radical empirical strategy of assimilating the primary quantitative analysis technique with the advanced Machine Learning (ML) technique and adding a methodological novelty to the study. This strategy emphasizes empirical and direct observation/ experience as the knowledge foundation (APA, 2018). For this purpose, the study is categorized into two phases:

Phase I includes the quantitative phase. In this phase, the primary quantitative data were gathered from the employees working in the civil services sector in Pakistan. The survey strategy was used for this purpose. For the analysis purpose, a PLS-SEM technique with bootstrapping 5000 was employed to analyze the conceptual framework (Hair et al., 2017).

In Phase II, an additional level of significance of the designed associations is achieved. For the ML section, the subsequent section sheds light on the details of the processes undergone by ML.

In this regard, the predictive power of ML is found to be effective for increasing the explanatory focus on PLS-SEM. This helps in addressing the research question of the study.

Phase I: Quantitative Phase

To determine the impact of cyber ostracism and social undermining on organizational identity, a primary quantitative approach was utilized. It was also used for determining the mediating role of employee silence and the moderation of organizational virtuousness.

Population and Sampling

Employees working within the civil services sector of Pakistan were selected to test the study's synthesized conceptual framework. This sector was selected as a setting for this study for two backend reasons. First, the civil services sector in Pakistan is a knowledge-based sector where knowledge and employees are essential elements within the organization, and there are previous studies that have identified different factors that exacerbate negative feelings in employees (Sahabuddin et al., 2023).

Sampling and Sample Size

The sampling method which was employed in this study was a non-probability sampling technique, specifically purposive sampling, followed by convenience sampling. Purposive sampling was used so that individuals with specific knowledge or experience relevant to the research topic could be selected (Etikan et al., 2016). In this way, it was ensured that the sample included employees from various organizational levels, such as entry-level to senior management. The sample was structured to reflect key demographic variables, including age (20 to >40), gender (both male and female), and professional background (<2 to >6 yrs working experience). This approach ensured a diverse participant pool, allowing for a more comprehensive understanding of how different demographic groups perceive and respond to research questions. Convenience sampling was help gather data from participants who were easily accessible and willing to participate (Golzar et al., 2022). All participants were currently working remotely at the time of data collection, as confirmed through a screening question included in the recruitment process. It ensured a practical and efficient approach for data collection while maintaining a broad perspective of the organizational dynamics. This combination also allowed for capturing diverse insights across different roles and experiences.

The sample characteristics included employees from diverse backgrounds. An emphasis was placed on those in the sector who were known for high interpersonal interaction. It made them particularly relevant for studying social undermining and silent behaviors (Bhatti et al., 2025). The sample was comprised of those individuals who had diverse backgrounds. It ensured a comprehensive representation of the workforce. An emphasis was placed on including participants from those departments that were known for high interpersonal interaction and are particularly relevant for studying behaviors like social undermining and silence. In this way, the researcher ensured to gain a broad perspective on organizational dynamics. Therefore, inspired by Bhatti et al. (2025), an initial sample of 350 participants was selected for this study to prevent any research bias. This also ensured the collection of data from a larger sample in current quantitative research, with a 100% response rate, as all 350 questionnaires were returned. However, the data from 249 participants were included in this study. The remaining questionnaires were found to be incomplete. This presents a usable response rate of 71%. While nonresponse bias was a consideration, the high response rate and diversity within the usable sample helped mitigate its potential impact. This limitation has been acknowledged, and care was taken to ensure the included data were representative of the target population.

Data Collection

Responses were gathered from the employees working in the civil services sector to get a holistic view of the organizations and their working environment. Potential respondents were contacted in person to get their responses on the designed questionnaire. To ensure methodological rigor and ethical standards, the survey followed standard data collection protocols, including participant consent and anonymity..

Data collection took place over a period of three months, from June to August 2024. It ensured a comprehensive response from participants. The survey was administered in person so that authenticity and accuracy in responses could be ensured. All ethical considerations were taken into account during the distribution of the questionnaires. For instance, the consent of the participants was taken, and their privacy was maintained. In addition, all participants were provided with the authority to leave the study whenever they wanted without any consequence.

Questionnaire

For the quantitative phase of this study, a questionnaire was designed for the survey strategy. This questionnaire included two parts. Part 1 focuses on the demographic characteristics of the participants, while Part 2 mainly includes the measures of the constructs.

The demographic characteristics of the respondents included employees from various organizational levels within the civil services sector of Pakistan. The respondents consisted of both male and female participants, which ensured gender representation in the study. The majority of respondents fell within the age ranges of 20-40, with a distribution across various brackets (20-25, 26-30, 31-35, and 36-40). There was also a smaller representation of those aged 40 and above. In terms of working experience, participants had diverse tenures. The experience of employees ranged from less than two years to more than six years. It highlighted a mix of both relatively new employees and those with extensive

experience within their organizations. This demographic diversity provides a comprehensive perspective on the research topic. These employees ranged from entry-level to senior management.

Measures for Independent, Dependent, Mediating, and Moderating Variables

The Likert-scale questionnaire was developed from previous studies. It was administered to assess various variables like organizational identity, silence, social undermining, and organizational virtuousness.

For CO, a 14-item scale, developed by [Hatun and Demirci \(2020\)](#), was used. Next, the other independent construct of SU was measured with 13 items borrowed from [Dar et al. \(2023\)](#) developed by [Duffy et al. \(2002\)](#). The mediating variable, employee silence, as its dimensions (pro-social silence, acquiescent silence and defensive silence) were measured with 5 items each. This scale was developed by [Dyne et al. \(2003\)](#). The other dimension of employee silence, i.e., relational silence, was also measured by a 5-item scale developed by [Brinsfield \(2013\)](#). The moderating variable OV was measured with 10 items identified in [Magnier-Watanabe et al. \(2020\)](#) and was developed by [Cameron et al. \(2004\)](#). In the last, the dependent variable, organizational identity, was measured with a 6-item scale. It was obtained from a study by [Mael and Ashforth \(1992\)](#). Participants' responses against each adopted item were recorded in a 5-point Likert scale of 1 to 5 range (1=strongly disagree, 5=strongly agree). [Hatun and Demirci \(2020\)](#).

Data Analysis

After gathering the required primary quantitative data for the quantitative phase, statistical analysis was performed. In the initial steps, factor loading was performed, followed by "Heterotrait-Monotrait Ratio of Correlations" (HTMT) and validity analysis. ([Roemer et al., 2021](#)). Finally, "Partial Least Squares Structural Equation Modeling" (PLS-SEM) ([Ciavolino et al., 2024](#)) was performed to test the relationship between the variables of the study in association with the formulated conceptual framework.

Phase II: Machine Learning Approach

The ML approach was used for testing the performance of the formulated conceptual framework. This also added novelty to the current research.

Data Preparation

We split our dataset to evaluate the performance of the model; 80% dataset is for training, and the other 20% is for testing. To ensure that all features contribute equally, we normalize the data by scaling every feature to retain a mean of zero and a uniform variance by the following formula.

$$A(\text{scaled})_i = \frac{A_i - \text{mean}_i}{SD_i} \quad \text{eq(1)}$$

In this study, to reduce the prediction error and enhance the model accuracy, the gradient boosting regressor (GBR) mode ([Wang & Gu, 2015](#)) has been used, GBR is an integrated model with higher performance and better stability ([Li et al., 2018](#)). Gradient-descent-based formulation of boosting methods was derived by Friedman [natekin]. The GBR model increases the boosting algorithm to solve regression problems. The algorithm utilizes the negative gradients of the loss function to solve for the minimum value ([Li et al., 2018](#)). Good prediction accuracy and less time consumption of GBR enable it to be an appropriate algorithm ([Keprate & Ratnayake, 2017](#)). In regression problems, gradient descent builds the model as a collection of DTs (decision trees) in which every new tree tries to accurate residuals or errors of the previously built tree. At k iteration, the prediction of the model is

$$F_k(A) = F_{k-1}(A) + \tau \cdot l_k(A) \quad \text{eq(2)}$$

Its purpose is to reduce errors of prior predictions by adding trees, thereby reducing the loss. The loss function we want to reduce in regression is usually the MSE (mean square error). The GBR intends to iteratively decrease error by fitting a new DT towards negative residuals of the loss function. Gradient descent is used by GBR to reduce the loss function ([Zhao et al., 2019](#)). The residual of the loss function is calculated by every iteration relative to the previously made predictions. The negative residual of this gradient gives the next decision tree to be trained to forecast.

Let $L(b, F(A))$ be the MSE (loss function), the residual of MSE about the current model $F_{k-1}(A)$ is

$$g_i = \frac{\partial L(b_i, F_{k-1}(A_i))}{\partial F_{k-1}(A_i)} = -2(b_i - F_{k-1}(A_i)) \quad \text{eq(3)}$$

This residual declares at what cost the prediction of the model for the sample i demands to be suited to minimize the loss. The performance of the model is calculated by following the MSE and R^2 -score formulas.

$$MSE = \frac{1}{m} \sum_{i=1}^m (b_i - \hat{b}_i)^2 \quad \text{eq(4)}$$

$$R^2 = 1 - \frac{\sum (b_i - \hat{b}_i)^2}{\sum (b_i - \bar{b})^2} \quad \text{eq(5)}$$

Feature importance

In this study, we focused on knowing which features have the greatest impact on organizational identity, an important estimate of how employees view an organization. For this purpose, the importance of the features is calculated using GBR. Feature importance allocates a score to every feature based on its usefulness in forecasting the "organizational identity". Features that further improve model performance receive higher scores. Through investigating the most critical features, we can gather insights directly into which independent factors and interactions with various factors are managing organizational identity. Let A_i show every independent feature, and b shows the target variable.

$$\hat{b} = f(A_1, A_2, \dots, A_m) \quad \text{eq(6)}$$

Where f shows the sum of many DTs, and each feature contribution for this function is calculated as the importance of the features. Now, feature importance is denoted as $imp(A_i)$, and is calculated through the reduction of the MSE (loss function, i.e, L

$$imp(A_i) = \sum_{\text{splits on } A_i} \nabla L \quad \text{eq(7)}$$

This means that the more times a feature is used in the model tree to make important decisions, the greater the enhancement in forecasting accuracy it gives, and the higher the importance of the feature score.

Table 3.
Discriminant Validity through Fornell and Larcker

	AS	CO	DS	OI	OV	PS	RS	SU
AS	0.840							
CO	-0.593	0.764						
DS	0.443	-0.572	0.716					
OI	0.663	-0.633	0.522	0.850				
OV	0.643	-0.551	0.444	0.645	0.848			
PS	0.482	-0.631	0.547	0.618	0.545	0.809		
RS	0.608	-0.549	0.458	0.655	0.507	0.539	0.816	
SU	-0.476	0.558	-0.572	-0.508	-0.435	-0.630	-0.562	0.824

Source: Author's Work

1.1.1 Structural Model

The structural model assessment was investigated in the second step using the bootstrapping sample of n=5000 (Table 4). The beta coefficient, t-values, p-values, and the overall variance of the model were estimated. The coefficient of determination R^2 ranged from the medium value of 0.611 for the endogenous variable OI.

Direct Effects. The direct relationship between CO, SU, and OI was examined, and the results in Table 4, below, revealed significant outcomes for the relationship between CO and OI, and the impact of SU on OI was rejected, Thus, H1 was rejected, and H2 was accepted.

Table 4.
Direct Effects

Hypothesis	Relationship	β	T	P
H1	SU->OI	0.062	1.153	0.250
H2	CO->OI	-0.153	2.500	0.013

Source: Author's Work

Indirect Effects. The indirect effects are shown in Table 5. The results in the table show significant indirect effects for both SU and CO on OI through different types of employee silence.

For SU, significant negative indirect effects on OI were observed through RS ($\beta = -0.082$, $p = 0.003$) and PS ($\beta = -0.070$, $p = 0.005$), supporting hypotheses H3a and H3 b. However, the indirect effects via AS ($\beta = -0.038$, $p = 0.062$) and DS ($\beta = -0.028$, $p = 0.109$) were not significant, failing to support H3c and H3d. For CO, significant indirect effects were also found through RS ($\beta = -0.047$, $p = 0.033$), PS ($\beta = -0.051$, $p = 0.013$), and AS ($\beta = -0.073$, $p = 0.008$), supporting hypotheses H4a, H4b, and H4c (Table 5). However, the indirect effect via DS ($\beta = -0.023$, $p = 0.139$) was not significant, meaning H4d is not supported. These findings confirm that different forms of employee silence mediate the relationship between both SU and CO on OI, with relational, prosocial, and acquiescent silence playing significant roles.

Table 5.
Indirect Effects

Hypothesis Number	Association	β Value	T Value	P Value
H3a	SU → RS → OI	-0.082	2.973	0.003
H3b	SU→PS→OI	-0.070	2.811	0.005
H3c	SU→AS→OI	-0.038	1.869	0.062
H3d	SU→DS→OI	-0.028	1.607	0.109
H4a	CO→RS→OI	-0.047	2.136	0.033
H4b	CO→PS→OI	-0.051	2.483	0.013
H4c	CO→AS→OI	-0.073	2.664	0.008
H4d	CO→DS→OI	-0.023	1.483	0.139

Source: Author's Work

External Effects. The results indicate that organizational virtuousness (OV) plays a significant role in moderating the relationship between social undermining (SU) and organizational identity (OI) across multiple behaviors of silence. However, OV strengthens the negative mediation relationship for relational silence (H5a, $\beta = 0.188$, $p = 0.002$) and defensive silence (H5d, $\beta = 0.139$, $p = 0.029$). In this regard, both paths are showing statistically significant results. These findings suggest that in high-OV environments, relational and defensive silence have a more pronounced negative impact on the organizational identity. On the other hand, the moderation effects of OV on prosocial silence (H5b, $\beta = 0.140$, $p = 0.061$) and acquiescent silence (H5c, $\beta = 0.132$, $p = 0.024$) show weaker trends (Table 6). Therefore, prosocial silence indicates significance. These results indicate that OV has a moderating role. It means that it is particularly strong when silent behaviors are more overtly harmful to the organization, such as relational and defensive silence.

However, the moderating effect of OV on the relationship between cyber ostracism (CO) and organizational identity is less pronounced. The paths for relational silence (H6a, $\beta = -0.081$, $p = 0.193$), prosocial silence (H6b, $\beta = 0.034$, $p = 0.678$), and defensive silence (H6d, $\beta = 0.033$, $p = 0.616$) do not show significant results. Only the path for acquiescent silence (H6c, $\beta = -0.087$, $p = 0.166$) (Table 6) demonstrates a negative but non-significant effect. This suggests that OV has a stronger moderating effect when social undermining is involved, as compared to cyber ostracism, where the moderation effects were not significant. Therefore, it can be concluded that the moderation effect of OV is more pronounced in the context of social undermining as compared to cyber ostracism. Specifically, high OV values reduce the negative impact of silence behaviors on organizational identity. Consequently, it can result in fostering a more supportive environment despite the presence of silence.

Table 6.
External Effects

Hypothesis Number	Association	β -Value	T Value	P Value
H5a	OV x SU \rightarrow RS	0.188	3.095	0.002
H5b	OV x SU \rightarrow PS	0.140	1.880	0.061
H5c	OV x SU \rightarrow AS	0.132	2.263	0.024
H5d	OV x SU \rightarrow DS	0.139	2.193	0.029
H6a	OV x CO \rightarrow RS	-0.081	1.305	0.193
H6b	OV x CO \rightarrow PS	0.034	0.416	0.678
H6c	OV x CO \rightarrow AS	-0.087	1.388	0.166
H6d	OV x CO \rightarrow DS	0.033	0.503	0.616

Source: Author's Work

ML Analysis Predictive Modelling

We estimate our proposed GBR model's performance on the given dataset through MSE and R2-score

Table 7.
Gradient Boosting Regressor Model Performance

Model	MSE	R ² -score
GBR	0.796	0.238

Source: Author's Work

It is clear from Table 7 that our model's performance is good. On the mean, predictions of the model deviated from actual "organizational identity" scores by 0.238 units. So, this error is low, remarking that the model is accurate. The model analysed 79.6% of the variance in "organizational identity". A high score indicates that the model captures a sufficient number of patterns within the data. For more clarification, the visualization of model performance in terms of MSE and R2-score is shown in Figure 2.

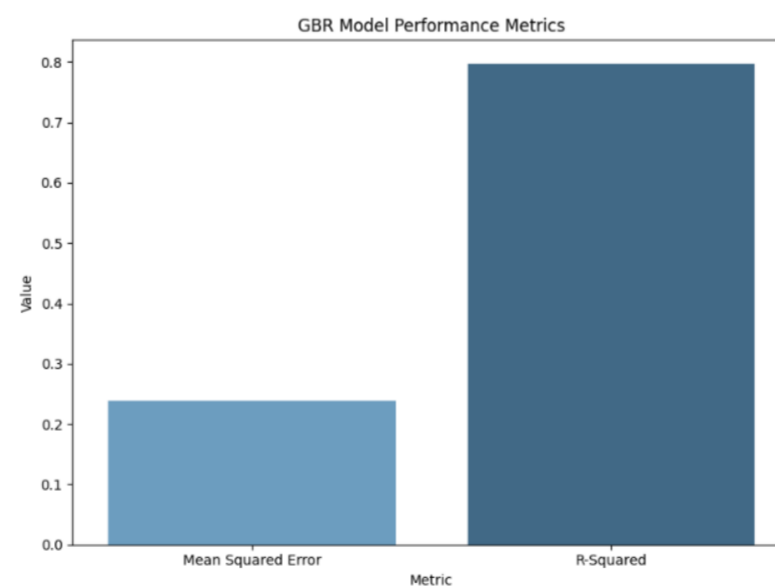


Figure 2. Gradient Boosting Regressor Model Performance through MSE and R2-score
Source: Author's Work

The actual vs. predicted value is shown in Figure 3.

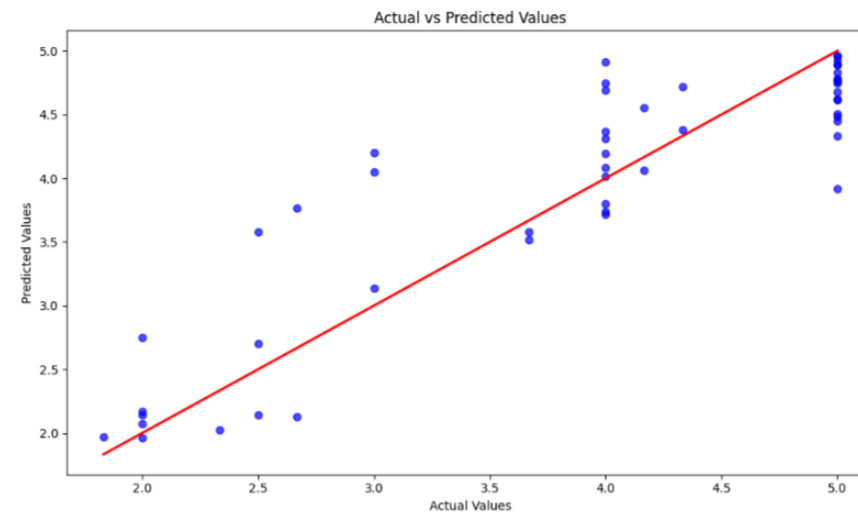


Figure 3. Actual Vs. Predicted values

Source: Author’s Work

Table 7 presents a moderate score of 0.238 for GBR. This suggests a limited variance proportion within organizational identity as presented in the model. However, the graphical presentation in Figure 3 presents a tight clustering of the predicted and the actual values. This shows no contradiction; instead, visual proximity of the “predictions to the actuals” is observed.

Figure 4 plot shows how correctly the predictions of the model meet the actual values. Every point showing a prediction means that if the points are close to the diagonal, the prediction is correct.

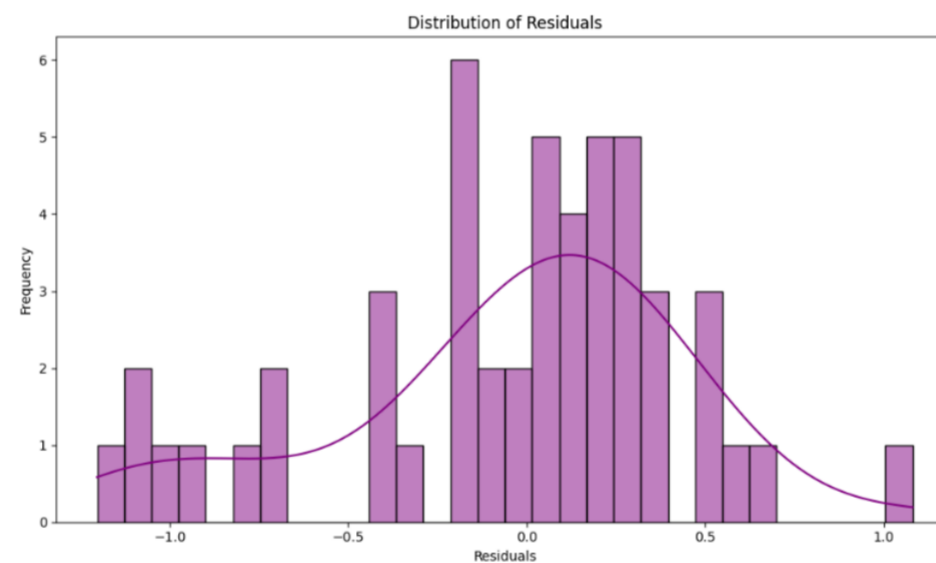


Figure 4. Distribution of errors

Source: Author’s Work

This histogram shows the residuals (errors) produced by the model. The errors are centered near zero, indicating that the model produces small unbiased mistakes, and is normally distributed without large outliers.

Feature Importance Analysis

In this study, we capture which features have the greatest impact on organizational identity, an important estimate of how employees view an organization. Allocated a score to every feature based on its usefulness in forecasting the “organizational identity”. The top 4 features with their interactions with the “organizational virtuousness” score are shown in Table 8.

Table 8.

Gradient Boosting Regressor Model Performance

Interaction with Features	Importance score
OV1_x_RS1	0.293129
OV4_x_RS1	0.042587

OV4_x_RS5	0.039031
OV4_x_AS3	0.032866

Source: Author's Work

From the above table, it is clear that every feature has some important score in predicting “organizational identity.

The highest interaction between OV1 and RS1 has a high importance of 0.293 scores, showing that this interaction plays an important role in the formation of “organizational identity”. Another powerful interaction was between OV4 and RS1 with a 0.0426 score. This suggests that different virtuousness elements interact with the silent behaviour of the employee to impact identification. Both OV1 as well as OV4 highlighted the important role played by organizational virtuousness combined with silence.

The third feature shows the interaction between OV4 and RS5 score of 0.0390. This also supports that when different kinds of silencing behaviours are combined with organizational virtuousness can have a strong influence on organizational identity. The fourth interaction among OV4 and AS3, with a 0.0329 score, suggests that in high-quality organizations, aggression can enhance or undermine the organization's identity, determined by its management.

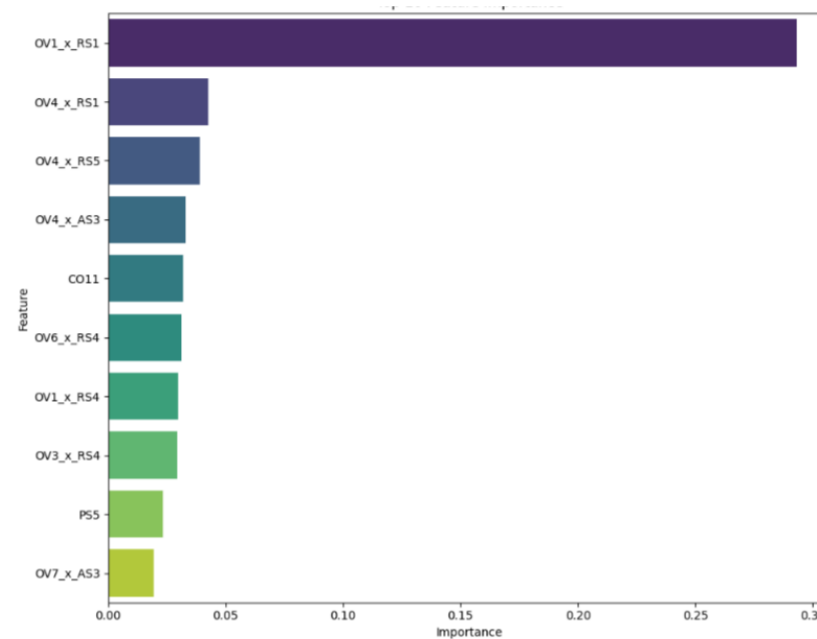


Figure 5. Importance of the features Source: Author's Work

5. Discussion

The digital and advanced era of technology has sprouted many diverse challenging points for mankind, and the researchers have been enlightening the dual aspects of this burgeoning technology usage, as social media in daily life. Similarly, in Pakistan, different organizations are taking important measures to integrate digital technologies for improving the remote and hybrid work performance of the employees. In this trend, the negative aura of acquisition and criticism has gained fire due to indirect and highly active social networks, which have raised the serious interest of researchers in cyber-ostracism (Xu et al., 2022). Such troubleshooting points are more important when individuals are working in a negative environment and face excessive pressure from the organization. This stressful and harmful workplace environment has been observed as a root cause of many other negative employee behaviours as social undermining, employee silence, employee deviant behaviour (Jung & Yoon, 2019), employee dissonance, stress and lower organizational identification (Wegge et al., 2012), retarded employee engagement and organizational performance (Rasool et al., 2021). Thus, the findings underscore the growing concerns around cyber-ostracism in the digital era. However, it could benefit from more direct connections regarding how technology amplifies these issues in the workplace. Additionally, the focus on negative employee behaviors may overlook potential organizational interventions or solutions. This issue is also observed in the civil services sector in Pakistan due to its conventional work environment.

It has been identified that cyber-ostracism and social undermining are persuasive and have detrimental and destructive results for the organizational health setup (Mulaphong, 2023; Zhang, 2020). The work culture in Pakistan integrates a combination of modern trends and conventional values, supported by hierarchy and dedication. This can prevent effective communication between the management and the employees. In an organizational setup, where employees face criticism and suppression stimulus from the other members of a workplace, they will experience a severely hampering effect on their morale and will find no way to escape, and will turn silent. In the extant literature, studies have been contending on the negative consequences and trouble-causing psychological consequences of ostracism and undermining the employees' constructive diligence and creativity, and their spark of dedication to work fades (Ahmad et al., 2022; Bhatti et al., 2023; Mulaphong, 2023; Yao et al., 2022). The findings effectively underscore the detrimental effects of cyber-ostracism and social undermining on the morale of employees, yet they could further explore specific organizational strategies so that these issues can be addressed. Additionally, while focusing on the negative impacts, it may benefit from highlighting potential protective factors or positive interventions in the workplace.

This study has identified that civil services organizations in Pakistan have not reached the adverse stage of acquiescent silence, and employees pursue pro-social and relational silent behaviour while still working with collaboration and cooperation. Moreover, the study shared another innovative conception of employee silence as a mediator and its associated significant outcomes. These identified results are supported by previous studies as well. Such as a study highlighted the mediating role of employee silence between abusive leadership and employee satisfaction and provided a base ground that negative stimulators in the workplace (Wang et al., 2020). In another study, synergic to the previously cited research, the empirical scholars illuminated the negative mediating influence of employee silence to damage their job satisfaction (Baloch et al., 2023). Similar to the cited empirical studies of evidence, this study has identified the same fact that when employees struggle with negative stressors and unjust behaviour, they turn their voice



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into silence, and in this negative phenomenon, their organizational identity takes a tremendous shock. The study effectively highlights the role of employee silence as a mediator and links it to negative organizational outcomes, drawing on relevant studies. Additionally, exploring the potential positive forms of employee silence could offer a more balanced perspective in this context.

In the last, the study revealed some mixed outcomes for the moderation of organizational virtuousness that have been justified by previous studies ([Singh et al., 2024](#)). Organizational virtuousness works on the assumptions of organizational justice, and it gives significant air to ethical, just, and fair practices that cultivate satisfaction and performance, and simultaneously eradicate the chance of performance of negative stimulators ([Gogia et al., 2024](#)).

While discussing the results, it is important to consider the cultural characteristics specific to Pakistan, which is generally classified as a collectivist society. In such cultures, individuals tend to define themselves in relation to their social groups, and maintaining interpersonal harmony and group belonging is of high importance (Chen, 2023 #4906). This cultural orientation may amplify the psychological impact of ostracism, as social exclusion directly threatens core social values such as loyalty, respect, and familial or communal connectedness. Thus, the findings suggest that in Pakistani society, the consequences of social exclusion may be more pervasive and enduring than in individualistic cultures, and highlight the need for culturally informed interventions that prioritize social reintegration and collective well-being (Pervaiz, 2021 #4907).

5.1. Conclusion

This research highlights the negative impacts of cyber-ostracism and social undermining on organizational identity, particularly in remote working environments of Pakistani organizations. With the discovery of how such negative digital behaviors exacerbate various forms of employee silence, the study indicates a very threatening risk to employees' engagement and unity. Even though organizational virtuousness was supposed to act as a buffer against these effects, its moderating impact was unstable, i.e., virtue-based values are not adequate to counter the psychological damage of exclusionary actions. Its interaction with machine learning and PLS-SEM presented strong evidence for these relationships, and it indicates the necessity for multidimensional analysis in organizational studies. These results necessitate immediate, systemic interventions for fostering open communication, psychological safety, and digital civility. Finally, then, to fight digital ostracism and sabotage is not only an organizational imperative, it is a social obligation to guarantee sound, inclusive, and resilient working cultures in today's more and more digitalizing professional environment.

5.2. Implications

This study presents both theoretical, practical and societal implications as discussed below:

5.2.1. Theoretical Implications

The findings indicate that employees have a congruent need for justice to successfully survive in an organizational setup, and organizational virtuousness, combined with other positive constructors, is the prime key to ensure identification ([Chun, 2017](#)). Moreover, this study was the first type of research that incorporated the negative organizational parameters with individual-level traits, such as silence ([Rai & Agarwal, 2018](#)). The findings also indicated that undermining is a very serious concern for the organization where the management has to pay head and complete attention to motivating and supporting their employees so that a healthy, supportive and constructive environment. It also came to light that social undermining, when combined with employee silent behaviour, asserts a damaging pressure to a negative form of acquiescent silence ([Afshan et al., 2022](#)). Such silent behaviours can lead to loss of potential workforce; therefore, they must be monitored and resolved. This study enhances the understanding of how cyber-ostracism and social undermining impact organizational identity and enriches the literature within this context. It also contributes to the existing literature by highlighting the role of employee silence and organizational virtuousness as mediators. The study provides new insights into the mechanisms that affect organizational behavior. Managers can also utilize the findings to create healthier organizational environments. In this way, they can focus on addressing issues of social undermining and cyber-ostracism. Consequently, organizational virtuousness can be promoted, and open communication can be encouraged. It can reduce employee silence, thereby improving organizational identity and overall performance.

5.2.2. Practical Implications

The findings of this study will be crucial in encouraging the management in the civil services sector to take important measures for developing and implementing virtual exercises for team-building. In addition, bias training should also be provided for the managers to recognize digital ostracism. This can be effective in improving the overall work environment within the associated organization. Moreover, counselling services will also be designed for the employees to prevent them from social undermining. This approach is also crucial for improving the mental health of the employees, contributing to their overall performance. However, the anonymity of the employees should also be maintained during such counselling sessions. This will allow them to openly present their concerns. In this regard, employee silence also presents one of the main factors. Therefore, the human resources of the civil services companies also need to look out for such silent factors to improve the working environment for the employees.

In addition to these managerial implications, different policy-related implications are also considered to be effective. In this regard, the development and implementation of inclusive policies is considered to be vital. At the same time, such policies also need to integrate anti-cyber ostracism measures and protocols. In addition, different public awareness programs regarding cyber ostracism, can also be developed and implemented by civil services organizations. This will help in improving organizational identity, leading to improved community development. Thus, this study largely contributes to the understanding of the underpinning behaviors of the employees within the context of social undermining.

5.2.3. Societal Implications

This study has significant social consequences in virtual labor and internet-based communication, especially in Pakistani organizational contexts. As increasing amounts of face-to-face communication are being substituted with digital communication, cyber-ostracism and social undermining are commonplace risks to workers well-being and organizational identity. These actions instill a culture of silence that jeopardizes psychological safety and denies workers' ability to express their concerns or participate constructively with their organizations. Socially, thus, the findings highlight the utmost importance of redefining how we think about workplace online communication and inclusion. Organizations have to implement integral steps that move beyond the promotion of shallow virtues and actually work on combating poisonous online behavior. This involves instilling digital codes of conduct, maintaining open lines of communication, and training leaders to recognize and silence signs of exclusion and silencing online (Rosha, 2021). At the policy level, work standards and labor law in developing settings such as Pakistan need to change to recognize the mental hazards of remote and hybrid

work. In addition to promoting worker mental health and productivity, this would help shape more ethical, sustainable, and inclusive organizational cultures needed to drive sustained societal progress and economic development (Haque, 2023).

5.3. Limitations and Future Suggestions

The study investigated the underlying causal link by multi-sourcing the organizational data from Pakistan, but there are significant cultural differences in the Western, Eastern, and Asian cultures (Alavi et al., 2020) and the same causal links can generate entirely different outputs in other culture-specific areas. Next, this study has kept its lens of research to the four types of employee silence, however, studies have further extended the scope of their studies by adding to the drastic consequences of employee silence, such as turnover intentions, productivity, etc. (Shaukat & Khurshid, 2022; Wang et al., 2020). Last but not least, this study has used the organizational justice theory perspectives and didn't investigate any of the justice-specific elements like leadership, support, organizational justice and other constructs (Nafei, 2016; Rayan et al., 2020), reflecting the positive efforts of the organizations to hamper the negative functioning segments of the workplace environment, but can be introduced in the implied model to add some supportive grounds for the organizations and employees to cope with the negative aura of ostracism and undermining.

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