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Research article

WHAT DRIVES CYBERLOAFING AMONG INDIAN IT PROFESSIONALS? AN ISM AND MICMAC INVESTIGATION

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Abstract: In an era where work and workplaces are increasingly digitized, the pervasive phenomenon of cyberloafing—diverting work hours to non-job-related online activities—poses a growing challenge. This study delves into the underlying factors of cyberloafing identified in the literature and examines the interrelationships among them. By categorizing these factors, the study aims to provide a comprehensive understanding of cyberloafing. Data were gathered through interviews with 15 IT experts and 3 academic professionals and analyzed using interpretive structural modeling (ISM) and cross-Impact Matrix Multiplication Applied to Classification (MICMAC) analysis. The findings highlight organizational culture, job demand-resource (JDR), leadership styles, and perceived overqualification (POQ) as primary drivers of cyberloafing. This research enhances our understanding of cyberloafing and proposes targeted measures to mitigate its impact, emphasizing the need for organizations, particularly within the dynamic Indian IT sector, to address this issue proactively.

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Keywords: Cyberloafing, counterproductive workplace behaviours, ISM, interpretive structural Modelling, MICMAC.

MSC: 20D45

1. INTRODUCTION

Cyberloafing has emerged as a significant concern for organizations due to the fact that employees often fail to pay attention while performing job-related responsibilities, which ultimately leads to a decline in job productivity [1, 2, 3]. Engaging in personal email correspondence, exploring websites unrelated to work, and viewing online videos are instances of behaviors associated with cyberloafing [4]. In today's digital age, where the internet is readily accessible, organizations have recognized cyberloafing as a significant concern. Employees spend approximately 3 hours per day on cyberloafing resulting in organizational costs reaching as high as USD 85 billion annually [4, 5]. Cyberloafing is a prevalent and covert behavior that significantly hinders organizational development. It does not only diminish work efficiency but also carries a range of adverse consequences for both employees and companies [6, 7]. And after the COVID-19 pandemic, cyberloafing has become even more critical because of the changing work-environment [8, 9]. According to a study, 20 to 25 percent of employees in advanced nations and roughly 10 percent in emerging economies work from home three to five days per week which has added the instances of cyberloafing [10].

The impact of cyberloafing on job, employees, and organizational productivity is a subject of ongoing discussion. In fact, use of internet and smart gadgets and less managerial monitoring while working from home has significantly contributed to the problem of cyberloafing which in turn add to the organizational costs. In addition to the associated costs, cyberloafing also threatens the organizational security and increase the risk of security breach due to surfing unsecure files [11]. Though, some researchers have shown the upside of cyberloafing and argued that it is beneficial for employees. However, researchers have argued that to some extent only, cyberloafing act as a coping mechanism for job stress, burnout, workplace aggression, workplace ostracism and enhance innovation performance, etc. [6, 12, 13]. Given its intricate nature, cyberloafing can be interpreted as either a constructive or counterproductive behavior in the workplace [3]. Managers generally perceive cyberloafing as a behavior that should be regulated within the workplace. In fact, use of internet and smart gadgets and less managerial monitoring while working from home has significantly contributed to the problem of cyberloafing which in turn add to the organizational costs Conversely, employees often regard it as an opportunity to recuperate and refresh themselves from the rigors of the job [14, 15].

In light of this, it is very important for organizations to figure out what are the important factors influencing cyberloafing and how to mitigate these challenges it and how to handle it effectively. Prior literatures have identified various antecedents of cyberloafing such as personality traits, demographics, time management, habits, managerial supports, supervisor’s communication style, role conflict, role ambiguity, organizational justice, etc. [16, 17, 18, 19, 20, 21]. Recently, [1] classified and categorized the antecedents of cyberloafing but this study does not highlight the relative importance of the factor that contributes highly to cyberloafing. Hence, to fill this gap this study has following objectives.

Determine the key factors that contribute to cyberloafing.

To use Interpretive Structural Modelling (ISM) approach to analyse and determine the relationship among the factors of cyberloafing.

To categorize those factors into four clusters (independent, dependent, linking and autonomous) of cyberloafing using MICMAC analysis [22].

In recent years, there is no comprehensive study to develop an Interpretive Structural Modelling (ISM)-based cyberloafing model covering the crucial factors. This study marks the initial step in filling this gap. We employed two structural analysis techniques, ISM and MICMAC analysis, to construct a thorough ISM model. This approach aims to offer a more precise method for identifying significant factors influencing the formulation of cyberloafing models.

This paper is categorized into five sections. Section 1 presents introduction where the relevance of the topic, why factors of cyberloafing needs to be researched, objective of the study and what methodology will be used in the study are described. Section 2 presents the important factors related to cyberloafing identified in the literature review. Section 3 outlines the methodological process for structural analysis to the identified factors of cyberloafing. Section 4 outlines the primary findings, while Section 5 provides the study's conclusions.

2. LITERATURE REVIEW

2.1. Cyberloafing

The concept of cyberloafing is not novel. It was first proposed by Kamins in 1995 as a component of workplace deviance, and it gained popularity in the early 2000s as firms began digitising their operations [23]. However, due to its high costs and widespread use, researchers' attention has been drawn to it once more. Over the past two decades, there has been a significant increase in the number of proposed terminologies used to define cyberloafing. Cyberloafing is an umbrella term that encompasses cyberslacking, personal internet use, mobile loafing, and personal-mobile internet loafing, with the primary focus being on the consumption of non-work-related online content utilising numerous means and assets during working hours [23, 24, 25]. Cyberloafing activities are not specified regarding the means via which employees gained access to technology. These conceptual changes are a result of technology advancements that have taken place in the last twenty years. During the initial stages of cyberloafing, internet connection was not as widespread and was more costly. Consequently, the unauthorised utilisation of the bandwidth offered by organisations was a significant issue for employers. In the present day, as employees increasingly bring their own data-enabled gadgets to the workplace, managers are worried about other outcomes of cyberloafing, such as stealing time, decreased productivity, or engaging in risky actions. Regardless of the various interpretations of cyberloafing and similar concepts, they all share a common emphasis on employees utilising technology gadgets to take a break or "escape" from work and engage in nonwork activities. Therefore, these behaviours might be regarded as a type of withdrawal that is made easier by the use of information technology. Nowadays, employees use the internet for both personal and professional purposes. Scholars' opinions on the effects of such unethical behaviour in an organisation vary. While some scholars have argued against cyberloafing as a recovery mechanism or stress reliever, others have researched its negative impact on organisations [26]. Cyberloafing is

considered a counterproductive workplace behaviour due to its negative impacts on organisations overall performance, which companies need to overcome. Therefore, the purpose of this study is to identify the factors that influences cyberloafing and to analyse and determine the relationships among those factors.

2.2. Factors of cyberloafing

The cyberloafing literature has provided significant insight into its factors and consequences. Extensive research has been conducted on the numerous factors and their effects on employee cyberloafing. Individual factors (such as employee characteristics, perceptions, and motivation) or organisational factors (such as organisational commitments, norms, policies, and leadership styles) have been the focus of previous research on the determinants of employee cyberloafing [16, 21, 27, 28].

Organizational Justice – Organizational justice is recognized as a psychological concept cantered on employees' subjective evaluations of the fairness of their treatment within the workplace and how it influences their work experiences [29]. Prior research has demonstrated that organisational justice affects the cyberloafing behaviour of employees [30, 31, 32]. Previous studies have discovered factual proof that employees are more prone to engaging in deviant behaviours when they feel their organization to have acted unfairly in the distribution of rewards or resources [33]. These researches focused on to investigate the reasons behind individuals engaging in cyberloafing, using the framework of organisational justice. Investigating the detrimental effects of internet addiction and misuse on both job productivity and attitudes, as well as the potential legal consequences. Scholars commonly utilise ideas pertaining to deviance and criminology, including general deterrence theory, organisational justice theory, and neutralisation theory [34, 35].

Organizational Culture – Culture significantly influences human behaviour, with cultural values playing a crucial part in decision-making processes. A study by [4] posited that the influence of social and organisational culture on the proliferation of cyberloafing within organisations is substantial. Prior studies implies that specific individual interpretations of organisational culture, when contrasted to others, can impact the engagement in cyberloafing activities [36, 37]. Scholars in their studies also mentioned that electronic monitoring is more effective for employees who have high levels of job satisfaction, whereas Internet use policies are more effective for employees who have high levels of self-esteem than for those who have low levels of self-esteem [34].

Job Demand-Resource (JDR) - The JD-R model elucidates work-related outcomes by analysing the dual set of job characteristics that impose demands on and provide resources to individuals [38]. Literatures have advocated that job demand increase burnout and reduce work engagement. On the other hand, Job resources are physical, psychological, social, or organisational factors that help fulfil work goals, minimise job demands and physiological and psychological costs, promote personal growth and development, and increase work engagement [39, 40, 41]. In short, JD-R is a unifying theory of job design that incorporates multiple viewpoints on job stress and motivation which in turn influences employees' behaviours such as deviant behaviour, work engagement, etc. [40, 42].

Leadership Styles - Previous research found that managerial support and accessibility of Internet access were positively associated with cyberloafing [43]. The communication

style of a manager also plays an essential role in predicting cyberloafing among employees. Employees whose supervisors have assertive communication styles are less likely to cyberloaf than those whose supervisors have aggressive and passive, abusive communication styles [16, 44, 45]. Some researchers have argued that there is a direct relationship between responsible leadership and employee cyberloafing [46]. However, other researchers have argued that a supervisor's mindfulness influences employees' cyberloafing behaviour [47]. One of the recent studies posits that authoritarian leadership styles positively impact cyberloafing behaviour among subordinates [48].

Perceived Overqualification - Perceived overqualification (POQ) is the employee's perception of the extent to which their qualifications exceed the job requirements [49]. It is a type of underemployment in which an employee considers his education, knowledge, skills, and competencies are not fully applied in their job [50]. Literatures have demonstrated that overqualified employees feel demotivated and perceive their person-job misfit as a frustrating work condition that hinder their professional goal, which results into anger towards their organization [51, 52]. Consequently, POQ is associated with unfavourable job attitudes, and behaviour, such as unhappiness, intention to leave, work alienation, low organisational commitment, withdrawal behaviour, and cyberloafing [52, 53, 54].

Workplace Ostracism - Workplace ostracism is a type of workplace hostility that involves individuals feeling ignored or alienated by others in the workplace [55]. Extensive studies in management literature have thoroughly explored the repercussions faced by individuals who experience workplace ostracism. Studies have revealed that employees who are ostracised experience a range of psychological consequences, including emotional tiredness, depressed mood while working, and increased work tension. These adverse effects can lead to reduced job satisfaction and diminished work performance, and counterproductive workplace behaviour [55, 56]. Many studies have directly linked workplace ostracism with cyberloafing and argued that employees who feel ostracized, do cyberloafing to cope up with emotional exhaustion, psychological resilience, etc. [5, 57, 58].

Work Engagement - Work engagement is defined as a state of positive, fulfilling, and work oriented mindset that is characterized by vigour, devotion, and absorption. Vigour is defined as high level of energy and cognition while spending more time on challenging work. Dedication is defined as an employee's motivation, enthusiasm, pride, and significance, at work. Absorption is defined as a state of mind where employees are fully focused towards work [59]. Work engagement research has grown in importance fernetwithin industry and academics. Individual and environmental factors are considered to be an important determinants of work engagement [30]. Prior research has linked work engagement with both positive and negative work behaviour such as job performance, turnover intention, innovative behaviour and job satisfaction, and deviant behaviour [60]. A study explored that proposed that job demands increase work stress which reduce work engagement and increase cyberloafing, and on the other side job resources increases work engagement which in turn reduces cyberloafing [42].

Harmonious Passion - Harmonious passion refers to an individual's favourable emotions derived from independently finding pleasure in their work and their willingness to dedicate time and effort to their career [61]. This pertains to the process of integrating work into one's identity by self-directed means, such as perceiving the work as meaningful and significant. Harmonious passion is mostly influenced by subjective

characteristics of employees, which they have the ability to regulate [62]. Studies have posited that harmonious act as a mediator with POQ and cyberloafing [63].

Workplace loneliness - Workplace loneliness refers to a detrimental emotional state resulting from unsatisfactory connections with colleagues in the office [64]. It is widely acknowledged that organisations consistently subject their employees to this form of occupational stressor. Research has found that loneliness in the workplace negatively impacts both attitudinal and behavioural outcomes, including low job satisfaction, organisational commitment, and intention to leave, as well as poor job performance and organisational citizenship behaviour [64]. Empirical studies on cyberloafing have also demonstrated a positive correlation between excessive internet utilisation, smartphone addiction, online gambling, and loneliness. This field of study postulates that maladaptive coping mechanisms, such as problematic internet behaviours, are employed by individuals who feel lonely [65].

Conscientiousness - Conscientiousness, a facet of the big five personality model, refers to the degree to which individuals exhibit traits such as being diligent, industrious, persistent, self-controlled, and driven to succeed [66]. Studies on cyberloafing have explored conscientiousness as a strong moderator [9].

Organizational Commitment - Organisational commitment typically pertains to an individual's psychological attachment to their place of employment [67]. The research examined the connection between intrinsic participation, work involvement, and cyberloafing in a group of professionals from different industries. It discovered a negative link between these components associated to organisational commitment and cyberloafing [43]. Similarly, a greater level of commitment to the organisation resulted in a decreased occurrence of cyberloafing among a randomly selected group of employees in the United States [68].

3. METHODOLOGY AND DATA

3.1. Interpretive Structural modelling

The objective of this study is to identify the factors of cyberloafing and to determine the relationship among those factors and to categorize those factors among different clusters. The purpose of this study is accomplished by the utilisation of Interpretive Structural Modelling technique analysis (ISM) and MICMAC analysis. The ISM approach proposes the utilisation of expert opinions in conjunction with management techniques like nominal group techniques or brainstorming in order to establish contextual relationships among the variables. ISM-based approach was introduced by Warfield in 1973 [69]. ISM is a dynamic educational method that organises a diverse collection of interconnected parts into a coherent and systematic paradigm. The model represents the intricate nature of a topic, problem, system, or field of study through a well-structured arrangement of visuals and words. The fundamental concept of ISM involves utilising the practical expertise and knowledge of experts to break down a complex system into multiple sub-systems (elements) and create a hierarchical structural model. The ISM technique facilitates the establishment of structure and guidance in managing the intricate interconnections between components inside a system [70] (Figure 1).

The steps of ISM are as follows:

Identify the system elements.

Let $C_1, C_2, C_3, \ldots, C_n$, be the system elements identified from the literature and verified from the experts. These system elements can be designated from 1, 2, 3, …., *n*.

$$C_i (i = 1,2,3, \ldots, n) \quad (1)$$

Determine the relationship matrix (initial reachability matrix) between system elements. Let $D = [a_{ij}]$ be the relationship matrix based on the influence of C_i on C_j.

$$a_{ij} \begin{cases} 1 \; if \; C_i \; influence \; C_j \\ 0 \; if \; C_j \; influence \; C_i \end{cases} \quad (2)$$

After constructing initial reachability matrix D, we calculate the reachability matrix M^* using equation (3) and equation (4).

$$M = D + I \quad (3)$$

$$M^* = M^k = M^{k+1} \quad (4)$$

(Where $I = n*n$ identity matrix and $k > 1$)

The power k of the operation is based on the Boolean multiplication and Boolean addition (1*1=1, 1+1=1, 1+0 = 0+1 = 0+0 = 0*0 = 0)

The region and inter-stage decomposition are carried out on the reachable matrix M. Before decomposing, the reachable set, antecedent set, and Intersection are determined for each element.

$$Reachable\ set: R(C_i) = \left\{ C_{i(column)} \middle| m_{ij} = 1 \right\} \quad (5)$$

$$Antecedent\ set: A(C_i) = \left\{ C_{i(row)} \middle| m_{ij} = 1 \right\} \quad (6)$$

$$Intersection\ set: T(C_i) = R(C_i) \cap A(C_i) \quad (7)$$

Construct a directed graph using nodes and single or double-ended arrow lines. Eliminate transitive links from the diagraph in accordance with the relationships specified in the reachability matrix. Subsequently, make the resulting diagraph an ISM model by substituting statements for factors nodes.

3.2. MICMAC analysis

MICMAC analysis is developed by Michel Godet and François Bourse [71] as a methodical examination of analysing complex problems. The outcomes of ISM serve as an input for MICMAC analysis, which aims to determine the influential and dependent power of factors.

MICMAC is a method of indirect classification used to thoroughly examine the extent of each element. It examines the causal and dependency relationships between variables to discover and categorise important variables, therefore revealing the factors that facilitate the adoption of voice assistants. In the current study, the factors are classified into categories based on driving and reliance power as autonomous variable, independent variable, dependent Variable, and Linking variable.

3.3. Validation of the factors through expert's opinion

After going through the literature, we found the eleven factors namely, organizational justice, organizational culture, JDR, leadership styles, POQ, workplace ostracism, work engagement, harmonious passion, workplace loneliness, conscientiousness, and organizational commitment which influence cyberloafing. These factors are further validated through experts' opinion. In this study, to identify the prominent factors

influencing cyberloafing, our study conducts a comprehensive analysis of the factors by 18 experts, 15 experts from the IT industry and 3 experts from academia from Delhi NCR (for questionnaire refer appendix). The experts were individually called to gather information on the primary elements that influence cyberloafing in the Indian context. In-depth, one to one interview were conducted to collect data from the respondents, aiming to gain an in-depth understanding of the factors of cyberloafing. Participants were assured of the confidentiality and anonymity of their responses, and they were briefed about the study's objectives. Each interview lasted between 35 and 90 minutes, ensuring completeness and accuracy. All the eleven factors that we found through literature, were also chosen by the experts and taken into consideration.

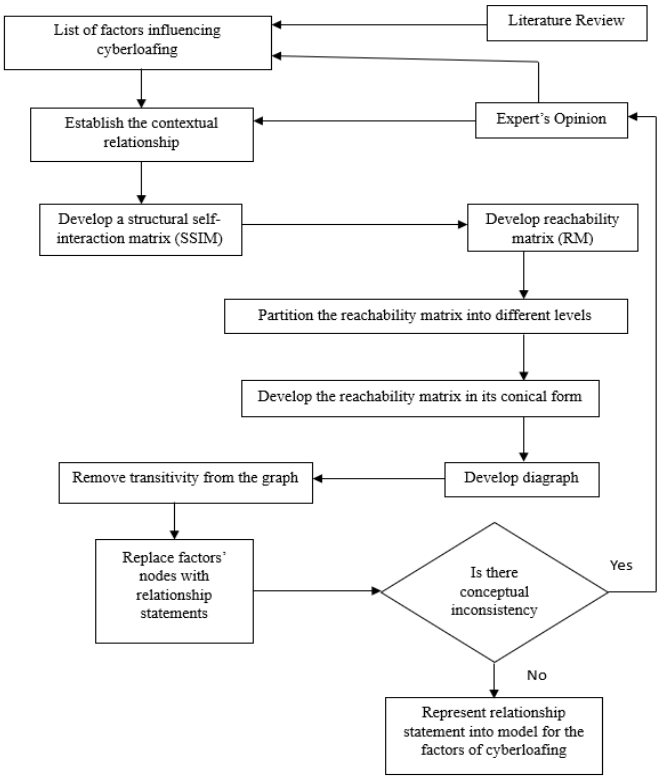

Figure 1: Flow chart of ISM model (Source: modified from [70])

4. FINDINGS

The main objective of our study is to ascertain the factors of cyberloafing, a critical aspect in comprehending and alleviating this widespread phenomenon in contemporary work environments. The first step of the ISM method is to identify the factors reflecting the multifaceted nature of the variables influencing cyberloafing behaviours. After going through the literatures and validating these factors from the experts' opinion, this study finds the below mentioned factors of cyberloafing (refer Table 1).

Table 1: Identified factors of cyberloafing

Factors	Descriptions	Author's (Year)
Organizational justice (F1)	Organizational justice is recognized as a psychological concept cantered on employees' subjective evaluations of the fairness of their treatment within the workplace and how it influences their work experiences	Moorman (1991); Öğüt et al. (2013); Oosthuizen et al. (2018); Restubog et al. (2011); Zoghbi-Manrique-de-Lara and Melián-González (2009); Lim and Teo (2024)
Organizational culture (F2)	Culture significantly influences human behaviour, with cultural values playing a crucial part in decision-making processes.	Lim and Chen (2012); Ugrin et al. (2018); Zoghbi-Manrique-de-Lara and Viera-Armas (2017); Lim and Teo (2024)
JDR (F3)	The JD-R model elucidates work-related outcomes by analysing the dual set of job characteristics that impose demands on and provide resources to individuals	Bakker and Demerouti (2007); Agarwal and Gupta (2018); Bakker et al. (2023); Bakker and Demerouti (2017); Elrehail et al. (2021)
Leadership styles (F4)	Leadership styles refer to the way they treat their employees. Few leadership styles which are undertaken in this study are responsible leadership, authoritarian leadership, mindfulness of supervisors, etc.	Liberman *et al.* (2011); Agarwal (2019); Dhali et al. (2023); Koay et al. (2022b); Zoghbi-Manrique-de-Lara et al. (2020); Zhang et al. (2022)
POQ (F5)	Perceived overqualification (POQ) is the employee's perception of the extent to which their qualifications exceed the job requirements.	Erdogan and Bauer (2009); Uddin et al. (2022); Erdogan et al. (2018); Liu et al. (2023); Liu et al. (2023); Luksyte et al. (2022); Zhang et al. (2020)
Workplace ostracism (F6)	Workplace ostracism is a type of workplace hostility that involves individuals feeling ignored or alienated by others in the workplace.	Li *et al.* (2021); BaŞ and Sabri Sirin (2023); Hu et al. (2023a); Koay (2018b); Koay and Lai, (2023)
Work engagement (F7)	Work engagement is defined as a state of positive, fulfilling, and work oriented mindset that is characterized by vigour, devotion, and absorption. Vigour is defined as high level of energy and cognition while spending more time on challenging work.	Schaufeli and Bakker (2004); Oosthuizen et al. (2018); Grobelna (2019); Elrehail et al. (2021)
Workplace loneliness (F9)	Workplace loneliness refers to a detrimental emotional state resulting from unsatisfactory connections with colleagues in the office.	Wright (2005); Hu et al. (2023b)
Conscientious (F10)	Conscientiousness, a facet of the big five personality model, refers to the degree to which individuals exhibit traits such as being diligent, industrious, persistent, self-controlled, and driven to succeed	Barrick and Mount (1991); Zhu et al. (2021a)
Org commitment (F11)	Organisational commitment typically pertains to an individual's psychological attachment to their place of employment	Yousef (2017); Liberman et al. (2011); Garrett and Danziger (2008)
Cyberloafing (F12)	Engaging in personal email correspondence, exploring websites unrelated to work, and viewing online videos are instances of behaviors associated with cyberloafing	Koay et al. (2022a); Lim and Teo (2022); Sarfraz et al. (2023); Lim and Chen (2012)

Once the factors are identified and validated, the next step was to develop a structural self-interaction matrix (SSIM). The expert opinion was used to determine the contextual relationship among the factors, using the ISM technique. The SSIM was derived by evaluating each row against each column and assigning a code based on a predefined set (V, A, X, O). The trajectory of the interrelationship among factors is denoted by the symbolic identifiers listed below:

V: Factor P influences factor Q;
A: Factor Q influences factor P;
X: Both factors influence each other;
O: Both factors are unrelated.

Table 2: Self structural interaction matrix (SSIM)

Structural Self-Interaction Matrix (SSIM)												
Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Org. justice (F1)		A	A	A	A	V	V	O	X	O	X	V
Org. culture (F2)			A	A	A	V	V	V	V	V	V	V
JDR (F3)				A	A	V	V	V	V	V	V	V
Leadership styles (F4)					A	V	V	V	V	V	V	V
POQ (F5)						V	V	V	V	V	V	V
Workplace ostracism (F6)							X	X	X	A	O	V
Work engagement (F7)								X	V	X	X	V
Harmonious passion (F8)									V	X	X	V
Workplace loneliness (F9)										O	O	V
Conscientious (F10)											X	V
Org commitment (F11)												V
Cyberloafing (F12)												

The SSIM was constructed based on the previously mentioned principles, as outlined in Table 2. The number of pairwise comparisons required for the generation of SSIM is represented by ((N)*(N-1)/2), where N represents the number of factors influencing cyberloafing.

Then, the SSIM was converted into a binary matrix known as the initial reachability matrix (refer to Table 3) by converting V, A, X, and O to 1 and 0, respectively. The procedure for substituting 1 and 0 is as described below.

In the initial reachability matrix, if the value of the entry in cell (P, Q) of the SSIM is V, then cell (P, Q) becomes 1 and cell (Q, P) becomes 0.

In the initial reachability matrix, if the value of the entry in cell (P, Q) of the SSIM is A, then cell (P, Q) becomes 1 and cell (Q, P) becomes 0.

In the event that the value entered in cell (P, Q) of the SSIM is X, the values in cells (P, Q) and (Q, P) both increment to 1 in the initial reachability matrix.

In the event that the value of the entry in cell (P, Q) of the SSIM is O, the values of the entries in cells (P, Q) and (Q, P) both become zero in the initial reachability matrix. As per the stipulations, the initial reachability matrix is presented in Table 3.

Table 3: Initial Reachability matrix

Initial Reachability Matrix (IRM)													
Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	Driving Power
Organizational justice (F1)	1	0	0	0	0	1	1	0	1	0	1	1	6
Organizational culture (F2)	1	1	0	0	0	1	1	1	1	1	1	1	9
JDR (F3)	1	1	1	0	0	1	1	1	1	1	1	1	10
Leadership styles (F4)	1	1	1	1	0	1	1	1	1	1	1	1	11
POQ (F5)	1	1	1	1	1	1	1	1	1	1	1	1	12
Workplace ostracism (F6)	0	0	0	0	0	1	1	1	1	0	0	1	5
Work engagement (F7)	0	0	0	0	0	1	1	1	1	1	1	1	7
Harmonious passion (F8)	0	0	0	0	0	1	1	1	1	1	1	1	7
Workplace loneliness (F9)	1	0	0	0	0	1	0	0	1	0	0	1	4
Conscientious (F10)	0	0	0	0	0	1	1	1	0	1	1	1	6
Org commitment (F11)	1	0	0	0	0	0	1	1	0	1	1	1	6
Cyberloafing (F12)	0	0	0	0	0	0	0	0	0	0	0	1	1
Dependence Power	7	4	3	2	1	10	10	9	9	8	9	12	

The final reachability matrix was derived by examining the transitivity of the initial reachability matrix (refer to Table 4). In the ISM method, the transitivity of the relationships is a fundamental assumption. In the event that factor P is associated with factor Q (pRq) and factor Q is associated with factor R (qRr), then factor P is inextricably linked to factor R (pRr). In the same way that factor Q is related to factor S (qRs) and factor P is related to factor S (pRs), factor P must also be related to factor S. Therefore, following the imposition of the transitivity relationships represented by the symbol 1*, the ultimate reachability matrix is constructed in the manner illustrated in Table 4.

Table 4: Final reachability matrix (FRM)

Final Reachability Matrix (FRM)													
Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	Driving Power
Organizational justice (F1)	1	0	0	0	0	1	1	1*	1	1*	1	1	8
Organizational culture (F2)	1	1	0	0	0	1	1	1	1	1	1	1	9
JDR (F3)	1	1	1	0	0	1	1	1	1	1	1	1	10
Leadership styles (F4)	1	1	1	1	0	1	1	1	1	1	1	1	11
POQ (F5)	1	1	1	1	1	1	1	1	1	1	1	1	12
Workplace ostracism (F6)	1*	0	0	0	0	1	1	1	1	1*	1*	1	8
Work engagement (F7)	1*	0	0	0	0	1	1	1	1	1	1	1	8
Harmonious passion (F8)	1*	0	0	0	0	1	1	1	1	1	1	1	8
Workplace loneliness (F9)	1	0	0	0	0	1	1*	1*	1	1*	1*	1	8
Conscientious (F10)	1*	0	0	0	0	1	1	1	1*	1	1	1	8
Org commitment (F11)	1	0	0	0	0	1*	1	1	1*	1	1	1	8
Cyberloafing (F12)	0	0	0	0	0	0	0	0	0	0	0	1	1
Dependence Power	11	4	3	2	1	11	11	11	11	11	11	12	

The next step of ISM is level partitioning. In this step, the antecedent set and reachability set for each factor are derived using the FRM [72]. The reachability set includes cyberloafing and its factors. The antecedent set also includes cyberloafing and its enablers. Additionally, the intersection sets are obtained for each factor. The factors that share an identical intersection set and reachability set are situated at the apex of the ISM hierarchical framework. Beyond its own tier, the top-tier factor would not contribute to the accomplishment of any additional factors. As a result, this preeminent factor is identified, subsequently differentiated, and positioned apart from the remaining factors. Likewise, the subsequent factors of the highest rank are acknowledged for the subsequent levels, until every factor attains a specific level. The digraph and the ultimate ISM model are generated utilising the designated levels shown in Figure 2.

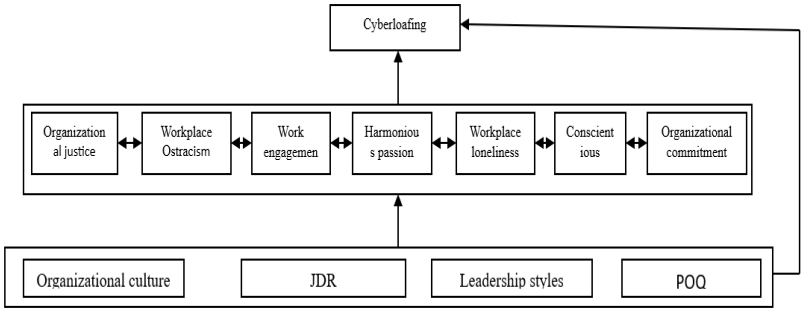

Figure 2: ISM-based model of factors

Once the ISM model was made, this study adopt MICMAC analysis to categorize those factors into four clusters shown in Figure 3.

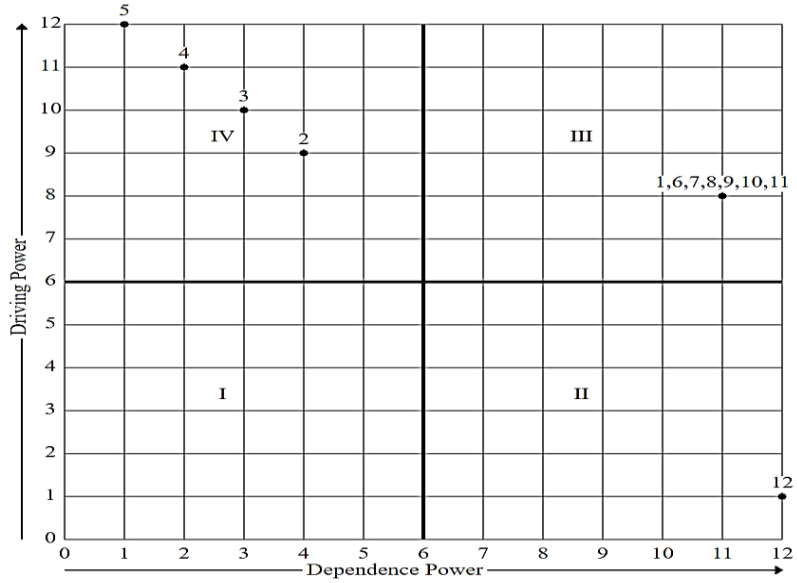

Figure 3: MICMAC graph

There are no autonomous factors in Quadrant I. Autonomous factors have limited impact on the cyberloafing as they are both weak drivers and weak dependents. The lack of these factors in the current study suggests that all the factors under consideration have a notable impact.

There is one dependent variable in Quadrant II "cyberloafing". This is a highly dependent on the each other factors.

Seven factors fall in Quadrant III (linking variables). These factors are organizational justice, workplace ostracism, work engagement, harmonious passion, workplace loneliness, conscientious, and organizational commitment.

Four factors, Organizational culture, JDR, leadership styles and POQ fall in the Quadrant IV (independent variables).

5. DISCUSSIONS/INTERPRETATION

This study aimed to (1) determine the key factors contributing to cyberloafing, (2) analyze the relationships among these factors using Interpretive Structural Modelling (ISM), and (3) categorize these factors into four clusters (independent, dependent, linking, and autonomous) using MICMAC analysis. Initially, the literature was reviewed to identify elements contributing to cyberloafing (refer to Table 1). These factors were then validated through expert opinions from Indian IT professionals and academicians.

After identifying and validating the components, a structural self-interaction matrix (SSIM) was created. The ISM technique established the contextual relationships among the elements based on expert judgment. Each row in the SSIM was assessed against each column and assigned a code from a predetermined set (V, A, X, O) (refer to Table 2). The SSIM was then converted into a binary matrix, known as the initial reachability matrix (refer to Table 3). Incorporating transitivity yielded the final reachability matrix (refer to Table 4).

From the final reachability matrix, the reachability and antecedent sets for each cyberloafing factor were determined. The reachability set includes both cyberloafing and its contributing factors, while the antecedent set comprises cyberloafing and other factors enabling it. The structural model was derived from the final reachability matrix (refer to Table 4), with relationships between factors i and j depicted by arrows from i to j. The digraph and eventual ISM model were constructed using the specified levels shown in Figure 2.

To achieve the third objective—assessing the driving and dependency forces of factors impacting employee cyberloafing—a fuzzy MICMAC analysis was conducted. The fuzzy MICMAC analysis classified the factors into four groups, as shown in Figure 3. The first cluster, comprising autonomous factors with low driver power and low reliance, had no factors in this study. Quadrant II included one dependent variable, "cyberloafing," heavily reliant on the interdependence of several components. The third cluster contained factors with both significant driving strength and strong dependency: organizational justice, workplace ostracism, work engagement, harmonious passion, workplace loneliness, conscientiousness, and organizational commitment. The fourth cluster comprised independent factors with significant driving strength but modest dependence, including organizational culture, JDR, leadership styles, and POQ.

This study effectively achieves its purpose by identifying and analyzing the relationships between influential elements and categorizing them into clusters. It provides

valuable precision to the discussion on cyberloafing, specifically tailored to the dynamic environment of the Indian IT industry.

6. CONCLUSION

Organizations operating in the rapidly evolving Indian IT sector stand to gain valuable insights from this research. The findings empower decision-makers, including managers and HR professionals, with a nuanced understanding of the intricate factors influencing cyberloafing behaviour among IT professionals. As cyberloafing poses a growing challenge in digitized work environments, the study's implications extend beyond the IT sector, impacting any organization navigating the complexities of contemporary workplaces.

Decision-makers adopting the proposed approach glean actionable strategies for addressing cyberloafing within their organizations. By recognizing the pronounced influence of interpersonal factors and individual traits, organizations can implement targeted interventions to foster a more engaged and productive workforce. The emphasis on organizational culture, JDR, leadership styles, and POQ as a main independent factor. Ultimately, organizations adopting these insights are better positioned to enhance productivity, job satisfaction, and overall workplace culture.

Despite its valuable contributions, this study has limitations. Firstly, the research draws its sample exclusively from the IT industry, potentially limiting the generalizability of findings to other sectors. Secondly, the focus on factors leaves unexplored the broader impact of cyberloafing on organizational outcomes. Additionally, the research confines itself to a developing country, necessitating further investigations in diverse global contexts to enhance the robustness and applicability of the results.

Future research can expand on this study by diversifying the industry sample to encompass sectors beyond IT, allowing for a more comprehensive understanding of cyberloafing across various workplace settings. Exploring the long-term consequences of interventions aimed at mitigating cyberloafing can provide valuable insights into the effectiveness and sustainability of such measures. Moreover, investigating the positive or negative impact of cyberloafing on organizational outcomes will contribute to a more holistic understanding of its implications. Additionally, replicating the study in different cultural and economic contexts will enhance the external validity of the findings, providing a more nuanced perspective on the universality of cyberloafing determinants. Lastly, employing alternative MCDM methods, such as the PROMETHEE method, can offer comparative insights and further validate the robustness of the identified cyberloafing antecedents.

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APPENDIX

The following table used to get the opinion of professionals from the IT industry and also from the academicians on the factors influencing cyberloafing.

Section (A): For industry Professional
Name:
Company's Name:
Profile:
Work Experience:

Section (B): For Academicians
Name:
Organization's Name:
Work Experience:
Profile:
Research Area:

Kindly fill the table according to the given instruction:
V: Factor P influences factor Q;
A: Factor Q influences factor P;
X: Both factors influence each other;
O: Both factors are unrelated.

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Org. justice (F1)												
Org. culture (F2)												
JDR (F3)												
Leadership styles (F4)												
POQ (F5)												
Workplace ostracism (F6)												
Work engagement (F7)												
Harmonious passion (F8)												
Workplace loneliness (F9)												
Conscientious (F10)												
Org commitment (F11)												
Cyberloafing (F12)												