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Doç. Dr. Sezen GÜNGÖR

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CHAPTER 1

BUILDING STRONGER PROJECT RELATIONSHIPS IN MEGA-PROJECTS: HOW INTER-ORGANIZATIONAL TRUST EMERGES FROM CONFLICT HANDLING APPROACHES

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1. INTRODUCTION

Construction projects are, by their nature, temporary coalitions of organizations with divergent financial interests, professional cultures, and risk appetites. Nowhere is this more apparent than in the owner-contractor dyad, where each party enters the project under contractual obligations while simultaneously pursuing distinct strategic goals (Meng, 2012). In Nigeria, a country with the largest construction market in sub-Saharan Africa, adversarial owner-contractor relationships have long been identified as a structural constraint on project delivery (Babatunde & Low, 2013; Mansfield). Cost overruns, delayed payments, documentation disputes, and personality-driven confrontations occur with sufficient regularity that the adversarial pattern has acquired something of an institutional status (Ogunbayo, 2013).

Studies on conflict in construction have predominantly focused on selecting the “right” conflict handling style for a given situation; integrating, avoiding, compromising, and so on (Lu & Wang, 2017; Wu et al., 2017). What receives far less attention is the organizational climate within which those behaviors operate. Climate, in this context, refers to parties’ shared perception of whether conflict is handled in a fair, constructive, and procedurally consistent manner (Rivlin, 2001; Jung et al., 2018). When owners and contractors operate within a strong conflict management climate, they understand, implicitly and explicitly, that grievances will be addressed, that procedures exist, and that neither side will exploit the conflict situation opportunistically.

Trust occupies a central, if sometimes underspecified, role in this picture. It has been theorized as the “glue” that holds construction relationships together under conditions of uncertainty [Lewicki & Wiethoff, 2000] and has been empirically linked to reduced transaction costs, enhanced communication, and improved project performance (Pinto et al., 2009). Yet the pathway by which the perceived conflict management environment shapes trust and, through it, relationship quality has not been empirically established in the Nigerian context.

This study addresses that gap with three specific objectives:

- i. To test whether CMC significantly predicts inter-organizational trust
- ii. To examine the direct effect of CMC on RQ; and
- iii. To examine whether inter-organizational trust mediates the CMC-RQ relationship.

The study contributes to the growing literature on inter-organizational relationships in construction by providing the first empirical examination of this mediated pathway in the Nigerian context.

2. Theoretical background and hypothesis development

2.1 Conflict Management Climate

Conflict management climate captures the parties' collective perception of the quality, fairness, and predictability of conflict-resolution procedures (Rivlin, 2001). It is a higher-order construct that aggregates five behavioral dimensions identified by Rahim (1983): *compromising* (reaching mutually acceptable middle-ground positions), *integrating* (jointly seeking solutions that fully satisfy both parties' interests), *dominating* (asserting one's position through authority or expertise), *avoiding* (sidestepping confrontation on minor issues), and *obliging* (accommodating the other party as a gesture of good faith). Treating these behaviors in isolation misses the systemic, climate-level signal they jointly send about how conflict is managed (Jung et al., 2018).

2.2 Trust in Construction Relationships

Trust is defined here as the willingness of one party in an exchange relationship to accept vulnerability based on positive expectations regarding the other party's behavior (Mayer et al., 1995). In construction, trust operates at the inter-organizational level between firms, and is particularly consequential in temporary coalitions with limited co-operation history and high exposure to opportunistic behavior (Wu et al., 2017; Lau & Rowlinson, 2009).

Social exchange theory provides the explanatory mechanism through which CMC produces trust (Blau, 1964). When owners and contractors perceive conflict management as procedurally fair and consistently applied, the norm of reciprocity is activated: parties feel obligated to reciprocate that good faith, which, over time, crystallizes into trust. Ndubisi (2011) found exactly this dynamic in outsourcing relationships, where cooperative conflict management behaviors enhanced trust and commitment.

H1: Conflict management climate positively impacts inter-organizational trust between contractors and owners in mega projects.

2.3 Relationship Quality

Relationship quality denotes the overall state of the interorganizational bond between owners and contractors, encompassing satisfaction, reliability, sincerity, and mutual commitment [8]. It emerged from relationship marketing (Crosby et al., 1990) but has been adapted to construction to monitor project health before conflicts escalate into formal disputes (Meng, 2012).

2.4 CMC, Trust, and Relationship Quality

A conflict management climate focused on fair, participatory procedures signals to both parties that their interests will be taken seriously. This perception directly shapes relationship quality by reducing opportunism and increasing the predictability of the other party's behavior. At the same time, the trust generated through positive conflict management experiences enhances relationship quality by creating an additional relational buffer parties who trust each other share information openly, maintain commitments under pressure, and resolve new conflicts before they escalate (Morgan & Hunt, 1994).

H2: *Inter-organizational trust positively influences relationship quality between owners and contractors.*

H3: *CMC positively influences relationship quality between owners and contractors in mega projects.*

H4: *Inter-organizational trust mediates the relationship between CMC and relationship quality.*

3. Methods

3.1 Study Context and Sample

Data were collected from January to August 2018 across construction projects in Lagos State and Nigeria's Federal Capital Territory (FCT). These two locations were selected because they account for the preponderance of formal construction activity in Nigeria, hosting both the highest concentration of private-sector residential development and government-funded infrastructure projects (Adams, 1997).

A self-administered questionnaire was distributed personally to project professionals on 143 active or recently completed projects. Of 641 questionnaires distributed, 426 were returned usable (66% response rate), exceeding the 20–30% norm for construction survey research (Zhao et al., 2017). The sample comprised 88.3% male respondents (n=376), with 19.2% representing

owners and 80.8% contractors. Residential projects comprised 47.2% of the sample, public infrastructure 31.2%, and industrial projects 15.3%. Over half the respondents held postgraduate qualifications, and 37.8% had between six and ten years of industry experience.

3.2 Measures

Conflict management climate was operationalized through fifteen items drawn from Morris et al. (1998), adapted by Jung and Yoon [9], across five three-item sub-scales (compromising, integrating, dominating, avoiding, obliging). Trust was measured using six items from Wu et al. (2017) that captured contractual reliability, technical competence, and good-faith commitment. Relationship quality was assessed using six items, four from Kumar et al. (1995) and two from Williams et al. (2015), covering sincerity, promise-keeping, satisfaction, and performance expectations. The measures were all rated on a five-point Likert scale.

3.3 Analytical Strategy

Harman's single-factor test confirmed common method variance was not a critical concern (largest factor = 39.834%). Confirmatory factor analysis (CFA) and structural equation modeling (SEM) were conducted in AMOS. A second-order measurement structure was applied to CMC (Chen et al., 2005). The indirect relationship was tested using Baron and Kenny's (1986) four-step approach, with the Sobel test for the indirect effect.

4. Data analysis

4.1 Measurement Model

Cronbach's alpha values range from 0.703 to 0.794; composite reliability from 0.771 to 0.865; and average variance extracted from 0.514 to 0.662, all above accepted thresholds (Fornell & Larcker, 1981). Factor loadings range from 0.639 to 0.875. Discriminant validity is confirmed: the square root of each construct's AVE exceeds its correlations with all other constructs. The three-factor CFA model fit the data well ($\chi^2/df = 2.07$, GFI = 0.940, AGFI = 0.915, CFI = 0.960, RMSEA = 0.050), outperforming both a one-factor and a seven-factor alternative.

Table 1: Pearson Correlations and descriptive statistics

	M	SD	CS	IS	DS	AS	OS	T
CS	3.60	1.10	.814					
IS	3.83	1.11	.507	.728				
DS	3.75	1.21	.474	.362	.775			
AS	3.80	1.08	.620	.475	.443	.795		
OS	3.84	.996	.504	.433	.563	.434	.764	
T	3.81	.828	.705	.588	.615	.666	.637	.720
RQ	3.79	.817	.625	.531	.568	.642	.573	.749

Note. Bold diagonal = $\sqrt{\text{AVE}}$. All correlations $p < .01$. AS = Avoiding; IS = Integrating; CS = Compromising; DS = Dominating; OS = Obliging; RQ = Relationship Quality; T = Trust.

4.2 Structural Model and Hypothesis Tests

The structural model yielded identical fit statistics ($\chi^2/\text{df} = 2.07$, GFI = 0.940, RMSEA = 0.050). Table 2 summarizes the results. H1 is supported: CMC predicts trust strongly ($\beta = 0.868$, $p < .001$). H2 is supported: trust predicts relationship quality ($\beta = 0.186$, $p < .05$). H3 is supported: CMC directly predicts relationship quality ($\beta = 0.649$, $p < .001$).

4.3 Mediation Analysis

All four Baron and Kenny (1989) preconditions were met. With trust entered as mediator, the direct effect of CMC on RQ

Table 2: Structural Parameter Results (Hypothesis Tests)

Hypothesis	β	p	Result
H1: CMC $\rightarrow$ Inter-organizational trust	0.868	< .001	Supported
H2: Inter-organizational trust $\rightarrow$ RQ	0.186	< .05	Supported
H3: CMC $\rightarrow$ RQ	0.649	< .001	Supported

Note. Model fit: $\chi^2/df = 2.07$; GFI = 0.940; CFI = 0.960; RMSEA = 0.050.

remained significant ($\beta = 0.641$, $p < .001$), suggesting *partial* mediation. The indirect effect through trust is 0.161, significant by Sobel test ($z = 3.254$, $p < .001$). Total effect = 0.802. H4 is supported (Table 3).

Table 3: Mediation Results

Total	Direct	Indirect	Sobel z	Type
0.802	0.641	0.161	3.254***	Partial

*** $p < .001$.

5. DISCUSSION

The principal finding is that CMC exerts both direct and trust-mediated influences on RQ in Nigerian construction projects. The H1 path coefficient ($\beta = 0.868$) is the largest in the model, suggesting that perceived fairness in conflict management procedures is a powerful predictor of inter-organizational trust arguably more powerful than many interpersonal trust-building interventions commonly proposed in the industry.

The partial mediation finding warrants careful interpretation. Trust carries only 20% of the total effect (indirect = 0.161 vs. total = 0.802), which does not diminish its theoretical importance.

Rather, it implies that CMC builds relationship quality through two distinct channels: one cognitive and behavioral (trust), and one more direct, possibly tied to perceptions of procedural justice operating independently of trust. Parties may develop stronger relationships simply by observing each other managing conflict constructively, even before trust has had time to consolidate. This is consistent with social exchange theory's distinction between calculative cooperation (short-term, based on perceived fairness) and relational trust (longer-term, based on accumulated experience) described by Wu et al. (2017).

The significant but modest trust-to-relationship-quality path ($\beta = 0.186$) does not suggest trust is unimportant, its bivariate correlation with RQ ($r = .749$) confirms its relational salience but rather that, once CMC is controlled, trust operates as a transmission belt for a portion of that effect rather than as an independent driver. For project managers, the practical takeaway is that fostering a climate of fair, transparent conflict handling builds trust and relationship quality simultaneously, and the two reinforce each other over the project lifecycle.

The obliging style emerged as the most frequently used CMC dimension ($M = 3.84$), while compromising was the least frequent ($M = 3.60$). This pattern is consistent with the power asymmetry characteristic of Nigerian owner-contractor relations, in which contractors often accommodate owners' preferences as a relational maintenance strategy (Kolawole et al., 2004).

6. CONCLUSION

This paper provides empirical evidence that CMC is a significant antecedent of both trust and relationship quality in Nigerian construction projects, and that inter-organizational trust *partially* mediates the CMC–relationship quality relationship. To the authors' knowledge, this is the first study to verify this mediated pathway in an African construction context. Practically, construction organizations—particularly owners who set the relational tone should invest in clear, fair, and consistently applied conflict management procedures. Such investment is likely to pay dividends not only in short-term dispute resolution but in the longer-term relational infrastructure that makes project collaboration possible.

Limitations include restriction to Lagos and the FCT, and a cross-sectional design. Future research might explore whether trust fully mediates the CMC-RQ relationship in higher-trust project contexts, and whether the partial mediation pattern differs across project types. Longitudinal designs tracking trust and RQ over the project lifecycle would particularly enrich this theoretical picture.

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CHAPTER 2

A CONCEPTUAL EXAMINATION OF ORGANIZATIONAL PERSISTENCE: THE INTERPLAY OF MEMORY, INERTIA, AND DECISION-MAKING

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1. Introduction

Organizations are commonly portrayed as adaptive systems that respond to environmental pressures through learning, innovation, and strategic transformation. Within the management and organization theory literature, concepts such as flexibility, change, and adaptation occupy a central position (Cyert & March, 1963; March & Simon, 1958). However, the empirical reality of organizational life does not always support this adaptation-oriented assumption. Even when environmental conditions shift, many organizations continue to rely on familiar routines, established structures, and historically shaped patterns of decision-making (Hannan & Freeman, 1984; Levitt & March, 1988).

This tension raises a fundamental question: why do organizations persist? More specifically, why do organizations often reproduce historically formed patterns of behavior despite the presence of pressures for change? This question is of central importance to the literature on organizational behavior, strategic management, leadership, and organizational change. Viewing organizations solely as entities that adapt and transform over time obscures an equally important dynamic, how they maintain and reproduce themselves across time (March, 1991).

In the existing literature, persistence has largely been addressed indirectly. Concepts such as resistance to change, structural rigidity, cognitive limitations, routinization, and path dependence offer valuable insights, yet they fall short of treating organizational persistence as a central phenomenon in its own right (Gilbert, 2005; Sydow, Schreyögg & Koch, 2009). Persistence is not merely the absence of change. It is also a fundamental organizational condition that enables coordination, supports identity formation, facilitates the accumulation of experience, and allows organizations to function reliably (Schein, 2010; Weick, 1995).

The purpose of this chapter is to reconsider organizational persistence from a process-based perspective. Rather than viewing persistence as a static state or the outcome of a single mechanism, this approach conceptualizes it as a dynamic process emerging from the interaction among organizational memory, inertia, decision-making, and leadership (Langley et al., 2013; Tsoukas & Chia, 2002). Within this perspective, the past is not treated as something that is directly and unchangedly transmitted into the present. Instead, it is selectively remembered, interpreted, and embedded within organizational practices, thereby shaping present action (Weick, 1995; Walsh & Ungson, 1991). This perspective contributes to a deeper understanding

of how organizations sustain existing patterns of behavior and under what conditions these patterns may be redirected.

2. Theoretical Foundations of Organizational Persistence

Organizations are not ahistorical entities. Rather, past experiences, prior decisions, institutionalized routines, symbolic meanings, and embedded power relations continuously shape organizational action (Selznick, 1957; Stinchcombe, 1965). Understanding organizations, therefore, requires not only a focus on their current structures and strategies but also attention to how these structures have emerged and are sustained over time.

In this context, organizational persistence refers to the tendency of organizations to reproduce patterns of experience, meaning, and practice derived from the past in their present actions. This reproduction, however, is not mechanical. The past is not carried directly and unchanged into the present; instead, it is selected, interpreted, and reframed, and subsequently translated into action through decision-making processes (Weick, 1995; Walsh & Ungson, 1991). Organizational persistence thus depends not merely on the existence of the past, but on how it is interpreted and mobilized.

This perspective suggests that persistence cannot be explained by any single element. It cannot be reduced to the mere presence of memory, routines, or decisions. Rather, it emerges from how these elements operate and interact with one another. In other words, persistence is a relational phenomenon that unfolds within ongoing organizational processes (Langley et al., 2013; Tsoukas & Chia, 2002).

This chapter examines organizational persistence through four key elements: organizational memory, organizational inertia, decision-making, and leadership. While each of these elements is significant in its own right, the primary theoretical contribution of this study lies in integrating them into an integrated framework and focusing on their interactions.

3. Organizational Memory: Carrying the Past into the Present

Organizational memory refers to how organizations store, retain, interpret, and utilize past experiences in present contexts (Walsh & Ungson, 1991; Argote, 2013). In this sense, memory is not confined to information embedded in documents, archives, or individual

cognition; it is also embedded in routines, organizational structures, culture, symbols, and shared systems of meaning (Walsh & Ungson, 1991).

Early approaches to organizational memory largely conceptualized it as stored information. This perspective provides an important starting point for understanding where and how knowledge is retained within organizations. Individuals carry experiential knowledge; routines encode learned patterns of behavior; organizational structures shape decision processes; and culture provides interpretive frameworks through which the past is understood (Walsh & Ungson, 1991; Nelson & Winter, 1982).

However, organizational memory cannot be reduced to a passive repository. From a more dynamic perspective, memory is continuously reconstructed through ongoing organizational processes (Casey & Olivera, 2011; Weick, 1995). Organizations do not recall their past in its entirety; rather, they selectively foreground particular events, successes, or experiences in light of current concerns and interpretive frames. As such, organizational memory is inherently selective, interpretive, and context-dependent (Weick, 1995).

The relevance of memory for organizational persistence becomes evident at this point. When confronted with new situations, organizational actors frequently draw upon past experiences and interpret present problems through familiar frames (March & Simon, 1958; Levitt & March, 1988). This reliance reduces uncertainty and facilitates action. At the same time, it may orient organizations toward familiar solutions and previously successful patterns, thereby narrowing the range of considered alternatives (Levitt & March, 1988).

Organizational memory thus performs a dual function. On the one hand, it is essential for learning, coordination, and the formation of organizational identity (Argote, 2013; Schein, 2010). On the other hand, excessive reliance on past experience may constrain the organization's capacity to adapt to new conditions (Hannan & Freeman, 1984). In this sense, persistence emerges as a process both enabled and constrained by organizational memory.

4. Organizational Inertia: The Reproduction of Stability

Organizational inertia refers to the tendency of organizations to maintain existing structures, routines, and patterns of behavior (Hannan & Freeman, 1984; Kelly & Amburgey, 1991). Traditionally, inertia has been associated with resistance to change. While this interpretation is partially valid, it remains insufficient if inertia is treated solely as a negative

phenomenon. Although inertia may hinder rapid and radical adaptation to new conditions, it also plays a functional role in sustaining organizational order (Hannan & Freeman, 1984).

Organizations cannot operate effectively without a certain degree of stability. Constantly redefining every decision, process, and relationship would render coordinated action nearly impossible. In this context, routines, standard operating procedures, and institutionalized practices provide predictability and continuity (March & Simon, 1958; Nelson & Winter, 1982). Inertia, therefore, is not only an obstacle to change but also a fundamental condition of organized action.

Inertia is inherently multidimensional. First, structural inertia arises from organizational arrangements, such as divisions of labor, hierarchies, technologies, and resource allocations, that become stabilized over time and constrain future action (Hannan & Freeman, 1984; Gilbert, 2005). Second, routine-based inertia reflects the repeated enactment of practices that gradually become taken for granted and resistant to questioning (Nelson & Winter, 1982; Levitt & March, 1988). Third, cognitive inertia emerges from the mental models and interpretive frames through which organizational actors make sense of their environment (Weick, 1995; March & Simon, 1958). These frames delimit what is perceived as possible, appropriate, or rational.

Taken together, these dimensions suggest that inertia is not a passive state but an actively reproduced process. Each enactment of a routine, each application of a procedure, and each decision grounded in past experience reinforces existing organizational patterns (Levitt & March, 1988; Weick, 1979). In this sense, inertia is better understood not as a fixed organizational attribute, but as an ongoing accomplishment sustained through everyday practices (Langley et al., 2013).

5. Decision-Making: Translating the Past into Action

Decision-making constitutes the primary mechanism through which organizational persistence is enacted in practice. However, decisions within organizations are rarely made under conditions of full rationality. Decision-makers operate under constraints of limited information, limited time, and bounded cognitive capacity. As a result, rather than identifying optimal solutions, they tend to select alternatives that are sufficiently satisfactory and feasible under given conditions (Simon, 1947; Cyert & March, 1963).

This dynamic is critical for understanding organizational persistence. Under conditions of bounded rationality, decision-makers exhibit a systematic tendency to rely on familiar options, previously applied solutions, and existing routines (March & Simon, 1958; Levitt & March, 1988). While this reliance reduces uncertainty and facilitates action, it also narrows the range of considered alternatives. In this sense, decision-making processes often function, implicitly rather than deliberately, as filtering mechanisms that reinforce existing organizational trajectories (March, 1991).

Decision-making is deeply informed by organizational memory. Past experiences shape which issues are perceived as salient and which solutions are considered legitimate or appropriate (Walsh & Ungson, 1991; March, Sproull & Tamuz, 1991). At the same time, decision processes are constrained by organizational inertia. Structures, hierarchies, power relations, and established procedures delimit the range of alternatives that can be considered and implemented (Cyert & March, 1963; Pfeffer, 1981).

From this perspective, decision-making extends beyond the mere selection among alternatives. It represents a process through which the past is interpreted and translated into present action, while simultaneously shaping future organizational patterns (Weick, 1979; Weick, 1995). Each decision selectively activates elements of organizational memory, reinforces, or in some cases partially challenges existing inertia, and becomes incorporated into the evolving stock of organizational experience. In this sense, decision-making functions both as a carrier and a reproduction mechanism of organizational persistence.

6. Leadership: Interpreting and Steering Organizational Persistence

Leadership is often associated with change, vision, and transformation (Bass, 1985; Yukl, 2013). However, leadership should not be understood solely as a driver of change. It also plays a central role in sustaining and shaping organizational persistence. Leaders influence how the past is remembered, how present issues are framed, and which decisions are considered legitimate (Weick, 1995).

The influence of leadership on organizational memory is particularly significant. Through narratives, symbols, and communication, leaders selectively foreground certain aspects of the organizational past while backgrounding others. They may position specific successes as central to organizational identity while marginalizing alternative experiences. This

process of selective framing does not simply reflect the past; it actively shapes how the past informs present organizational action (Gioia, Schultz & Corley, 2000; Weick, 1995).

Leadership is also closely intertwined with organizational inertia. By endorsing existing routines, allocating resources to established structures, and legitimizing current practices, leaders contribute to the reproduction of persistence. At the same time, leadership practices that question established interpretations, introduce alternative perspectives into decision-making processes, and enable experimentation can redirect the trajectory of persistence. These processes, however, are not solely driven by internal managerial discretion; they are also shaped by institutional expectations and legitimacy pressures (DiMaggio & Powell, 1983; Pfeffer, 1981).

In this sense, leadership should not be conceptualized as a force that eliminates persistence, but rather as a mechanism that interprets, mediates, and redirects it under specific conditions. Effective leadership involves not only the capacity to initiate change, but also the ability to understand the processes through which persistence is produced and to intervene in these processes in a deliberate manner.

Finally, leadership should not be reduced to an individual attribute. It is more appropriately understood as a relational phenomenon that emerges within ongoing organizational processes and interactions (Uhl-Bien, 2006). From this perspective, leadership operates as an embedded and distributed mechanism through which organizational persistence is both sustained and potentially reoriented.

7. A Process Model of Organizational Persistence

The approach developed in this chapter conceptualizes organizational persistence as a self-reinforcing process cycle. This cycle provides a processual account of how persistence is continuously produced through the recursive interactions among key organizational processes (Langley et al., 2013; Van de Ven & Poole, 1995).

Within this framework, organizational experiences accumulate over time and become encoded in organizational memory. However, memory does not operate as a neutral repository. Rather, it is selectively activated in light of current concerns, problems, and interpretive frames (Walsh & Ungson, 1991; Weick, 1995). This selective activation shapes how organizational

actors make sense of ongoing situations, thereby influencing subsequent decision-making processes (March & Simon, 1958).

Decision-making, in turn, translates these interpretations into concrete organizational actions, often through the enactment of established routines and procedures (Cyert & March, 1963). The repeated enactment of such routines reinforces structural, cognitive, and behavioral forms of inertia, thereby stabilizing existing organizational patterns (Hannan & Freeman, 1984; Levitt & March, 1988). As inertia becomes reinforced, new experiences are more likely to be interpreted and encoded within similar frames, feeding back into organizational memory. In this way, the process assumes a cyclical and self-reinforcing character, through which persistence is continuously reproduced (Weick, 1979).

Leadership can be conceptualized as a mediating mechanism that operates across, rather than within, this cycle. It shapes how experiences are interpreted, which elements of the past are activated, which alternatives are considered in decision-making, and which routines are maintained or altered. Through these interventions, leadership influences the direction and intensity of the persistence process (Weick, 1995; Gioia, Schultz & Corley, 2000).

This model demonstrates that organizational persistence cannot be attributed to any single factor. Rather, it emerges from the interaction among organizational memory, inertia, decision-making, and leadership. Moreover, the self-reinforcing nature of these interactions helps explain why organizational change often unfolds in incremental and path-dependent ways rather than through radical discontinuities (Sydow, Schreyögg & Koch, 2009).

8. Theoretical Propositions

Building on the process-based framework outlined above, the following theoretical propositions are advanced to clarify how organizational persistence is produced and sustained (Langley et al., 2013; Van de Ven & Poole, 1995).

Proposition 1.

Organizational memory does not influence decision-making in a uniform manner; rather, it is selectively activated through prevailing interpretive frames, resulting in partial and path-dependent representations of past experience.

Proposition 2.

The repeated enactment of established routines reinforces structural and cognitive inertia, thereby increasing the likelihood of organizational persistence over time.

Proposition 3.

Decision-making processes function as filtering mechanisms that systematically prioritize familiar interpretations and solutions, reinforcing existing organizational trajectories.

Proposition 4.

Structural, cognitive, and routine-based forms of inertia interact through mutually reinforcing feedback processes, stabilizing organizational behavior.

Proposition 5.

Leadership mediates organizational persistence by shaping how past experiences are interpreted and which elements of organizational memory are activated in decision-making processes.

Proposition 6.

The mutually reinforcing dynamics among organizational memory, inertia, and decision-making increase the likelihood that organizational change will occur in incremental and path-dependent forms rather than through radical discontinuities.

Proposition 7.

The alignment of past interpretations, present decisions, and future expectations generates a temporal integration effect that reinforces organizational persistence.

9. Discussion and Theoretical Contributions

The primary contribution of this chapter lies in moving beyond fragmented explanations of organizational persistence and advancing an integrated, process-based framework. While organizational memory, inertia, decision-making, and leadership have often been examined as

distinct lines of inquiry, the perspective developed here emphasizes that persistence emerges from the interactions among these elements (Langley et al., 2013; Tsoukas & Chia, 2002).

This approach contributes to organization theory in three key ways. First, it reconceptualizes persistence not merely as resistance to change or maladaptation, but as a functional and constitutive condition of organizational functioning (Schein, 2010; Weick, 1995). Second, it positions organizations as inherently temporal systems, highlighting the role of the interrelations among past, present, and future in shaping organizational behavior (Emirbayer & Mische, 1998). Third, it provides a process-based explanation for why organizational change often unfolds in incremental and path-dependent forms rather than through radical discontinuities (Sydow, Schreyögg & Koch, 2009).

The framework also offers important practical implications. Organizational change initiatives are frequently designed around new strategies, structures, or technologies. However, when the underlying processes that generate persistence, such as memory, routines, decision-making, and leadership, are not addressed, such interventions tend to remain superficial and limited in their impact (Gilbert, 2005). More substantive transformation requires understanding how organizations interpret their past, structure their decision processes, and reproduce their routines over time.

10. Conclusion

Organizational persistence cannot be reduced to resistance to change. It is also a fundamental process that enables the development of identity, coordination, reliability, and a sense of direction within organizations (Schein, 2010; Weick, 1995). For this reason, persistence should not be viewed as a problem to be eliminated, but as a dynamic to be understood and managed.

This study has argued that organizational persistence is produced through the interaction among organizational memory, inertia, decision-making, and leadership. Within this framework, memory carries past experience into the present in a selective manner; inertia stabilizes these experiences through routines and structures; decision-making translates them into action; and leadership shapes how these processes are interpreted and directed (Walsh & Ungson, 1991; Hannan & Freeman, 1984; Cyert & March, 1963; Weick, 1995).

By adopting a process-based perspective, this chapter contributes to a more nuanced understanding of why organizations persist and under what conditions such persistence may be redirected. In doing so, it establishes a relational and temporal bridge across the literatures on organizational behavior, change, and leadership, offering a more comprehensive conceptualization of organizational dynamics (Langley et al., 2013; Emirbayer & Mische, 1998).

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CHAPTER 3

BEHAVIORAL PATHWAYS TO OWNER-CONTRACTOR PROJECT RELATIONSHIPS: DISAGGREGATING CONFLICT MANAGEMENT STYLES IN MEGA-PROJECTS

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INTRODUCTION

The construction industry is a reliably fertile environment for inter-organizational conflict. Temporary project teams, contractual ambiguity, tight schedules, shifting design requirements, and payment disputes collectively generate friction that must be managed on an ongoing basis (Ofori, 2013; Wu et al., 2017). The critical question is not whether owners and contractors will experience conflict—they will, but whether the behavioral responses they bring to that conflict will strengthen or corrode their working relationship. (Burke, 1970)

(Rahim, 1983)'s five-style taxonomy has become the dominant framework for classifying those behavioral responses in organizational and construction management research. The five styles—compromising, integrating, dominating, avoiding, and obliging vary along two dimensions: concern for self and concern for others (Afzalur Rahim, 2002). Research originating in organizational behavior has generally treated integrating as the superior style on outcomes such as satisfaction, commitment, and performance, while dominating has been cast as harmful and avoiding as counterproductive (Munduate et al., 1999). Yet construction projects possess structural features embedded with power asymmetries, time pressure, regulatory hierarchy, and temporary organizational arrangements that may substantially alter these prescriptions.

Recent work by (Lu & Wang, 2017) found that obliging styles and integrating were positively associated with relationship quality in Chinese construction, with no significant effect for the dominating or avoiding styles. Whether this pattern holds in West African construction environments, where power dynamics between owners and contractors operate differently and where obliging may reflect role deference rather than genuine relational investment, remains an open question.

This paper addresses that question directly. Rather than treating conflict management climate as a second-order composite, it disaggregates the five styles and estimates their independent contributions to relationship quality. The primary objective is to determine which styles matter most and why in the Nigerian construction context.

LITERATURE REVIEW AND HYPOTHESES

2.1 Relationship Quality in Construction

Relationship quality refers to the overall depth and functionality of the inter-organizational bond between owners and contractors—encompassing reliability, sincerity, satisfaction, and commitment (Jelodar et al., 2015). These dimensions determine whether parties will cooperate under pressure, share information freely, and commit to the project's long-term success rather than protecting narrow self-interests. Given that construction projects frequently operate at the edge of budget and schedule tolerance, the quality of the owner-contractor relationship has tangible consequences for project outcomes (Meng, 2012).

2.2 The Five Conflict Management Styles

Compromising is the exchange of concessions to reach a mutually acceptable middle-ground position (Tsai & Chi, 2009). Both parties sacrifice something but also gain predictability and the continuation of the relationship. (Lussier, 2010) suggested that compromising demonstrates

relational commitment by signaling that neither party will allow a single dispute to derail the broader project relationship.

H1: Compromising positively predicts relationship quality.

Integrating is widely regarded as the most constructive approach because it directs both parties toward solutions that fully satisfy their respective interests (Caputo et al., 2018;). By treating conflict as a shared problem rather than a zero-sum contest, integrating reinforces the joint-enterprise character of construction projects and strengthens the perception that both parties are committed to outcomes beyond the contractual minimum. (Lu & Wang, 2017) confirmed a positive association between integrating and relationship quality in Chinese construction.

H2: Integrating positively predicts relationship quality.

Dominating involves exercising positional or expert authority to impose a resolution (Lussier, 2010)]. In hierarchical and time-pressured construction environments, it can serve a functional role: when a party with greater expertise uses power to create forward momentum, it can generate rather than damage relational goodwill (Harper & Bernold, 2005; Palaneeswaran et al., 2003). The key is whether power is applied in a manner that creates outcomes the other party can accept.

H3: Dominating positively predicts relationship quality.

Avoiding involves refraining from direct confrontation over a conflict . In construction, avoiding has a specific adaptive function: many conflicts that arise on site are peripheral to project objectives, and escalating them consumes relational capital without proportionate benefit. When both parties observe each other declining to escalate minor disputes, a norm of proportionality develops, reinforcing the relationship (Gunaratna et al., 2018).

H4: Avoiding positively predicts relationship quality.

Obliging involves subordinating one's own concerns to accommodate those of the other party (Pinto, 1998). In the construction context, obliging is frequently exhibited by the party with less bargaining power, typically the contractor (Lu et al., 2020). When a contractor routinely accommodates the owner's preferences, it signals responsiveness and commitment to the project relationship. However, repeated accommodation without reciprocity risks being read as weakness rather than goodwill.

H5: Obliging positively predicts relationship quality.

3. METHODS

3.1 Study Setting and Sampling

The study was conducted across construction projects in Lagos State and Nigeria's Federal Capital Territory (FCT) between January and August 2018. These locations were selected because they are the dominant centers of formal construction activity in the country (Adamu et al., 2015). Project professionals employed by owners and contractors were surveyed using simple random sampling across 143 active or recently completed projects. Of 641 distributed questionnaires, 426 usable responses were recovered (66% response rate). The sample comprised 376 males (88.3%) and 50 females (11.7%). Owners represented 19.2% of responses

($n=82$) and contractors 80.8% ($n=344$). Project types: residential (47.2%), public infrastructure (31.2%), industrial (15.3%), and other (6.3%).

3.2 Instruments

The dimensions (5) of CMC were measured using 15 items adapted from (Morris et al., 1998) and refined by (Jung & Yoon, 2018), with 3 items per style. Relationship quality was assessed using six items, four from (Kumar et al., 1995) and two from Williams et al., as adapted by (Lu & Wang, 2017), covering sincerity, reliability, satisfaction, and performance expectations. The items were all measured using a five-point Likert scale.

3.3 Measurement Validation

Confirmatory factor analysis (CFA) confirmed satisfactory measurement properties. Cronbach's alpha coefficients ranged from 0.703 to 0.787, composite reliability (CR) from 0.771 to 0.862, and average variance extracted (AVE) from 0.514 to 0.662, meeting (Fornell & Larcker, 1981) criteria. Factor loadings were from 0.639 to 0.875. Variance inflation factor (VIF) values were from 2.303 to 4.080, below the critical threshold of 10, suggesting no problematic multicollinearity. Harman's single-factor approach produced a maximum factor accounting for 39.834% of variance, below the fifty percent threshold for common method bias.

3.4 Analysis

Two hierarchical regression models were estimated with relationship quality as the dependent variable. Model 1 entered two control variables (project type and working experience). Model 2 introduced the five CMC sub-scales simultaneously to isolate the incremental variance attributable to each style after controlling for project-level covariates.

4. RESULTS

Table 1 presents descriptive statistics. Obliging carries the highest mean ($M = 3.84$, $SD = 0.996$), followed by integrating ($M = 3.83$, $SD = 1.11$), avoiding ($M = 3.80$, $SD = 1.08$), dominating ($M = 3.75$, $SD = 1.21$), and compromising ($M = 3.60$, $SD = 1.10$). Relationship quality had a mean of 3.79 ($SD = 0.817$). Inter-correlations among all CMC sub-scales and RQ were positive and significant at $p < .01$, with the five CMC styles correlating with RQ between $r = .531$ and $r = .642$.

Table 1: Descriptive Statistics for CMC Sub-scales and RQ

Variable	M	SD	α	r with RQ
Compromising (CS)	3.60	1.10	.761	.625**
Integrating (IS)	3.83	1.11	.703	.531**
Dominating (DS)	3.75	1.21	.717	.568**
Avoiding (AS)	3.80	1.08	.728	.642**
Obliging (OS)	3.84	.996	.749	.573**
Relationship Quality	3.79	.817	.787	—

** $p < .01$. α = Cronbach's alpha.

Table 2 presents the hierarchical regression results. Model 1 explains only 2.4% of the variance in RQ, with project type as the sole significant control ($\beta = .155, p < .05$). Model 2, entering the five CMC sub-scales, explains 66.1% of the variance (Adjusted $R^2 = .655$), representing a highly significant increment of 63.7% ($\Delta F = 156.901, p < .001$). All five styles are significant predictors. H1 through H5 are all supported.

5. DISCUSSION

5.1 Why Integrating Leads

The primacy of the integrating style ($\beta = .266$) aligns with the theoretical expectation that joint problem-solving creates the strongest relational foundations. When owners and contractors direct their energies toward identifying solutions that address both parties' underlying interests, they reframe conflict from a contest over positions to a shared problem requiring joint expertise. This reframing has persistent relational effects—it establishes a collaborative working norm and demonstrates that both parties can subordinate short-term positional claims to the broader project relationship. The integrating coefficient is notably higher than that of obliging, which is particularly telling given that obliging had the highest observed mean ($M = 3.84$). Frequency of use does not translate into relational impact.

Table 2: Hierarchical Regression: Relationship Quality

Predictor	Model 1 β	Model 2 β
<i>Control Variables</i>		
Project Type	.155*	—
Working Experience	-.011	—
<i>CMC Sub-scales</i>		
Compromising (CS)	—	.182***
Integrating (IS)	—	.266***
Dominating (DS)	—	.215***
Avoiding (AS)	—	.185***
Obliging (OS)	—	.120**

5.2 The Counterintuitive Role of Dominating

The second-highest coefficient is for dominating ($\beta = .215$), a result that appears to contradict standard prescriptions in the conflict management literature. Several features of the Nigerian construction context help account for this finding. The industry's institutional structure is hierarchical: owners occupy the apex of the project authority structure, and contractors generally recognize the legitimacy of owner-directed decisions, particularly when those decisions are informed by technical expertise or resource realities (Giritli & Oraz, 2004). A decisive, authority-based resolution that moves the project forward can be experienced by contractors as more relationship-preserving than a protracted negotiation that introduces uncertainty. This finding is consistent with (Palaneeswaran et al., 2003), who noted that power asymmetry, when handled transparently and predictably, can motivate the lower-power party to maintain the relationship as a protective strategy.

5.3 Avoiding and Compromising as Stabilizers

Avoiding ($\beta = .185$) and compromising ($\beta = .182$) yield near-identical effect sizes, suggesting they operate through related mechanisms. Both styles prevent conflict from reaching destructive intensity without necessarily resolving the underlying source. Avoiding does so by withholding escalation; compromising by negotiating a shared settlement that neither fully satisfies nor fundamentally threatens either party's core interests. The literature's tendency to classify avoidance as a passive style overlooks the fact that many construction-site conflicts are genuinely peripheral. An owner and a contractor who can collectively calibrate their conflict

thresholds reserving integrative engagement for high-stakes issues and employing avoidance and compromise for minor ones are likely to maintain higher overall relationship quality.

5.4 The Limits of Obliging as a Relational Strategy

The weakest effect among the five styles is for obliging ($\beta = .120$), despite its being the most frequently employed ($M = 3.84$). This divergence between frequency and impact is theoretically significant. In the Nigerian construction context, obliging by contractors may reflect structural deference to owner authority rather than a genuine relational gesture. When one party consistently accommodates the other's preferences as a cost of maintaining the contract, the relational credit generated is limited: the accommodating party is seen as compliant rather than committed. This interpretation is consistent with (Lu et al., 2020) observation that bargaining power imbalances shape conflict management behaviors in ways that do not map neatly onto relational quality outcomes.

6. CONCLUSION

This study disaggregated conflict management climate into five behavioral components and demonstrated that each independently predicts owner-contractor relationship quality in Nigerian construction projects, though with meaningfully different magnitudes. The integrating style exerts the strongest effect ($\beta = .266$), followed by dominating ($\beta = .215$), avoiding ($\beta = .185$), compromising ($\beta = .182$), and obliging ($\beta = .120$). Collectively, the five styles account for 66.1% of the variance in relationship quality, underscoring the centrality of conflict management behavior to relational outcomes in this sector.

For project managers, the practical implication is that a balanced conflict management repertoire capable of deploying integrating approaches for high-stakes disputes, using authority-based resolution when expertise warrants it, and reserving avoiding and compromise for lower-stakes friction is likely to produce stronger relationship quality than any single-style default. The high frequency but weak relational impact of obliging warrants particular attention: contractors who habitually accommodate owner preferences without reciprocity should recognize that this pattern may not be generating the relational goodwill they intend.

Limitations include the cross-sectional design and geographic restriction to two Nigerian states. Future research should explore whether the style-ranking found here generalizes to other Nigerian regions and whether the effect of dominance is moderated by factors such as contract value, project type, or pre-existing trust levels.

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CHAPTER 4

EVALUATION OF RESOURCE DEPENDENCE THEORY FROM ORGANIZATIONAL PERSPECTIVE

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INTRODUCTION

Today's organizations must acquire various resources as inputs and transform them into outputs to sustain their long-term existence, achieve their organizational goals, and maintain a balance between quality and price in their products and services to succeed in their activities. Moreover, organizations need to optimize the use of these input resources to gain a competitive advantage over rivals, who are influenced by evolving technology, technical capabilities, and market conditions. However, many organizations fall short in effectively managing their resources. Most organizations rely on other organizations for resources, which creates uncertainty within them. However, in today's highly competitive business environment, organizations can mitigate resource challenges and reduce uncertainty both internally and externally by efficiently managing their internal resources and collaborating effectively with other organizations. Consequently, the necessity for organizations to secure resources to sustain their operations over time has brought increased attention to the concept of resource dependence in the literature.

Resource dependence theory focuses on resources, power, and dependence within the context of interorganizational relationships, following systems or contingency approaches. According to this theory, power relations within organizations play a significant role, especially in contemporary organizations. In this regard, power relations introduce a political dimension to the decision-making process (Pfeffer and Salancik, 1978: 24; Inkpen and Currall, 2004: 586). Resource dependence theory has significantly contributed to understanding the relationship between organizations and their environments concerning organizational resource needs. This theory is associated with powerful organizations' efforts to manage their environments. Furthermore, resource dependence theory explains the types of actions organizations can take to counter environmental pressures, constraints, and threats, as well as how they can implement these actions. In this context, individuals and groups involved in acquiring resources can gain greater power within the organization due to these advantages. Consequently, power balances and thus cooperation and interest-based relationships become significant within organizations (Kumar et al., 1998, as cited in Jiang et al., 2023: 3).

According to some authors, this theory advocates for the effective implementation of management practices such as consortia, strategic alliances, and legal agreements to reduce the risks associated with resource procurement that organizations may face (Inkpen and Currall, 2004: 586; Pfeffer and Salancik, 1978). Resource dependence theory explains how access to resources within an organization is achieved by various individuals and groups. Furthermore, it elucidates the types of challenges organizational management encounters during resource procurement and the nature of the dependence relationships involved (Pfeffer and Salancik, 2015: 356; Inkpen and Currall, 2004: 587). From the perspective of resource dependence theory, although valuable and scarce resources needed by an organization are available in the environment, the organization's encounter with environmental constraints and uncertainties in acquiring these resources is a critical factor (Heide, 1994: 72). Therefore, the ability to manage these uncertainties is essential for organizations. Additionally, resource dependence theory is significant because it offers a distinct perspective on resources and their utilization, particularly in economic and political terms, from the organizational viewpoint (Pfeffer and Salancik, 1978: 2; Üsdiken, 2015: 79).

This study aims to theoretically examine resource dependence theory and related issues from an organizational perspective. Additionally, it seeks to explore the theoretical foundations of the resource dependence theory and its fundamental components, namely the environment, environmental adaptation or management, power, resource concentration, and inter-organizational relationships. In this context, the study intends to enhance contemporary

organizations' understanding of the theory by presenting its various aspects and offering a fresh perspective. This study is expected to make a small contribution to both national and international literature, particularly because it analyzes resource dependence theory from an organizational perspective and is among the few studies that address the theory's elements comprehensively. Furthermore, developed from an organizational perspective, this study aims to increase awareness among researchers and contemporary organizational managers regarding the interaction between organizations and their environments within the framework of resource dependence theory. It also seeks to help managers better understand the theoretical foundations, processes, components, and changes of the resource dependence theory from an organizational perspective. In addition, managers are expected to develop a new perspective by considering theoretical critiques. Within this framework, the subsequent sections of the study can be explained as follows; the second section conceptually examines resource dependence theory; the third section covers the theoretical foundations on which resource dependence theory is based; the fourth section discusses the fundamental components of resource dependence theory; the fifth section examines resource dependence theory from an organizational perspective; and finally, the last section, the conclusion and discussion, presents a critique of resource dependence theory.

THE CONCEPT AND DEFINITION OF THE RESOURCE DEPENDENCE THEORY

Essentially, every organization requires resources to produce goods and services. Over time, this need creates a dependency on these resources, which can lead to various challenges for organizations (Pfeffer and Salancik, 1978: 24). In this context, organizations must first utilize their resources effectively and efficiently. Subsequently, they should strive to acquire external resources without difficulty. The uncertainties and power struggles that arise in this process significantly influence an organization's survival. Consequently, resource dependence theory, a component of contemporary management theories that focus on the relationship between organizations and their environments, has received increasing attention in the literature in recent years (Üsdiken and Leblebici, 2009: 379).

Resource dependence theory is classified within postmodern organizational theories (Üsdiken and Leblebici, 2009: 379-380). The theoretical foundations of resource dependence theory were established in Thompson's (1967) work, "Organizations in Action". Thompson (1967) examined the use of external resources by organizations, focusing on the constraints and uncertainties posed by the external environment during resource utilization, and the resulting organizational actions. He highlighted the resource requirements of organizations and noted that resulting resource dependence created challenges for managers (Demirel, 2020: 38-39). Pfeffer and Salancik more specifically developed resource dependence theory in their 1978 work, "The External Control of Organizations: A Resource Dependence Perspective" (Meydan, 2020: 179). It is argued that resource dependence theory is accepted within the framework of the open systems approach (Galbraith, 1973, as cited in Scott, 2003: 147). Open systems are those that continuously receive inputs from other systems in their environment, process these inputs through various mechanisms, and then transfer outputs back to the environment, thereby maintaining continuous interaction with it (Hodgetts, 1975, as cited in Yalçinkaya, 2002: 105).

Resource dependence theory seeks to explain how organizations sustain their existence from a resource perspective. This theory focuses on the degree of dependence organizations

have on the resources necessary to carry out and maintain their activities and workflows (Pfeffer and Salancik, 2015). In other words, resource dependence theory emphasizes that organizations rely on their external environment to survive and actively manage these dependencies in their favor through various action initiatives (Casciaro and Piskorski, 2005: 167). Resource dependence theory aims to elucidate the actions, attitudes, and behaviors organizations adopt to acquire essential resources from their environment and to mitigate pressures and threats that may arise (Üsdiken, 2010: 81). Furthermore, it addresses the importance of ensuring the continuous, secure, and consistent acquisition of necessary resources.

The concept of resource dependence is divided into five dimensions. These are (Mintzberg, 1983, as cited in Pfeffer and Salancik, 2015); (a) organizations are fundamental units that emerge to better understand businesses' interactions, relationships, and society (Prethuis, 1978), (b) organizations cannot operate independently; they depend on other organizations, which impose various constraints, (c) this interdependence generates uncertainty in areas such as the organizational life cycle, performance, and success, (d) in this context, organizations attempt to manage their external dependencies; however, these efforts cannot fully eliminate uncertainty, resulting in new and reciprocal dependencies, (e) dependencies create power relationships both within and between organizations. This power influences organizational behavior (Mintzberg, 1983, as cited in Pfeffer and Salancik, 2015: 357).

Organizations must have the necessary resources to sustain their operations throughout their life cycles. The importance of inputs such as products, materials, money, energy, labor, skills, and knowledge in ensuring organizational continuity cannot be overstated (Güney, 2020: 256). Therefore, organizations are dependent on their environments (Pfeffer and Salancik, 2015:357). However, they can take various actions to sustain their life cycles and thereby reduce their dependence on these environments. In this context, environmental conditions are crucial for organizations to achieve their goals successfully. This theory posits that organizations maintain a relationship of dependency with their environments and strive to turn this dependency to their advantage (Davis and Cobb, 2010; Pfeffer and Salancik, 1978, as cited in Droll, 2013: 38). Essentially, resource dependence theory relies on two fundamental assumptions (Aldrich and Pfeffer, 1976). The first proposition is that organizational attitudes and actions are shaped not only by organizational goals and managerial desires but also by pressures, constraints, and obstacles arising from the organizational environment. The second proposition is that the concept and exercise of power within organizations are significant factors. Additionally, the theory emphasizes that internal decision-making processes within organizations have a political nature and that organizations possess a coalition-like structure consistent with the political nature of their relationships with external environments (Aldrich and Pfeffer, 1976, as cited in Üsdiken, 2015: 82).

According to some authors, resource dependence theory seeks to explain how organizational choices influence power dynamics and dependencies among organizations, how organizations can protect themselves from the negative consequences arising from such dependencies and environmental uncertainty, and how they can achieve greater independence (Pfeffer and Salancik, 1978). Furthermore, resource dependence theory intends to manage uncertainties within organizations through strategic cooperation from a managerial perspective (Davis and Cobb, 2010; Pfeffer and Salancik, 2015). Dependence in resource dependence theory can be examined according to two criteria. First, there is outcome dependency, which refers to one organization's outcomes being determined by another organization's outcomes. The second criterion is behavioral interdependence, which refers to an organization's actions being dependent on another organization's behavior (Elgin, 2015; as cited in Andrews and Hodgkinson, 2024: 1182).

Resource dependence theory emphasizes that organizations are continually influenced by their environments, which impose pressures, constraints, and uncertainties (i.e., unknowns) (Galbraith, 1973, as cited in Scott, 2003: 147). Furthermore, organizations' resource needs create dependencies on both internal and external environments. To manage these critical dependencies, organizations cultivate strong relationships with external actors. In this context, managers can make decisions that render the external environment more predictable (Pfeffer and Salancik, 1978: 5). According to resource dependence theory, organizations' activities and survival are shaped by the inputs they receive from their environment, such as money, capital, energy, materials, skills, legitimacy, labor, customers, suppliers, and markets (Güney, 2020: 256; Frooman, 1999: 195). Organizations compete for these limited resources to obtain them and become dependent on their environment. Thus, power relations with the actors they depend on are revealed. Organizations may need to reorganize their activities in response to extinction or changing environmental conditions. Essentially, in this theory, the process is more important than the outcome of the relationship between the organization and its environment.

The work performed by individuals or groups who provide critical resources to an organization can become a source of power for them. Consequently, power balances within the organization take shape (Hillman et al., 2009: 1404). Resource dependence theory explains organizational behavior based on two fundamental concepts: power and dependency (Koç and Sayılar, 2016: 136). Within this theoretical framework, organizations primarily focus on their relationships with both internal and external environments, emphasizing power and dependency to understand these relationships. The theory also addresses how organizations should manage their relationships with their environments (Koç and Sayılar, 2016: 136; Hillman et al., 2009: 1404). Various uncertainties affecting resource exchange are listed. These are (Dess and Beard, 1984: 56; Yolsal, 2015: 8); (a) environmental interconnectedness: This term refers to an organization's ability to influence the regulation and management of various environmental connections and relationships. The challenge lies in managing the intensity of these connections and relationships and the difficulties associated with controlling them (Child, 1972: 3), (b) environmental dynamism: Environmental dynamism refers to the speed and rate at which an organization's environment changes (Dess and Beard, 1984: 57). It is crucial to consider how an organization procures necessary resources, the customers to whom it can sell, the prices it can charge, and its ability to adapt to changes. If an organization cannot make long-term predictions about technological and technical changes, environmental dynamism is considered high. Conversely, if it can, environmental dynamism is considered low (Aldrich, 1979: 56). A continuous increase in environmental dynamism also leads to greater environmental uncertainty, (c) environmental richness: This term occurs when the resources required by an organization are abundantly available in its environment. In such cases, organizations do not face competition from others in acquiring these resources. Conversely, environmental poorness forces organizations to compete with one another for scarce resources (Aldrich, 1979: 57).

THEORETICAL FOUNDATIONS OF THE RESOURCE DEPENDENCE THEORY

Several theories and perspectives have significantly contributed to the development of the contemporary understanding of resource dependence theory. In this context, resource dependence theory is built upon three theoretical foundations. These are; the open systems approach, the social exchange approach, and the coalition perspective (Üsdiken, 2015: 80-81).

Open System Approach

According to Galbraith (1973), resource dependence theory fundamentally adopts the open systems approach (cited in Scott, 2003: 148). Essentially, the open systems approach plays a central role in resource dependence theory. This approach posits that organizations inevitably interact with their environments, which involve limitations and uncertainties, and that these interactions are key variables shaping organizational behavior (Pfeffer and Salancik, 2015). In other words, the open systems approach suggests that organizations engage with economic, sociological, and political conditions, and that these environmental factors provide the inputs necessary for organizations to sustain their life cycles (Emery, 2004). The systems approach emphasizes the relationships and interactions between subsystems (Mele et al., 2010: 126). The environmental factors with which the systems approach interacts are in a constant state of flux. Furthermore, the state of the environment cannot be fully predicted (Üsdiken, 2015: 80-81). In this context, the systems approach examines events such as situations, systems, and issues within a multidimensional and comprehensive framework in relation to other events. In the open systems approach, organizations continuously receive inputs from other systems, process these inputs through various mechanisms, and then transfer them back to the environment. As in the open systems approach, interaction with the environment is the focal point in resource dependence theory (Casciaro and Piskorski, 2005: 167; Pfeffer and Salancik, 1978). In other words, the environment is a critical factor for organizations. Open systems are in constant interaction with their environment, and this interaction influences organizational actions. Resource dependence theory seeks to explain these relationships (Robbins and Coulter, 2016: 67). According to this theory, if an organization cannot internally meet its resource needs, it must obtain them from the external environment. The open system approach posits that organizational functioning and behavior extend beyond the organization itself, emphasizing the importance of various inputs exchanged between organizations (Negandhi and Reiman, 1973: 12). Organizations can sustain their existence by establishing effective relationships with their environment, which includes their ability to adapt to environmental conditions. Similar to the systems approach, resource dependence theory also focuses on power and dependence (Davis and Cobb, 2010: 25). According to resource dependence theory, organizations use power to manage their environments (Pfeffer and Salancik, 1978). Moreover, powerful individuals within organizations hold significant influence over organizational actions. Within this theoretical framework, these individuals also play a crucial role in transforming environmental conditions into favorable outcomes (Meydan, 2020: 180). This perspective aligns closely with the systems approach. Fundamentally, like the open system approach, resource dependence theory suggests that organizations are managed by their environments, which can exert influence and pressure on them. The theory assumes that managers can experience and successfully manage these influences and pressures (Hatch, 2018: 78).

The systems approach emphasizes that organizational activities interact with one another and that all components are part of an integrated system. An organization is a large system composed of smaller subsystems within it. Organizations structure their business functions to support systems thinking and strive to plan activities in alignment with the systems approach (Johnson et al., 1964: 376). According to this approach, the formal structure of organizations comprises elements such as departments, relationships, employees, groups, subordinates, superiors, goals, and actions. If organizational managers establish balance among these elements and are particularly successful in fostering cooperation, they will be able to achieve organizational goals effectively (Robbins and Coulter, 2016: 67).

Social Exchange Theory

Another fundamental theory underlying resource dependence theory is the Social Exchange Theory, developed by Blau (1964). Building on social exchange theory, resource dependence theory focuses on the resources that create dependence in organizations and argues that organizations gain more power by controlling these resources (Mizruchi and Yoo, 2002). Within the framework of social exchange theory, the key propositions in the works of Blau (1964) and Gouldner (1960) have been particularly influential in examining the employee-organization relationship. According to some authors, this relationship primarily concerns the employee's relationship with their manager (Cropanzano and Mitchell, 2005; Shore et al., 2009: 290; as cited in Başaran, 2024: 635). According to some authors, in organizations where the employee-organization relationship is strong, organizational trust, organizational commitment, citizenship behavior, and job performance tend to be higher, while the intention to leave the job decreases (Shore et al., 2009:291). Parties that control the resources required by the organization can overcome their dependencies through social exchange. Furthermore, it is advantageous for one party to gain power to reduce dependency relationships within the organization. Social relationships play a crucial role in this process (Brass, 2002: 137-138).

Social exchange theory, like resource dependence theory, seeks to explain the reciprocal relationships among organizations within an organizational framework. This theory posits that individuals and organizations maintain their relationships based on various benefit expectations within their social relationships (Zafirovski, 2005, as cited in Başaran, 2024: 635). From another perspective, social exchange theory assumes that when one party in a reciprocal relationship provides the other with a significant, advantageous, and beneficial resource, the other party is obligated to reciprocate with a resource of similar value (Mitchell et al., 2012, as cited in Başaran, 2024: 635). The theory is grounded in the concept of reward exchange between individuals (Zafirovski, 2005:1). According to social exchange theory, parties offer each other two types of outputs: economic and socio-psychological. Economic outputs are material, whereas socio-psychological outputs pertain to the individual's inner world (Bolat et al., 2009).

In social exchange theory, necessary resources are obtained from other organizations that possess them. Due to exchange relationships within organizations- many of which are not established on equal terms- dependency and power relationships arise (Emerson, 1962: 11). Although relationships in resource dependence theory are unequal, the notion that these relationships are conducted voluntarily remains central (Emerson, 1962, as cited in Aydın, 2017: 549). Furthermore, social exchange theory comprises several key elements. The first is the *reward-cost ratio*, which emerges from relationships based on the mutual exchange of rewards and costs in social relationships. The second is the *comparison level*, defined as an individual's expectation of receiving rewards in reciprocal relationships. The final element is the *comparison level for alternatives*, which involves assessing options and probabilities to determine how beneficial the outcomes of reciprocal relationships will be (Thibaut and Kelley, 1959: 37; Dainton and Zelle, 2022:61).

Coalition Perspective

The coalition perspective is fundamentally shaped by social exchange relationships (Blau, 1964). The foundations of coalition theory in the literature date back to the works of March and Simon (1958) and Thompson and McEwen (1958) (Stevenson et al., 1985: 256). Essentially, individuals and groups with mutual bonds or interests within the organization tend to influence and manage it in ways that benefit themselves (Cyert and March, 1963). This dynamic gives rise to the coalition perspective. The coalition perspective has primarily formed the basis for resource dependence theory, particularly in the context of benefit and

interest relationships. Some authors have conceptualized organizations as coalitions (Cyert and March, 1963). The coalition perspective focuses on employees or groups engaging in cycles of exchange with the organization (Cyert and March, 1963, as cited in Bozagaç and Aktaş, 2018: 43). In other words, the coalition perspective emerged from individuals and groups within the organization striving to achieve their diverse goals and preferences, leading to the organization being described as a coalition. In this context, the coalition perspective is a pluralistic and politically grounded concept (Stevenson et al., 1985). Resource dependence theory also has a political foundation shaped by the coalition perspective in this regard (Pfeffer and Salancik, 2015: 357). In this perspective, organizations do not aim to fulfill the individual goals of their members or groups. Moreover, this view does not consider the organization as a means to achieve individual objectives (Eccles, 1981; Stevenson et al., 1985). According to the coalition perspective, individuals and groups form alliances within the organization or with external organizations (Pfeffer and Salancik, 2015: 357).

The coalition perspective emphasizes that individuals and groups within organizations seek to influence other organizations to benefit themselves. Organizations are referred to as coalitions because individuals and groups within them pursue different goals and alternative choices (Cyert and March, 1963). Essentially, this perspective, like resource dependence theory, is grounded in a politically oriented perspective on decision-making processes both within organizations and in their interactions with other organizations (Pfeffer and Salancik, 2015: 359). Individuals and groups aim to obtain certain benefits in exchange for the contributions they provide to their own or other organizations. Moreover, this perspective highlights the significance of personal or group desires within organizations and their tendencies to steer organizational direction (Cyert and March, 1963; as cited in Bozagaç and Aktaş, 2018: 43). Cyert and March (1963) argue that organizational decisions require the approval of various managers, and the final decision results from a coalition of these managers. However, as in resource dependence theory, this dynamic can lead to power struggles. Such decisions are not necessarily the most optimal solutions but rather satisfactory compromises. This satisfaction arises from selecting the alternative that provides the greatest satisfaction to the decision-makers. Instead of considering all possible options to solve problems comprehensively, managers tend to focus on the option that is readily available and resolves the issue most quickly (Daft, 2001: 412).

THE FUNDAMENTAL COMPONENTS OF THE RESOURCE DEPENDENCE THEORY

Resource dependence theory emphasizes the significance of the environment, organizational adaptation to it, and the environment's influence over organizations. It highlights the role of power in interorganizational relationships, equating power with organizations' efforts to manage their environments. Additionally, this theory centers on resources and dependency. In this case, organizations use their power to attempt to control their environments (Meydan, 2020: 183). The key components of resource dependence theory include the environment, adaptation to or management of the environment, power, resource concentration, and relationships with other organizations (Meydan, 2020: 184-185).

Environment

In resource dependence theory, organizations are viewed as open systems. Open system theory is particularly important for organizations that continuously interact with their environment. In this context, the theory seeks to explain the organizational life cycle in terms of relationships with the environment (Robbins and Coulter, 2016: 34). It emphasizes that organizations are continually reshaped by their environment (Davis and Cobb, 2010: 25).

Organizations are considered successful if they possess knowledge about their environment and can apply this knowledge effectively.

The environment encompasses all components outside an organization's boundaries that have the potential to affect the organization as a whole or any of its parts (Daft, 2001: 130). The relationship between organizations and their environments gained significant importance in the 1950s with the development of systems theory, which linked the state of biological organisms to organizational systems and their environments. An organization consists of an external environmental system and an internal relational system that are interdependent (Homans, 1974). In this context, the organization is a dynamic system influenced by environmental conditions, constantly changing and adapting to internal and external pressures. Organizations tend to rely on external resources; accordingly, they are in a constant state of flux (Pfeffer and Salancik, 1978; Bode et al., 2011, cited in Chiang and Chuang, 2024: 4). Resource dependence theory primarily focuses on developing strategies to reduce organizations' dependence on their environments (Scott, 2003: 148). The environment of organizations is generally examined within the framework of two fundamental factors. The first factor pertains to the general environment, which includes ecological, legal, social, political, economic, and technological conditions. The second factor concerns the task environment, which comprises suppliers, customers, interest groups, and competitors (Daft, 2001:130).

Environmental Adaptation and Management

It is undeniable that organizations have become increasingly dependent on their environments over time to sustain their activities. Within this framework of dependency, organizations require various resources. Moreover, the environmental conditions in which organizations operate influence their success, effectiveness, and, consequently, their ability to survive (Vos, 2002: 71). Organizations are not always self-sufficient; therefore, they strive to obtain the resources they need from their environment. In doing so, they seek resources from other organizations, which forms the central focus of resource dependence theory.

Organizations are influenced by their environment and its demands, to which they respond. These responses take the form of adaptation or management (Pfeffer and Salancik, 2015: 359). Organizations develop various strategies to adapt to and shape the uncertain external environment. In this context, the environment and the organization mutually influence each other (Demers, 2007, as cited in Meydan, 2020: 186).

Since environmental conditions and organizations are constantly in flux, controlling the environment is challenging. Consequently, organizations strive to adapt to the environment by shaping their own structures and actions (Meydan, 2020: 181). If organizational environmental adaptation is not achieved, organizations may either transform themselves or attempt to adapt to their environment to gain greater benefits (Pfeffer and Salancik, 1978: 108-110). The environment can be uncertain and challenging. When the environment is demanding, various solutions emerge to overcome it, including; (a) altering the organization's dependencies; (b) enhancing interorganizational coordination, (c) influencing political and public institutions involved in environmental formation (Pfeffer and Salancik, 1978: 113-114).

Power

The concepts of power, resources, and dependence receive significant attention in organizational relationships. In this context, power becomes prominent as organizations seek to manage their environments (Davis and Cobb, 2010: 25). Power is a crucial element that enables organizations to sustain their activities and remain competitive. Environmental conditions do not entirely dictate an organization's activities and structure. Therefore, power

serves as a key variable that allows organizations to influence and intervene in their environments (Davis et al., 1994).

Power is the ability of individuals or groups, both within and outside an organization, to create mutual dependencies and influence the organization's decisions to achieve outcomes aligned with their own interests (Emerson, 1962:11; Meydan, 2020: 184-185). Power plays a crucial role in organizations due to the constant power struggles that occur within them. In this context, the political process becomes especially prominent in internal organizational decisions as well as in the organization's external relations. Accordingly, to increase an organization's power, it is important to reduce its dependence on external resources and to manage resources effectively. An organization's influence over other organizations varies according to its level of independence in resource control, the degree of other organizations' dependence on its resources, and their capacity to respond to power (Pfeffer and Salancik, 2015: 362). According to resource dependence theory, organizations employ power models that represent power and dependence in their internal and external relationships. An organization's power is enhanced by reducing its dependence on critical resources. Powerful organizations seek to regulate market rules in their own interests to utilize their power more effectively, while powerless organizations focus on rules and norms to protect themselves from more powerful ones (Pfeffer and Salancik, 1978).

Resource Intensity

Resource intensity refers to the extent to which an organization, in its efforts to acquire a specific resource, can access multiple resource providers capable of supplying that resource, thereby creating alternatives (Pfeffer and Salancik, 1978: 26). The primary concern in resource intensity is the degree to which critical and necessary resources for the organization are concentrated (Pfeffer and Salancik, 1978, as cited in Meydan, 2020: 184-185). In other words, resource intensity symbolizes the sectoral distribution of power and authority related to specific resources and, consequently, the intensity level of primary resources (Pfeffer and Salancik, 1978: 26).

Resource intensity refers to the extent to which an organization in need of resources can access various resource providers and develop alternatives. Organizations seeking resources aim to reduce uncertainty; however, they remain sensitive to the desires and expectations of external actors (Alexander and Wells, 2008:730). To manage resource intensity, organizations employ different strategies, such as establishing collective enterprises, cartels, monopolies, and similar arrangements (Pfeffer and Salancik, 1978; Drees and Heugens, 2013). Resource intensity increases an organization's vulnerability to the demands of actors within its uncertain external environment, thereby limiting the autonomy that would enable the organization to act in ways that benefit its suppliers or customers. To gain operational autonomy, organizations strive to develop diverse resources (Alexander and Wells, 2008). Autonomy can serve as an intermediary factor linking organizational performance to collaborative arrangements with other organizations (Drees and Heugens, 2013). Moreover, as resource intensity increases, the mutual influence among organizations grows, which in turn reduces environmental uncertainty (Pfeffer and Salancik, 1978).

Inter-Organizational Relationships

One of the most significant issues emphasized by resource dependence theory is that organizations establish dependency relationships with the external environment concerning the inputs they obtain from the environment and the outputs they provide to the environment. This dependency relationship encompasses uncertain situations, events, and the associated risks arising from the external environment. Consequently, maintaining strong relationships

with other organizations is necessary to minimize external risks. Such relationships enable organizations to maintain control and oversight over resources (Scott, 2003:158; Pfeffer and Salancik, 1978: 27). In other words, it is essential for every organization to possess resources and to acquire those it lacks from its environment. Most inter-organizational relationships arise due to resource requirements and uncertainty. Other organizations are among the most significant actors in securing resources from the external environment. Organizations with resource needs can effectively manage uncertainties and risks by establishing strong relationships with other organizations (Pfeffer and Salancik, 1978:27; Koç and Sayılar, 2016: 80).

Resources control all environmental units necessary for an organization's activities, as well as the vital resources that sustain it. It is challenging for organizations to meet all their resource needs independently. Consequently, organizations may become dependent on other organizations over time (Pfeffer and Salancik, 1978: 27; Pfeffer, 1992: 25). Dependency arises when an organization cannot fully control all the conditions or factors related to its activities and behavior. Dependency is an important factor that influences managers' attitudes and decisions. Relationships with other organizations are affected by this element of dependency. In this context, organizations cooperate and establish effective relationships with others to access essential resources (Koç and Sayılar, 2016: 80). Therefore, organizations must develop sustainable, effective, and efficient relationships with other organizations. Managers bear significant responsibility for fostering such positive relationships.

THE RESOURCE DEPENDENCE THEORY FROM AN ORGANIZATIONAL PERSPECTIVE

Today's organizations must compete intensely to ensure their survival. Very few organizations are self-sufficient in terms of resources. Consequently, organizations become dependent on others to obtain the necessary resources. Those who control these resources hold power within the organization (Gomes et al., 2010, as cited in Andrews and Hodgkinson, 2024: 1182). Resource needs vary according to the organization's requirements and the sector in which it operates. It is crucial for management to make the right decisions regarding resources and to effectively implement these decisions across production, sales, and marketing activities. The relationships between the organization and its suppliers are also significant. This theory, which is part of management theories, focuses on the analysis of resources within organizations (Andrews and Hodgkinson, 2024: 1183; Yeager et al., 2014: 51).

In the resource dependence theory, actors such as organizations, shareholders, managers, employees, and civil society organizations, as well as the coalition structures formed by numerous individuals and groups with diverse interests, expectations, and goals within these organizations created by these actors, are significant (Andrews and Hodgkinson, 2024: 1183). Accordingly, the coalition structures formed by all actors must be managed in a balanced manner. Consistent with this perspective, resource dependence theory adopts a political approach, viewing organizations as coalitions of subgroups pursuing their own interests and emphasizing the existence of disagreements and conflicts among these coalitions. Consequently, managers must be capable of effectively managing conflicts and disagreements between individuals and groups (Pfeffer and Salancik, 2015: 359; Aldrich and Pfeffer, 1976, as cited in Üsdiken, 2015: 82). In summary, managers must successfully navigate environmental challenges (Pfeffer and Salancik, 2015: 358).

Some authors argue that the high value of resources, along with their irreplaceability, scarcity, uniqueness, and inimitability, creates a competitive advantage (Andrews and Hodgkinson, 2024: 1183). Organizations seek to reduce their dependence on an uncertain

external environment by engaging in various behaviors to sustain their life cycles and mitigate environmental pressures (Davis and Cobb, 2010: 5). Essentially, resource dependence theory emphasizes that organizations are dependent on their environment to continue their activities and strive to coordinate and regulate these dependencies in their favor by exhibiting diverse behaviors (Pfeffer and Salancik, 2015: 360). According to this theory, some authors suggest that in uncertain situations, it is beneficial to include competitors, suppliers, customers, and others on the board of directors (Davis and Cobb, 2010: 31).

Essentially, managers tend to act in response to the uncertainties arising from environmental conditions. Managers who effectively manage external uncertainties gain greater power within the organization (Mintzberg, 1983). How managers perceive the uncertain external environment is crucial. Consequently, their actions and decisions are influenced by their perception of the environment (Yeager et al., 2014: 51). Managers strive to control the resources they seek to acquire to minimize their dependence on them. According to Jones (2017), managerial recommendations within the framework of resource dependence theory include criterias. These are (Jones, 2017: 80; as cited in Uçak, 2020:52); (a) organizations should assess the scarce resources they require and determine how to obtain them, (b) managers should plan the strategy, advantages, and costs involved when dealing with other organizations in advance, (c) to manage resource dependence and the organization's dependence on resources, informal linkages should be prioritized, (d) informal cooperation should be preferred in collaborations with other organizations; potential problems should be anticipated, and solutions should be prepared in advance, (e) the transaction cost theory, which considers the transaction as the basic measure (Williamson, 1981; as cited in de Camargo Fiorini et al., 2018: 124), should be used to determine interests and costs in managing dependencies, (f) recommendations and suggestions in strategies applied to manage symbiotic and competitive dependencies should be taken into consideration.

Resource dependence theory underpins the process by which organizations acquire and secure necessary resources from their external environment. This theory primarily addresses power relations within organizations to explain their power relations with others. Accordingly, organizations strive to control their external environment by exerting their power. Resource dependence theory emphasizes the distribution of power within organizations. In this context, effectively securing resources through proper management amid risky, uncertain, and limited conditions signifies organizational strength (Meydan, 2020: 184). According to resource dependence theory, changes in senior management can serve as a means of aligning organizational changes with the organization's environment (Pfeffer and Salancik, 1977; Pfeffer and Moore, 1980).

RESULTS AND DISCUSSION

The resource dependence theory emphasizes that organizations are dependent on their environment to sustain their life cycles and that they attempt to manage these dependencies in their favor through various action initiatives (Pfeffer and Salancik, 2015). According to this theory, contemporary organizations must acquire resources quickly and efficiently, either internally or from other organizations, especially under intense competitive conditions. Resource dependency theory emerged from the observation that organizations are unable to secure resources to meet their needs and encounter various problems in obtaining them, leading to their dependence on other organizations. Consequently, organizations seek to minimize their dependency on resources, uncertainty, and therefore risks through various methods. In this context, organizations endeavor to manage their relationships and interactions with other organizations as effectively as possible (Casciaro and Piskorski, 2005; Singh et al., 2011: 50; Barney et al., 2021: 4). In other words, this theory is effective in

understanding the relationship between an organization and its environment, particularly in parallel with the organization's resource needs. Resources are fundamental elements in the functioning of organizations. Therefore, creating a favorable resource environment within organizations and their relationships is among the desired elements by organizations. In particular, organizations must establish relationships with other organizations while trying to obtain resources. These factors are critical for gaining a competitive advantage among organizations (Rumelt, 1974; Barney et al., 2021: 4).

The constant changes in the environment that meet resource needs and the occasional uncertainties in obtaining these resources can lead organizations into complex situations. In such cases, organizations that have established strong relationships with their environment are better equipped to cope with uncertainty. A sound managerial perspective is crucial in this context (Barney et al., 2021: 4). Organizations must control and coordinate all their activities at the highest level to reduce uncertainties and dependencies. The primary goal of effective coordination is to prevent the duplication of activities and minimize costs (Güney, 2020: 255). A well-managed organization can significantly ensure this coordination.

Over time, various criticisms have been directed at resource dependence theory. Foremost among these is the critique that the theory's boundaries are not clearly defined, and its theoretical scope is inadequately articulated (Pfeffer and Salancik, 1978: 245). Another significant criticism concerns the theory's foundational assumptions, which are not strongly supported by empirical research. Some authors argue that the theory fails to treat concepts such as power imbalance and interdependence as distinct factors. In this regard, it has been suggested that the theory's core elements (power, power intensity, and dependency) should be re-examined and considered alongside other theoretical perspectives (Davis and Cobb, 2010: 32). Furthermore, some authors contend that examining dependency in only one direction is incorrect. Additionally, it has been stated that for attitudes and behaviors aimed at reducing dependency to be successful, different dimensions of dependency must be considered. These attitudes and behaviors are not solely the result of managerial decisions; they can also arise from environmental constraints and pressures (Casciaro and Piskorski, 2005). Another criticism is that the theory does not fully explain how employees obtain resources or where they acquire them (Pfeffer and Salancik, 1978: 245).

According to some authors, this theory does not fully account for organizational contexts (Priem and Butler, 2001). Furthermore, another criticism is that the theory fails to explain how different resources contribute to organizations (Kraaijenbrink et al., 2010). Additionally, there is a lack of clarity regarding the role of resources in achieving sustainable competitive advantage. Some authors argue that the theory is distant from managerial practice (Pfeffer and Salancik, 1978: 245). These criticisms have influenced the further development of the theory.

Resource dependence theory posits that organizations are dependent on other organizations due to their inability to possess resources within the scope of their critical requirements and their challenges in fulfilling their needs. Consequently, organizations seek to reduce uncertainty and dependency related to resources through various methods and manage their interactions with other organizations optimally. Organizational motivation plays a crucial role in mitigating this uncertainty and dependency (Singh et al., 2011: 50; Casciaro and Piskorski, 2005). Managers are responsible for providing this motivation. Those who excel in resource planning are better equipped to make informed decisions based on uncertainties. Ultimately, managers can strive to increase factors such as efficiency, productivity, and performance based on the organization's goals. In this sense, managers should be able to make decisions that enable the organization to operate more independently within the external environment on which it depends (Pfeffer and Salancik, 1978, as cited in Yeager et al., 2014: 51).

This study conceptually examines resource dependence theory. It aims to determine the concept and definition of resource dependence theory and its elements, while providing essential information for the literature. Furthermore, the study discusses notable aspects of the theory, including its theoretical foundation, fundamental components, and organizational perspective. In this context, it explores the relationship between an organization's resources and resource dependence theory, highlighting topics relevant to organizations and researchers in the field. Additionally, the study addresses criticisms of the theory. It is anticipated that contemporary managers and researchers will develop a different perspective on RDT based on these critiques and contribute to its further

The evaluation of resource dependence theory from an organizational perspective can be further developed to address the needs of contemporary organizations. This study aims to provide a comprehensive literature review of resource dependence theory, offer a fresh perspective relevant to today's organizations, and guide managers in its effective application. Additionally, this study analyzes the theory from an organizational perspective and introduces a novel viewpoint to the existing literature. Examining resource dependence theory from the perspective of organizations and management can offer managers and researchers new insights. By thoroughly evaluating the theory, it is anticipated that today's organizations will gain a better understanding of it. Moreover, by focusing on the fundamental components of the theory in this study, the necessity for managers to successfully manage environmental challenges is emphasized. In addition, future research would benefit from exploring topics such as identifying the conditions for utilizing the most valuable resources, fostering collaboration with other organizations, and optimizing resource management. Moreover, investigating the relationship between resource dependence theory and a broader range of organizational and managerial issues would significantly contribute to this literature. Future studies should also develop models that examine the impact of resource dependence theory on the organizational structure.

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CHAPTER 5

COUNTRY RISK AND ECOLOGICAL QUALITY IN BRICS NATIONS: EVIDENCE FROM THE LOAD CAPACITY FACTOR

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1 INTRODUCTION

The Paris Agreement of 2015 was a commitment of almost all world economies to reduce their greenhouse gas emission levels to achieve a global temperature rise of no more than 2°C (Adebayo, 2022a; Shahbaz et al., 2018). Despite this agreement, carbon dioxide emissions in emerging markets especially in the BRICS countries (Brazil, Russia, India, China and South Africa) continue to increase. Together the BRICS countries have 3.2 billion inhabitants, consume about 40% of the world's total energy and produce more than half of the G20 countries' total greenhouse gas emissions (Danish and Ulucak, 2020; Adedoyin et al., 2020). Therefore there is still tension between these countries' continued pursuit of higher standards of living through economic growth and the need to protect the environment (Bano et al., 2022). There is extensive literature available exploring the ecological impact of economic development/energy consumption and financial development within the BRICS states using measures such as CO₂ emissions and ecological footprints (Ojekemi et al., 2022; Awosusi et al., 2022; Kirikkaleli and Adebayo, 2021). Two significant areas where research is lacking however are: Firstly, many previous studies used the ecological footprint as a measure of ecological impacts. This is a single-sided approach to understanding ecological impacts since it does not take into consideration supply-side factors (biocapacity) related to ecological sustainability. As Siche et al. (2010); Adebayo (2023a) noted, the Load Capacity Factor (LCF) is a better overall indicator of ecological sustainability because it takes into account both demand (ecological footprint) and supply (biocapacity) sides. Secondly, few researchers have investigated the linkages between financial and economic risk at the national level (as measured by the PRS group), and ecological quality in BRICS. Although it is increasingly recognized that instability in macroeconomics can affect both investments and energy usage (Hassan et al., 2022; Zhang & Chiu, 2020), very little research exists linking country-level risk indicators and ecological quality in BRICS. In order to address these two research gaps, this study will develop a panel model where the LCF will be a function of economic growth (GDP), renewable energy consumption (REC), fossil fuel consumption (FF), financial risk (FR), and economic risk (ER) for five BRICS countries over the period 1990–2018. To address the identified issues with the data we will utilize a set of robust econometric methods that account for both cross-section dependence (CSD) and slope heterogeneity (SH), and which are consistent with our data characteristics. These include a variety of mean based long run estimators including FMOLS, DOLS, and FE-Ols. Additionally, we will also apply the method of moments quantile regression (MMQR) developed by Machado

& Santos Silva (2019) so that we may assess how each of the explanatory variables influences the LCF throughout its entire range of values. The contributions made by this study are: (i) first-time application of the LCF as an ecological variable in a country risk study for BRICS; (ii) new distributional insights through MMQR; and (iii) new policy recommendations aligned with goals for SDG-7 (Affordable Clean Energy) and SDG-13 (Climate Action).

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 EKC Hypothesis and the Economic Growth-Ecology Nexus

The Environmental Kuznets Curve (EKC) theory, suggesting environmental degradation is first greater and then lesser in relation to increasing income levels; was first proposed by Grossman and Krueger (1995). There have been numerous studies throughout BRICS that support the EKC theory through CO₂ emission and ecological footprint indicator usage. Using AMG and CCEMG estimations on BRICS data from 1990-2018, Ojekemi et al. (2022) found that increased economic growth results in higher CO₂ emissions, which is consistent with the upward phase of the EKC typically seen in emerging markets. Additionally, Miao et al. (2022) used quantile based methodologies on newly industrialized economies from 1990-2018 and also established an EKC relationship. Outside of the BRICS block, there is additional supporting evidence. Adebayo (2022b) analyzed Canada and Kirikkaleli et al. (2023) examined the U.S., and both authors concluded that economic growth remains one of the largest contributors to environmental degradation and growing emissions. These conclusions indicate even mature economies remain in environmentally unsustainable development stages. Collectively, these studies show that BRICS economies are still at the resource-intensive phases of their economic development processes.

2.2 Energy, Country Risk, and Ecological Quality

Renewable energy consumption (REC) is widely documented as an ecological quality enhancer. Kirikkaleli and Adebayo (2021) demonstrated that REC reduces ecological deterioration in BRICS using the CSARDL method. Awosusi et al. (2022) corroborated this using quantile approaches, confirming REC's emissions-reducing role across quantiles. Conversely, fossil fuel use consistently amplifies ecological damage (Abbasi et al., 2021; Adedoyin et al., 2021). Regarding country risk, the literature is divided into three schools. The

first holds that financial instability (high financial risk) promotes ecological damage by constraining the accumulation of capital that funds environmental infrastructure (?). The second argues the reverse: financially unstable environments slow heavy industrial investment, reducing ecological pressure (Abbasi and Riaz, 2016; Shahbaz et al., 2018). A third strand finds no significant link (Ozturk and Acaravci, 2016). Studies explicitly using financial and economic risk indices (PRS Group) for ecological quality analysis are rare, and none have applied the LCF as the ecological proxy in BRICS. The load capacity factor-introduced as an ecological quality measure by Siche et al. (2010) and recently applied by Adebayo (2023a) and Akadiri et al. (2022) integrates the demand side (ecological footprint) and supply side (biocapacity), offering a holistic ecological sustainability assessment. Its application in the context of country risk and disaggregated energy in BRICS remains entirely absent from the literature, motivating the present study.

3 Data and Methodology

3.1 Data Sources and Variable Description

Table 1 lists the six key variables for analysis. The dataset includes five BRICS economies: Brazil, Russia, India, China, and South Africa. The time frame spans 1990 through 2018. This produces 145 total observations in an unbalanced panel format. You will note that all variables undergo natural log transformation. This step stabilizes variance and improves distribution properties for reliable estimation.

Table 1: **Variable Description**

Variable	Sign	Unit	Source
Load Capacity Factor	LF	Biocapacity / Ecological Footprint	GFN
Economic Growth	GDP	GDP per capita (USD 2015)	World Bank
Renewable Energy	REC	% of total final energy	BP
Fossil Fuel	FF	TWh	BP
Financial Risk	FR	Index (higher = lower risk)	PRS Group
Economic Risk	ER	Index (higher = lower risk)	PRS Group

Descriptive statistics (Table 2) indicate that the mean LCF of 1.215 suggests BRICS nations collectively hover near the ecological sustainability boundary. GDP exhibits negative skewness

(-0.068), while FF, REC, and LF are positively skewed, reflecting China's outsized energy and ecological footprint values.

3.2 Model Specification

The empirical model is:

$$\ln LF_{it} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln FF_{it} + \beta_3 \ln REC_{it} + \beta_4 \ln FR_{it} + \beta_5 \ln ER_{it} + \varepsilon_{it} \quad (1)$$

where $i \in \{1, \dots, 5\}$ indexes countries and $t \in \{1990, \dots, 2018\}$ indexes years.

Table 2: Descriptive Statistics

	LF	FF	REC	GDP	FR	ER
Mean	1.215	6640.3	811.6	5913.7	37.622	32.363
Median	0.505	3988.7	731.6	6186.6	38.453	34.001
Maximum	4.477	32388.1	5325.5	11993.1	48.006	44.875
Minimum	0.218	829.65	20.56	575.52	16.936	23.989
Std. Dev.	1.268	7734.8	887.5	3654.6	6.888	8.051
Skewness	1.333	2.038	2.717	-0.068	-0.619	-1.553

3.3 Econometric Methods

The empirical estimation procedure is conducted in five sequential stages. First, slope heterogeneity and cross sectional dependence are examined using the slope homogeneity test developed by Pesaran and Yamagata (2008) alongside the cross sectional dependence test proposed by Pesaran (2015). The rejection of the null hypotheses confirms the presence of heterogeneity and dependence across cross sections, thereby necessitating the use of second generation estimation techniques. Second, unit root properties are evaluated through the CIPS and CADF tests introduced by Pesaran (2007), which are suitable in the presence of cross sectional dependence and slope heterogeneity. Variables found to be stationary after first differencing are subsequently subjected to cointegration analysis. Third, the existence of a long run equilibrium relationship is assessed using the Westerlund (2007) panel cointegration test. This approach accounts for cross sectional dependence through bootstrapped critical values, ensuring robust inference regarding long run associations among the variables. Fourth, long run coefficients are estimated using FMOLS, DOLS, and FE OLS estimators to obtain average long run effects. In addition, the Method of Moments Quantile Regression developed by Machado

and Santos Silva (2019) is employed to capture distributional elasticities across different quantiles ranging from $\tau = 0.1$ to $\tau = 0.9$.

Fifth, causal relationships among the variables are investigated using the Dumitrescu and Hurlin (2012) panel causality test, which is appropriate for panel datasets characterized by cross sectional dependence.

4 Results and Discussion

4.1 Preliminary Tests and Cointegration

The test of slope heterogeneity produces $\Delta^* = 10.928 (p < 0.01)$ and $\Delta^*_{\text{“adjusted”}} = 11.373 (p < 0.01)$. Hence we confirm that the BRICS economies have different slopes in their regression models. We use the CD statistic to check if the variables used in our analysis have some form of cross-sectional dependence. As shown in Table 2, the CD statistic for all the variables is greater than the 1 % critical value (LF: 11.73; GDP: 6.044; REC: 13.01; FF: 10.24; FR: 8.365; ER: 5.539). This confirms the existence of cross-sectional dependence among the BRICS economies due to close economic ties and interdependence through trade and finance. The CIPS and CADF tests (presented in Table 3) also showed that all the variables were integrated of order one (I(1)) when tested individually at levels but stationary at the first differences. Also as can be seen from Table 2, the Westerlund cointegration test produced $G_t = -3.740 (***)$ and $P_a = -14.589 (***)$ which confirmed that there exists a long run relationship or stable equilibrium relationship between the LCF and its explanatory variables.

4.2 Long-Run Estimation Results

Table 4 presents the FMOLS, DOLS, and FE-OLS estimates. Economic growth (GDP) exerts a consistently negative and significant effect on LCF across all three estimators (FMOLS: -0.543^{***} ; DOLS: -0.630^{***} ; FE-OLS: -0.593^{***}). A 1% increase in GDP reduces the load capacity factor by 0.54 – 0.63%, confirming the ascending limb of the EKC for BRICS- development comes at an ecological cost as fossil-fuel intensive industries power economic expansion (Grossman and Krueger, 1995; Ojekemi et al., 2022).

Table 3: CIPS and CADF Unit Root Test Results

Variable	CIPS		CADF	
	I(0)	I(1)	I(0)	I(1)
LF	2.134	-5.053***	-1.925	-4.271***
GDP	-1.975	-4.434***	-2.034	-5.284***
REC	-1.287	-4.734***	-1.033	-4.777***
FF	-1.934	-5.158***	-1.516	-5.118***
FR	-2.117	-4.049***	-2.187	-3.954**
ER	-1.926	-4.818***	-1.293	-4.349***

Note: *** and ** denote 1% and 5% significance levels.

Renewable energy (REC) consistently improves ecological quality (FMOLS: +0.093***; DOLS: +0.102*; FE-OLS: +0.203***). Transitioning 1% of energy supply toward renewables lifts the LCF by 0.09 – 0.20%, consistent with Kirikkaleli and Adebayo (2021) and Awosusi et al. (2022). Fossil fuel (FF) strongly reduces LCF (FMOLS: –0.839*; DOLS: –0.754**; FE-OLS: –1.038***), underscoring the dominant ecological threat posed by fossil dependence. This is consistent with the broader BRICS energy literature (Abbasi et al., 2021; Adedoyin et al., 2021). Financial risk (FR) positively impacts LCF in FMOLS (+0.116***) and DOLS (+0.145***), suggesting that financial instability in BRICS constrains energy-intensive capital investment, thereby indirectly reducing ecological damage-consistent with the second school of thought in the financial risk literature (Abbasi and Riaz, 2016; Shahbaz et al., 2018). The FE-OLS result (–0.234*) reflects heterogeneity in this effect across estimators. Economic risk (ER) is positive in FMOLS (0.290), DOLS (+0.230***), and FE-OLS (+0.110***), suggesting that countries facing higher economic risk tend to slow industrial activity, reducing ecological pressure.

Table 4: FMOLS, DOLS, and FE-OLS Long-Run Estimates (Dependent Variable: $\ln LF$)

Variable	FMOLS		DOLS		FE-OLS	
	Coeff.	p	Coeff.	p	Coeff.	p
$\ln GDP$	-0.543***	0.000	-0.630***	0.000	-0.593***	0.012
$\ln REC$	+0.093***	0.029	+0.102*	0.070	+0.203***	0.000
$\ln FF$	-0.839*	0.000	-0.754**	0.000	-1.038***	0.000
$\ln FR$	+0.116***	0.099	+0.145***	0.080	-0.234*	0.000
$\ln ER$	+0.290	0.000	+0.230***	0.030	+0.110***	0.000

Note: ***, **, * denote 1%, 5%, 10% significance.

4.3 MMQR Quantile Regression Results

Table 5 reports MMQR results across quantiles 0.1 to 0.9 . The GDP coefficient is negative and significant at all quantiles, ranging from -0.710 (low, $\tau = 0.1$) to -0.520 (high, $\tau = 0.9$), confirming a uniform growth-ecology trade-off across the ecological quality distribution. The fossil fuel coefficient intensifies monotonically: -0.700 at $\tau = 0.1$ to -2.113 at $\tau = 0.9$. This implies that in countries already under severe ecological pressure (high ecological footprint relative to biocapacity), additional fossil fuel consumption is disproportionately damaging-a finding with clear policy urgency for China and India. REC is uniformly positive and significant across all quantiles (+0.220 at $\tau = 0.1$ to +0.390 at $\tau = 0.9$), with the effect slightly larger at higher quantiles-renewable energy is more powerful at improving ecological quality precisely where ecological conditions are worst. Financial risk is positive and significant across all quantiles (+0.430 at $\tau = 0.1$ to +0.210 at $\tau = 0.9$), with a diminishing effect at upper quantiles. Economic risk is positive and significant at lower to mid quantiles ($\tau = 0.1 - 0.5$; ranging from +0.110 to +0.190) but becomes insignificant at upper quantiles ($\tau = 0.6 - 0.9$), suggesting that economic risk only shields ecological quality in less stressed environments.

Table 5: MMQR Results (Dependent Variable: $\ln$)

Quantile	$\ln$ GDP	$\ln$ REC	$\ln$ FF	$\ln$ FR	$\ln$ ER
0.10	-0.710*	+0.220**	-0.700*	+0.430*	+0.110*
0.20	-0.700*	+0.310**	-0.960**	+0.400*	+0.130*
0.30	-0.680*	+0.370**	-1.130**	+0.380*	+0.150*
0.40	-0.650*	+0.330**	-1.200**	+0.350*	+0.170*
0.50	-0.630*	+0.340***	-1.430**	+0.320*	+0.190*
0.60	-0.600*	+0.350***	-1.610**	+0.290*	0.230
0.70	-0.570*	+0.360***	-1.800**	+0.260*	0.280
0.80	-0.550*	+0.370***	-1.930***	+0.230**	0.240
0.90	-0.520*	+0.390***	-2.110***	+0.210**	0.260

Note: ***, **, * denote 1%, 5%, 10% significance.

4.4 Causality Analysis

The Dumitrescu-Hurlin causality results reveal unidirectional causality from GDP to LF ($W = 6.673, p = 0.000$), from FR to LF ($W = 9.774, p = 0.000$), from REC to LF ($W = 3.266, p = 0.000$), and from ER to LF ($W = 1.571, p = 0.003$). A bidirectional relationship exists between FF and LF ($W_{FF \rightarrow LF} = 5.134; W_{LF \rightarrow FF} = 6.217$), indicating that fossil fuel consumption and ecological quality form a dynamic feedback loop. The finding that LF does not cause GDP ($p = 0.286$) implies that deteriorating ecological quality does not immediately translate into economic contraction in BRICS-a short-sighted outcome for long-run sustainability. Policymakers must therefore impose external constraints rather than relying on market self-correction.

5 Conclusion and Policy Recommendations

This research breaks new ground. The analysis presents the first examination linking financial and economic risk to the load capacity factor in BRICS states from 1990 to 2018. Advanced panel methods and quantile regression are applied. The data confirms the Environmental Kuznets Curve. Economic growth lowers ecological quality by 0.54 to 0.63 percent. This observation matches rapid development paths. Renewable power strengthens ecological balance. Gains of 0.09 to 0.39 percent appear across every model. Fossil fuels cause heavier damage as environmental stress rises. The damage peaks at 2.11 percent at the highest stress

level. Financial risk consistently raises the load capacity factor. Economic risk only supports ecosystems during calm periods. All variables directly drive changes in ecological quality. Fossil fuel use shows bidirectional influence. Sustainability improves by targeting energy sources and managing national risk. These findings require application through clear policy steps. First, ecological goals should tie to economic growth plans. Green tax breaks, carbon pricing, and removal of fossil fuel subsidies are needed. Second, funding for renewable projects like hydro, solar, wind, and biomass must be prioritized. China and India require immediate action due to severe fossil fuel damage at high stress levels. Third, macroeconomic policies and regulations should stabilize. Lower risk draws clean capital instead of polluting investments. These steps support Sustainable Development Goal seven and Sustainable Development Goal thirteen. Future studies should test this model in ASEAN, MENA, and G20 groups. Geopolitical risk measures should be added and each country analyzed separately to target interventions effectively.

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CHAPTER 6

EXAMINING THE RELATIONSHIP BETWEEN E-HEALTH LITERACY AND CYBERCHONDRIA IN PREGNANT WOMEN REGARDING DESCRIPTIVE CHARACTERISTICS

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INTRODUCTION

Although the widespread use of digital technologies has facilitated individuals' access to health information, it has led to a new phenomenon called "cyberchondria." This condition, characterized by an individual's propensity to transform online health searches into repetitive and compulsive behaviors, is associated with an elevated level of anxiety (McElroy et al., 2019). This behavior manifests with increasing frequency during periods of intense physical and psychological transitions, such as pregnancy (Lee et al., 2021).

Pregnancy is a period of significant importance and sensitivity in the lives of women. During this period, the demand for information from expectant mothers and the methods by which they obtain this information is of paramount importance for their physical and psychological well-being (Šoštarić, Jokić-Begić & Vukušić Mijačika, 2024). In the contemporary digital age, the Internet has become a predominant source of health information for individuals during pregnancy. However, this phenomenon is not without its drawbacks, as the pursuit of health-related information can lead to information overload, misinformation, and heightened anxiety (Šoštarić, Mikac & Jokić-Begić, 2023). Furthermore, inadequate health literacy can impede pregnant women's capacity to discern and critically evaluate accurate information, thereby elevating the risk of both physical and psychological complications. Furthermore, the psychological and social adaptation needs of expectant mothers, in conjunction with the physiological changes associated with pregnancy, can exacerbate their health concerns (Meldgaard, Gamborg & Maindal, 2022). In this context, health literacy emerges as a pivotal factor in the manner in which individuals access, interpret, and apply online information.

Many studies show that the level of health literacy plays a crucial role in how pregnant women interpret the information they receive and transfer it to their daily lives (Nawabi et al., 2021; Taheri et al., 2021). A systematic review underscored that inadequate health literacy can result in deficiencies in critical skills, including the ability to recognize risk factors during pregnancy, access information, and engage in critical evaluation, which can potentially lead to adverse birth outcomes (Meldgaard et al., 2022). Inadequate health literacy can facilitate the adoption of misinformation, which can, in turn, give rise to erroneous health behaviors (Thaha, Anwar & Maria, 2021). This phenomenon is particularly problematic for expectant mothers who are at risk of complications or are already experiencing complications during pregnancy (Šoštarić et al., 2024). The absence of effective communication with healthcare professionals and deficiencies in disease management can adversely impact the pregnancy

experience of expectant mothers (Tahira & Fatima, 2024). Consequently, enhancing health literacy during pregnancy is of paramount importance, as it facilitates access to accurate pregnancy-related information and plays a crucial role in the prevention and management of complications.

Despite the existence of studies in the literature examining the concept of cyberchondria during pregnancy, there is a limited number of comprehensive studies addressing the similarities or differences between expectant mothers with and without pregnancy complications (Geusens & Skalkidou, 2025; Sansakorn, Mushtaque, Awais-E-Yazdan & Dost, 2024; Šoštarić et al., 2023; Ünal, Ekinici & Tarhan, 2022). Consequently, a significant gap exists within this domain. The objective of this study is to make a comparison between the presence of cyberchondria and the health literacy level in expectant mothers who are experiencing pregnancy complications and those who are not. The objective is twofold: first, to identify distinct profiles of digital health behaviors in pregnancy associated with complications, and second, to provide data-based solutions for clinical practices and public health policies.

MATERIAL AND METHOD

Aim, Study Design and Sample

This study aimed to examine the relationship between e-health literacy and cyberchondria in pregnant women in terms of descriptive characteristics.

The data for this descriptive and correlational study were collected via a face-to-face questionnaire method from women who applied to the gynecology and obstetrics outpatient clinic of a training-research hospital in Samsun province between March 17-28, 2025. The study population consisted of pregnant women receiving services from a public hospital in Samsun. Purposive sampling, one of the non-random sampling methods, was used. Half of the pregnant women had been diagnosed with complications by a physician in the previous or current pregnancy, while the other half had not. Furthermore, the inclusion criteria stipulated that the pregnant women must have been at least 18 years of age. Power analysis was performed to determine the study sample size. The analysis incorporated a minimum effect size of interest (δ) set at 0.5, a desired test power (power) of 0.90, a type-I error level (α) of 0.05, and a two-way test. The size ratio between groups was planned to be equal (1:1). According to these criteria, the calculation yielded a minimum of 86 participants required for each group. Consequently, data were collected from a total of 180 pregnant women, with 90 pregnant women from each group.

Data Collection Tools

Within the scope of the study, three different questionnaire forms were utilized. The first one is the information form that includes the descriptive characteristics of pregnant women. In this form, which was prepared according to the literature, there are nine different statements, including the general complication status, age, employment status, income and education levels, number and weeks of pregnancy, daily internet usage time, and the frequency of searching information about pregnancy on the Internet.

E-Health Literacy Scale

The E-Health Literacy Scale, originally developed by Norman and Skinner (2006), was adapted into Turkish by Coşkun and Bebiş (2015). This adaptation was accompanied by rigorous validity and reliability analyses. The scale comprises two items concerning internet utilization and eight items evaluating internet attitude. The scale items, which are structured with a five-point Likert-type rating system, are scored between 1 (Strongly disagree) and 5 (Strongly agree). The scale's range of scores is from 8 to 40, with the two items concerning internet use excluded from the calculation of the total score. These two items are evaluated on a scale from 1 (Not at all important) to 5 (Very important). The attainment of elevated scores on the scale is indicative of an individual's proficient level of e-health literacy (Norman & Skinner, 2006). The reliability of the Turkish version was previously assessed, yielding a Cronbach Alpha ($C\alpha$) coefficient of 0.78, as reported by Coşkun and Bebiş (2015). This study has yielded a slightly higher coefficient of 0.79. (Table 2).

Cyberchondria Severity Scale

The scale developed by McElroy et al. (2019) was designed to measure the level of cyberchondria, which is defined as an excessive amount of health research conducted online. The Turkish validity and reliability study of the scale was conducted by Söyler, Biçer and Çavmak (2021). The scale utilizes a five-point Likert-type rating system comprising a total of 12 items. Each item is scored on a scale ranging from 1 (Never) to 5 (Always), with higher scores indicating a higher degree of cyberchondria. The scale's minimum score is 12, and the maximum score is 60. In the context of the Turkish version, the Cronbach's alpha ($C\alpha$) coefficient was determined to be 0.86. However, the findings of this study indicate that this coefficient is 0.81 (Table 2).

Statistical Analysis

The data collected for the study were analyzed using SPSS V.26. After the exclusion of questionnaires that were either incomplete or incorrectly completed, the remaining data were presented with frequency, percentage, arithmetic mean, minimum, maximum, and standard deviation values within the scope of descriptive statistics. The kurtosis and skewness values were subsequently analyzed to assess the data's conformance to a normal distribution. As Tabachnick and Fidell (2007) have articulated, parametric tests were employed since these values were within the range of ± 1.96 (see Table 2). Consequently, the t-test, one-way ANOVA test, Pearson correlation, and simple regression analyses were employed to examine the research data. The data were evaluated at the 95% confidence interval, and a significance level of $p < 0.05$ was considered statistically significant.

Limitations of the Study

The present study did not thoroughly assess psychological and environmental factors, including depression, anxiety levels, and social support. Consequently, numerous variables that may influence cyberchondria and e-health literacy remained unassessed. The reliance on self-reported data introduces potential biases, such as social desirability and recall errors, which can influence the results.

Ethical Aspects of the Research

This study was approved by the ethics committee of Istanbul Arel University on 21.03.2025 with the board decision numbered 2025/08. All procedures performed in studies involving human participants were in accordance with the ethical standards of the Ethics Committee from the institutions involved, and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Also, the study was followed the STROBE guideline.

RESULT

Upon examination of Table 1, which includes the descriptive characteristics of the pregnant women, it is understood that 50% of the pregnant women had complications from previous or current pregnancies. The average age of the pregnant women was 28 years; 53.9% of them were between 18 and 25 years of age, 68.3% were not employed, 42.7% had a high school diploma, and 60% had an income equal to their expenses. The study also revealed that 41.1% of the pregnant women were experiencing their second pregnancy, 36.7% of them were between 13 and 21 weeks into their gestation, 49.4% of them used the Internet between

3 and 5 hours a day, and 40.6% of them frequently searched for information about the pregnancy process on the Internet.

Table 1. Pregnant Women's Descriptive Characteristics (N=180)

Variables	Groups	n	%
General Complication Status	Yes	90	50.0
	No	90	50.0
Age ($\bar{x}$ =28±5.5; Min=18; Max=40)	18-28	97	53.9
	29-40	83	46.1
Employment Status	Working	57	31.7
	Not working	123	68.3
Education Level	Primary education	48	26.7
	High School	77	42.7
	University	50	27.8
	Postgraduate	5	2.8
Income Level	Income<Expense	38	21.1
	Income=Expense	108	60.0
	Income>Expense	34	18.9
Number of Pregnancy ($\bar{x}$ =2.11±0.94; Min=1; Max=5)	1st pregnancy	51	28.3
	2nd pregnancy	74	41.1
	3rd pregnancy	44	24.4
	4th pregnancy	7	3.9
	5th pregnancy	4	2.3
Pregnancy Week ($\bar{x}$ =20.83±9.2; Min=4; Max=39)	04-12 weeks	37	20.5
	13-21 weeks	66	36.7
	22-30 weeks	45	25.0
	31-39 weeks	32	17.8
Daily Internet Usage Time	0-1 hour	4	2.3
	1-3 hours	63	35.0
	3-5 hours	89	49.4
	5 hours and above	24	13.3
Frequency of searching for information about pregnancy on the Internet	Never	2	1.1
	Rarely	39	21.7
	Occasionally	59	32.8
	Frequently	73	40.6
	Every Day	7	3.9

Abbreviations: $\bar{x}$: Arithmetic Mean; $\pm$: Standard Deviation; **Min**: Minimum; **Max**: Maximum

As illustrated in Figure 1, which displays the distribution of pregnant women according to their complication status, the three most prevalent complications were identified as miscarriage risk, gestational diabetes, and developmental delay-advanced pregnancy, respectively. The least common pregnancy complications were excessive vomiting, multiple pregnancy, and oligohydramnios.

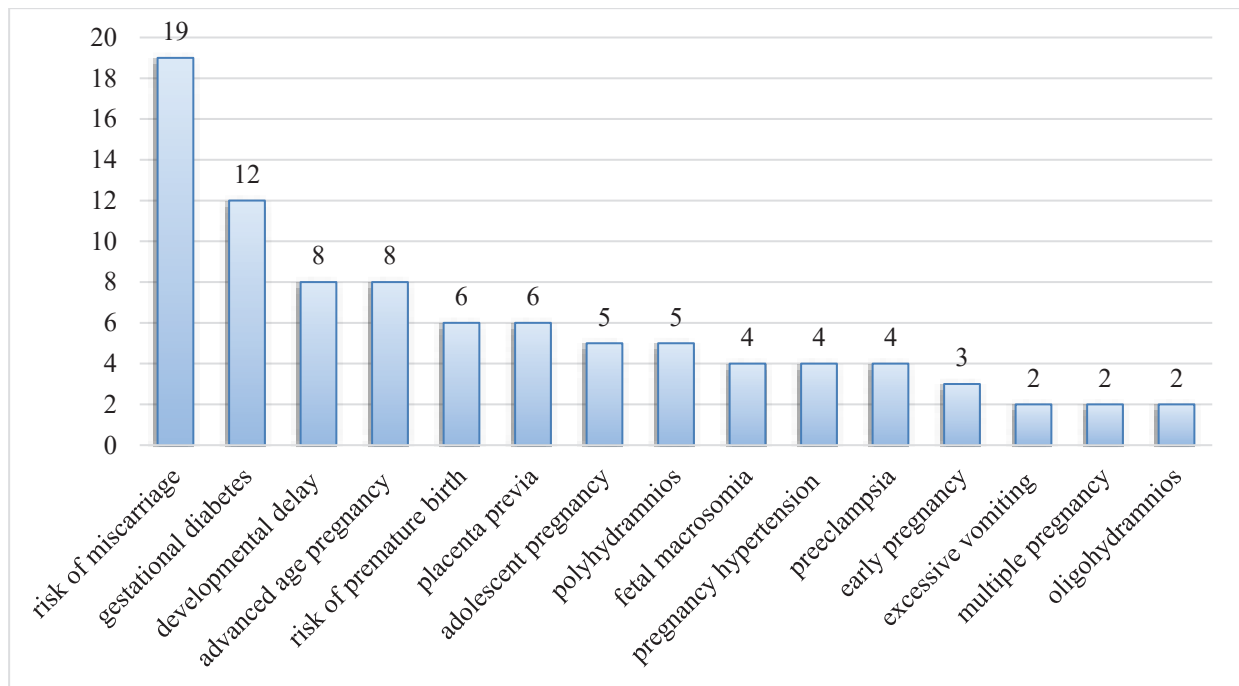


Figure 1. Distribution of Pregnant Women's Complication Status

Looking at Table 2, which includes the descriptive statistics and correlation analysis results of the scales, it is understood that pregnant women have an above-average level of e-health literacy (27.00 ± 4.29) and cyberchondria (40.00 ± 5.21). Furthermore, the findings indicate a positive, significant, and high-level relationship between e-health literacy and cyberchondria variables ($r=0.653$; $p<0.001$).

Table 2. Descriptive Statistics and Correlation Analysis of the Scales

Scales	$\bar{x} \pm$	Min-Max	Low and High Values	Skewness	Kurtosis	C. Alpha	1	
							r	p
E-Health Literacy (1)	27.00 ± 4.29	8-40	12-38	-0.48	0.76	0.79	—	
Cyberchondria (2)	40.00 ± 5.21	12-60	20-55	-0.15	1.26	0.81	0.653	0.000**

** $p<0.01$

Table 3 contains the analysis of the differences between the descriptive characteristics of the pregnant women and the scale means, and it shows that there are statistically significant differences between the general complication status and the means of both the e-health literacy and the cyberchondria scales ($p<0.05$). For both scales, it was determined that these significant differences were caused by women with pregnancy complications.

The results indicated that there were no statistically significant differences between the mean level of education and income of pregnant women and the mean level of e-health literacy ($p>0.05$). However, there were significant differences in terms of the mean level of cyberchondria ($p<0.05$). The Tukey post-hoc test revealed that this significant difference in terms of education level variable was between pregnant women with postgraduate education level and those with primary, high school, and university level education. In regard to the income level variable, a significant discrepancy was identified between pregnant women whose income equaled their expenses and those whose income exceeded their expenses.

Statistical analysis reveals significant differences ($p<0.05$) between the average daily Internet use of pregnant women and the mean scores of both the e-health literacy and cyberchondria scales. The Tukey post-hoc test revealed that these significant differences for both scales were between women who reported using the Internet for 0-1 hour and those who reported using the Internet for 1-3 hours, 3-5 hours, and at least 5 hours. Furthermore, a statistically significant relationship was identified between the frequency of searching for pregnancy-related information on the Internet and the mean of both scales ($p < 0.05$). The Tukey post-hoc test further revealed statistically significant differences between women who reported rarely using the Internet and those who reported using it occasionally, frequently, or every day. Conversely, the analysis revealed no statistically significant differences between the age, employment status, number of pregnancies, and gestational weeks of pregnant women and the means of both e-health literacy and cyberchondria scale scores. Additionally, the findings indicated no statistically significant differences between the mean levels of education and income of pregnant women and the mean levels of e-health literacy ($p > 0.05$), yet significant differences were observed in terms of the mean level of cyberchondria ($p < 0.05$). The Tukey post-hoc test revealed a significant discrepancy in the education level variable, distinguishing between pregnant women with postgraduate education and those with primary, high school, and university education. In regard to the income level variable, a significant difference was observed between pregnant women whose income was equal to their expenses and pregnant women whose income was higher than their expenses ($p>0,05$).

Table 3. Analysis of Differences Between Pregnant Women's Descriptive Characteristics and Scale Means

Variables	Groups	n	%	E-Health Literacy Scale		Cyberchondria Scale	
				$\bar{x} \pm$	t/F (p)	$\bar{x} \pm$	t/F (p)
General Complication Status	Yes	90	50.0	27.92 $\pm$ 4.08	t= 2.986	41.88 $\pm$ 6.12	t= 2.431
	No	90	50.0	26.08 $\pm$ 4.32	p= 0.003	39.12 $\pm$ 6.48	p= 0.016*
Age ($\bar{x}$ =28 $\pm$ 5.5; Min=18; Max=40)	18-28	97	53.9	26.88 $\pm$ 4.56	t= -0.276	40.32 $\pm$ 6.84	t= 0.253
	29-40	83	46.1	27.12 $\pm$ 4.00	p= 0.783	40.68 $\pm$ 6.00	p= 0.801
Employment Status	Working	57	31.7	27.28 $\pm$ 5.20	t= 0.583	40.92 $\pm$ 7.80	t= -0.590
	Not working	123	68.3	26.88 $\pm$ 3.76	p= 0.560	40.32 $\pm$ 5.64	p= 0.556
Education Level	Primary education	48	26.7	26.48 $\pm$ 4.08		39.72 $\pm$ 6.12	
	High School	77	42.7	26.56 $\pm$ 3.60	F= 2.498	39.84 $\pm$ 5.40	F= 3.999
	University	50	27.8	28.32 $\pm$ 4.72		42.48 $\pm$ 7.08	p= 0.009**
	Postgraduate	5	2.8	25.04 $\pm$ 8.24	p= 0.061	37.56 $\pm$ 12.36	4<1.2.3
Income Level	Income<Expense	38	21.1	27.04 $\pm$ 4.48		40.56 $\pm$ 6.72	F= 4.918
	Income=Expense	108	60.0	26.64 $\pm$ 3.44	F= 1.653	39.96 $\pm$ 5.16	p= 0.008**
	Income>Expense	34	18.9	28.16 $\pm$ 6.08	p= 0.194	42.24 $\pm$ 9.12	2<1
Number of Pregnancy ($\bar{x}$ =2.11 $\pm$ 0.94; Min=1; Max=5)	1st pregnancy	51	28.3	27.76 $\pm$ 4.64		41.64 $\pm$ 6.96	
	2nd pregnancy	74	41.1	26.96 $\pm$ 4.72	F= 1.734	40.44 $\pm$ 7.08	F= 2.430
	3rd pregnancy	44	24.4	26.48 $\pm$ 3.12		39.72 $\pm$ 4.68	
	4th pregnancy	7	3.9	27.60 $\pm$ 1.84		41.40 $\pm$ 2.76	
	5th pregnancy	4	2.3	22.48 $\pm$ 2.88	p= 0.145	33.72 $\pm$ 4.32	p= 0.050

Pregnancy Week ($\bar{x}=20.83 \pm 9.2$; Min=4; Max=39)	04-12 weeks	37	20.5	26.56 $\pm$ 4.88	39.84 $\pm$ 7.32	F= 1.346
	13-21 weeks	66	36.7	27.36 $\pm$ 3.36	41.04 $\pm$ 5.04	F= 0.311
	22-30 weeks	45	25.0	26.96 $\pm$ 5.04	40.44 $\pm$ 7.56	p= 0.261
	31-39 weeks	32	17.8	26.80 $\pm$ 4.24	40.20 $\pm$ 6.36	p= 0.817
Daily Internet Usage Time	0-1 hour	4	2.3	19.76 $\pm$ 10.32	29.64 $\pm$ 15.48	F= 7.326
	1-3 hours	63	35.0	26.80 $\pm$ 4.88	40.20 $\pm$ 7.32	p= 0.000**
	3-5 hours	89	49.4	27.12 $\pm$ 3.20	40.68 $\pm$ 4.80	1<2.3.4
	5 hours and above	24	13.3	28.40 $\pm$ 3.92	42.60 $\pm$ 5.88	
Frequency of searching for information about pregnancy on the Internet	Never	2	1.1	31.52 $\pm$ 0.72	47.28 $\pm$ 1.08	F= 3.001
	Rarely	39	21.7	24.80 $\pm$ 5.52	37.20 $\pm$ 8.28	p= 0.020*
	Occasionally	59	32.8	27.12 $\pm$ 3.84	40.68 $\pm$ 5.76	
	Frequently	73	40.6	27.44 $\pm$ 3.20	41.16 $\pm$ 4.80	2<3.4.5
	Every Day	7	3.9	32.00 $\pm$ 4.16	48.00 $\pm$ 6.24	

*p<0.05; **p<0.01

Table 4 shows the results of the regression analysis, which indicates that the independent variable of e-health literacy has a significant effect on the dependent variable of cyberchondria at the level of 42.7% ($F=132.663$; $t=11.518$; $p<0.01$; $R^2=0.427$).

Table 4. Regression Analysis Results

Independent Variable	Dependent Variable	t	F	p	R ²	Lower Limit	Upper Limit
E-Health Literacy	Fixed	9.819	132.663	0.000**	0.427	1.235	1.856
	Cyberchondria	11.518				0.440	0.622

** $p<0.01$

DISCUSSION

This study examined the relationship between e-health literacy and cyberchondria in pregnant women and explored how health behaviors and information-seeking processes are affected during pregnancy. The findings indicated that there were significant differences between pregnant women with and without complications. Specifically, the study found that women experiencing complications exhibited higher levels of e-health literacy, indicating an augmented capacity to access and comprehend online health information. Concurrently, the cyberchondria levels were higher in this group, indicating an intensification of health concerns and a tendency to engage in excessive information-seeking on the Internet. This study makes an original contribution to the literature on digital health behaviors in pregnancy by examining the interaction between cyberchondria and e-health literacy in the case of complications.

The findings of this study suggest a correlation between the increasing tendency of expectant mothers to seek online health information and the widespread use of digital platforms. The e-health literacy scores of pregnant women in this study were found to be above average, indicating a heightened propensity to utilize online health resources. This inclination is particularly pronounced among pregnant women facing complications, potentially due to their heightened need for information regarding their health status in clinically risky situations. It has been documented that the onset of any unusual symptom during pregnancy is associated with an escalation in anxiety levels among expectant mothers, subsequently prompting an increase in online information-seeking behaviors (McElroy et al., 2019). Consequently, the utilization of online health information also rises. A previous study conducted in Turkey found a positive yet weak relationship between women's health literacy perceptions and cyberchondria levels (Özkan, Sungur, & Özer, 2021). A separate study found

that pregnant women with allergies exhibited higher levels of cyberchondria (Gökmen, Gökmen & Sariboğa, 2022). In pregnant women experiencing medical complications, pregnancy-specific anxiety emerged as the predominant predictor of cyberchondria (Šoštarić et al., 2024). Additionally, research has identified that factors such as the presence of chronic diseases and the first trimester of pregnancy have a significant impact on cyberchondria levels (Kut, Ogulluk & Akbiyik, 2024). This phenomenon complicates the relationship with health professionals and creates a burden on individuals due to information pollution. Consequently, enhancing digital health literacy not only ensures access to reliable information but also plays a crucial role in balancing anxiety levels through access to accurate and reliable information and effective use of health services (Kırık & Çetinkaya, 2022).

Although no statistically significant difference was observed between education and income levels and e-health literacy, these socio-demographic variables were found to have significant effects on cyberchondria levels. In particular, the lower cyberchondria scores of pregnant women with postgraduate education compared to pregnant women with other levels of education indicate that the high-level cognitive skills of these individuals help them evaluate online health information more critically. It has been emphasized in many studies that higher education level increases individuals' media literacy, information extraction, and source evaluation skills, which may reduce the impact of content that may produce excessive anxiety (Kırık & Çetinkaya, 2022; Norman & Skinner, 2006). This finding suggests that the relationship between digital literacy and health anxiety depends on how information is interpreted rather than access to information. Similarly, the fact that individuals with higher income levels have lower cyberchondria levels indicates that these individuals may have developed skills to access more reliable and academic content, as well as having wider access to digital information and a wider variety of resources (Tunç, Demirci & Şahin, 2023). The findings that socioeconomic status plays a determining role in the quality of individuals' access to information and their coping strategies with information support the results of this study (Jafarabadi et al., 2021).

Although the direct impact of education and income level on e-health literacy is limited, these variables greatly shape individuals' ability to critically and consciously interpret digital health information (Nam & Ha, 2024). A study conducted among university students revealed that participants encountered challenges in critically evaluating online health information despite their familiarity with technology. This observation underscores the notion that e-health literacy involves not only access to information but also the ability to analyze

information (Oliveira et al., 2024). Consequently, interventions aimed at enhancing digital health literacy must prioritize not only the dissemination of technical knowledge but also the cultivation of critical thinking skills, the development of information filtering capabilities, and the promotion of the recognition of reliable sources.

The present study found that digital health literacy and cyberchondria scores increased statistically significantly as the duration of daily internet use increased. Specifically, participants who accessed the Internet for only 0-1 hours a day exhibited significantly lower scores on both scales compared to other groups. A positive correlation was identified between problematic internet use and both cyberchondria and e-health literacy. The 18-30 age group exhibited particularly high scores for these three variables. This finding suggests a duality of outcomes, with prolonged internet use potentially exerting both beneficial (e.g., enhanced literacy) and detrimental (e.g., cyberchondria) effects (Aslantaş & Altuntaş, 2023). In a separate study, a significant and positive relationship was identified between internet addiction and cyberchondria, with a notable escalation in cyberchondria levels observed among individuals who used the Internet for more than 2-3 hours (Yorulmaz, Göde, Aydoğdu & Dilekçi, 2025). A similar relationship was identified in a study conducted on teachers, where increased access to digital health information was found to be associated with heightened anxiety, suggesting a potential link between e-health literacy and cyberchondria (Demir, Dağ & Özpınar, 2023). This increased level of anxiety associated with access to information indicates that digital literacy skills should be developed not only at the technical level but also in terms of critical evaluation and emotional balance (Kırık & Çetinkaya, 2022). This phenomenon aligns with the prevailing perspective that enhanced access to health-related information may result in an excess of data, thereby inducing increased levels of anxiety in individuals (Jiang, Cao, Suomi & Zha, 2024). The efficacy of cognitive-behavioral support programs for women and health communication-based awareness studies is considered promising, particularly during pregnancy, a period when health anxiety can have direct individual and fetal consequences. Digital literacy skills can be enhanced through a variety of strategies. Attendance in digital literacy courses on online platforms (e.g., Udemy, Coursera) or local training workshops is recommended. Practicing with various digital tools and leveraging social media effectively is also recommended (Kırık & Çetinkaya, 2022).

CONCLUSION

The findings of this study indicate that physicians and healthcare professionals should closely monitor pregnant women's digital behaviors and inform those at risk of pregnancy complications about internet-induced anxiety. Moreover, the development of programs aimed at enhancing e-health literacy should address not only the accessibility of information but also the skills of information verification and anxiety management in the digital environment. By implementing these strategies, we can foster a more informed and controlled approach to pregnancy, thereby reducing excessive anxiety among women who are vulnerable to pregnancy complications and supporting healthy information-seeking behaviors.

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CHAPTER 7

ECO-INNOVATION, GLOBALIZATION, AND ECOLOGICAL FOOTPRINT IN BRICS NATIONS: AN ASYMMETRIC PANEL ARDL ANALYSIS

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1 Introduction

The BRICS economies-Brazil, Russia, India, China, and South Africa-occupy a paradoxical position in global sustainability governance. They represent approximately 21% of global GDP, 40% of global population, and consume nearly 40% of global energy (Mahalik et al., 2021). Yet their per capita ecological footprints have risen sharply over recent decades (Alola et al., 2022), placing them among the dominant contributors to planetary boundary transgressions. India and China alone account for 82% of BRICS CO₂ emissions, and neither country anticipates emission reductions before 2030 (Baskaya et al., 2022; Dingru et al., 2021). This trajectory places the Sustainable Development Goals-particularly SDG-7 (clean energy), SDG-13 (climate action), and SDG-15 (life on land)-at serious risk. Prior studies have examined ecological footprint determinants in BRICS using a variety of panel estimators, consistently finding that economic growth drives footprint expansion while renewable energy reduces it (Ojekemi et al., 2022; Alola et al., 2021). However, two important dimensions remain underexplored. First, eco-innovation-quantified as environmental-related technologies (ECO) from the OECD-has received mixed attention in BRICS studies; Fethi and Rahuma (2020) and Wang et al. (2020) find ecoinnovation reduces CO₂ in the USA and G-7 respectively, yet Sadiq et al. (2023) and Koengkan et al. (2023) document a positive nexus for ASEAN and European countries. Second, globalization's ecological role is contested between the pollution halo hypothesis (PHH)-which posits that globalization transfers clean technologies and reduces ecological damage-and the pollution haven hypothesis (PHvH), which argues that globalization shifts pollution to countries with lax regulations (Rahman, 2020; Sharif et al., 2022). Critically, existing BRICS ecological footprint studies rely on linear estimators that impose symmetry: they assume positive and negative shocks in eco-innovation and globalization have equal-but-opposite effects. This assumption is untenable. A period of rising eco-innovation investment involves short-run adjustment costs (new infrastructure, retraining, regulatory compliance) that may temporarily increase the ecological footprint before long-run benefits accrue. Similarly, increasing globalization (technology transfer) may operate differently from globalisation contraction (trade withdrawal). The nonlinear asymmetric Panel ARDL framework (Shin et al., 2014) is specifically designed to distinguish these dynamics. This paper makes three contributions. (i) It is the first to jointly examine eco-innovation and globalization with asymmetric decomposition-as ecological footprint determinants in BRICS. (ii) It reveals an ecoinnovation paradox: positive eco-innovation shocks reduce ecological footprint in the long run but temporarily increase it in the short run. (iii) It provides the first

asymmetric test of PHH versus PHvH for BRICS, finding long-run support for PHH exclusively via positive globalization shocks.

Section 2 reviews theory and evidence. Section 3 describes data and methodology. Section 4 presents results. Section 5 concludes with policy implications.

2 Literature Review and Theoretical Framework

2.1 Theoretical Framework

Three theoretical frameworks anchor this study. The Environmental Kuznets Curve (EKC) hypothesis (Grossman and Krueger, 1995) predicts an inverted-U relationship between income and environmental degradation: ecological footprint rises during early economic development but eventually declines as clean technologies and environmental preferences gain traction. In BRICS, the preponderance of evidence confirms the ascending limb (Ojekemi et al., 2022; Yilanci and Pata, 2020). The Pollution Halo Hypothesis (PHH) posits that globalization-through FDI and technology transfer from industrialised to emerging economies-diffuses cleaner production methods, reducing ecological damage in host nations (Shahbaz et al., 2018). In contrast, the Pollution Haven Hypothesis (PHvH) argues that firms relocate to countries with weaker environmental regulations, raising host-country ecological damage (Rahman, 2020). Which hypothesis prevails depends on whether globalization primarily brings clean technology (halo) or polluting capital (haven). Environmental Modernization Theory argues that eco-innovation-the development and deployment of environmental technologies-reduces ecological pressure over the long run by improving production efficiency and substituting clean for dirty inputs. However, the theory acknowledges that transition costs create a short-run ecological burden before long-run gains materialise (Wang et al., 2020; Lee and Min, 2015).

2.2 Empirical Review and Research Gaps

Ecological footprint studies for BRICS consistently document GDP's positive effect and renewable energy's negative effect (Ojekemi et al., 2022; Alola et al., 2021; Destek and Sarkodie, 2019). For eco-innovation, Wang et al. (2020) (G-7), Fethi and Rahuma (2020) (USA), and Lee and Min (2015) (Japan) find eco-innovation reduces CO₂, while Sadiq et al. (2023) (ASEAN) and Van Song et al. (2022) (USA, QARDL) and Koengkan et al. (2023) (Europe, MM-QR) find a positive nexus-results that appear conflicting but may reflect the asymmetric nature of eco-innovation investments. For globalization, Acheampong et al. (2022) and Ahmad et al. (2021) find globalization improves ecological quality in Australia and G-7,

supporting PHH. Destek (2020) finds the reverse in CEECs, consistent with PHvH. Aziz et al. (2021) documents PHH support in BRICS using a linear model. The key gap is that no study has tested PHH asymmetrically for BRICS ecological footprint, and none has jointly modelled eco-innovation alongside globalization in a nonlinear framework.

3 Data and Methodology

3.1 Data Sources and Variable Description

Table 1 describes the six variables. The sample covers five BRICS nations (Brazil, Russia, India, China, South Africa) for 1990-2018 (145 observations). All variables are log-transformed prior to estimation.

Table 1: Variable Description

Variable	Sign	Unit	Source
Ecological Footprint	ECF	Global hectares per capita	GFN
Economic Growth	GDP	GDP per capita (USD 2015)	World Bank
Renewable Energy	REC	kWh per capita	Our World in Data
Non-Renewable Energy	NREC	kWh per capita	Our World in Data
Eco-Innovation	ECO	Environmental tech. index	OECD
Globalization	GLO	KOF Globalization Index	KOF

Descriptive statistics (Table 2) reveal that the mean log-ECF is 0.941 , with moderate negative skewness (-0.693), indicating slight right-tail concentration of ecological pressure. NREC has the highest mean (8.252), reflecting BRICS nations' continued heavy reliance on fossil-based non-renewable energy.

Table 2: Descriptive Statistics (log-transformed values)

	ECF	GDP	ECO	GLO	NREC	REC
Mean	0.941	7.944	2.139	3.699	8.252	6.056
Median	1.087	8.151	2.214	3.774	8.291	6.595
Maximum	1.922	9.678	2.821	4.072	10.385	8.580
Minimum	-0.272	5.707	0.879	2.690	6.721	3.023
Std. Dev.	0.598	1.087	0.367	0.291	1.043	1.358
Skewness	-0.693	-0.527	-0.999	-1.288	0.318	-0.778

3.2 Model Specification

The asymmetric Panel ARDL model (Shin et al., 2014) decomposes each regressor into positive (X^+) and negative (X^-) partial sums:

$$X_{it}^+ = \sum_{j=1}^t \max(\Delta X_{ij}, 0), X_{it}^- = \sum_{j=1}^t \min(\Delta X_{ij}, 0) \quad (1)$$

The ecological footprint model is:

$$\ln ECF_{it} = \alpha_i + \sum_k (\beta_k^+ \ln X_{kit}^+ + \beta_k^- \ln X_{kit}^-) + \varepsilon_{it} \quad (2)$$

where $X_k \in \{GDP, REC, NREC, ECO, GLO\}$. Long-run asymmetry holds when $\beta_k^+ \neq \beta_k^-$.

3.3 Econometric Methods

The estimation proceeds as follows. (1) Cross-Sectional Dependence and Slope Heterogeneity: Pesaran (2015) CD test and Pesaran and Yamagata (2008) SH test determine whether second-generation methods are required. (2) Unit Root: CIPS and CADF tests (Pesaran, 2007) accommodate CSD; NREC is stationary at level $I(0)$ while other series are $I(1)$. (3) Cointegration: The Westerlund (2008) second-generation test, robust to CSD and mixed $I(0)/I(1)$ integration orders, validates the long-run relationship. (4) Asymmetric Estimation: Nonlinear Panel ARDL estimates separate long-run and short-run coefficients for positive and negative shocks. (5) Causality: The Dumitrescu and Hurlin (2012) test identifies causal directions among variables.

4 Results and Discussion

4.1 Diagnostic Tests and Cointegration

The SH test confirms slope heterogeneity across BRICS ($\hat{\Delta} = 10.383, p < 0.01; \hat{\Delta}_{adj} = 11.483, < 0.01$). CD test statistics are significant at 1% for all variables (GDP: 10.938; REC: 17.930; NREC: 13.635; ECO: 12.947; GLO: 16.187), confirming cross-sectional interdependence consistent with BRICS trade and institutional linkages. CIPS and CADF results (Table 3) confirm that NREC is stationary at level $I(0)$ while ECF, GDP, REC, ECO, and GLO become stationary only at first difference $I(1)$. The Westerlund cointegration test yields significant robust p -values (Table 4), confirming a long-run equilibrium between ecological footprint and the five regressors.

Table 3: CIPS and CADF Unit Root Test Results

Variable	CIPS		CADF	
	I(0)	I(1)	I(0)	I(1)
ECF	-1.038	-4.040*	-2.034	-3.740*
GDP	-1.495	-4.246*	-1.949	-4.576*
REC	-1.938	-4.772*	-1.535	-5.489*
NREC	-3.048**	-	-3.947*	-
ECO	-1.849	-4.841*	-2.138	-4.947*
GLO	-1.254	-4.394*	-1.483	-5.037*

Note: * and ** denote 1% and 5% significance. NREC is I(0).

Table 4: Westerlund (2008) Cointegration Test

Statistic	Value	Z-value	p-value	Robust p
G_t	-3.293	-2.604	0.005	0.000
G_a	-8.947	3.048	0.847	0.000
P_t	-16.203	-9.947	0.000	0.050
P_a	-11.847	1.404	0.874	0.000

Note: Cointegration confirmed via robust p -values.

4.2 Asymmetric Panel ARDL Results

Table 5 presents the long-run and short-run asymmetric ARDL estimates. Several key findings emerge. Economic growth (GDP): Positive GDP shocks significantly increase ecological footprint in both the long run ($+0.833^*$) and short run ($+1.003^*$). This confirms the EKC ascending limb: BRICS economic expansion continues to generate ecological costs through fossil-fuel-powered industrialization (Grossman and Krueger, 1995; Ojekemi et al., 2022). Notably, negative GDP shocks (economic contractions) do not significantly reduce ecological footprint in the long run ($p = 0.392$), but do cause a short-run reduction (-0.670^*). This asymmetry implies that ecological restoration from economic downturns is a temporary phenomenon, not a structural improvement-once growth resumes, footprints rebound. Renewable energy (REC): Positive REC shocks significantly reduce ecological footprint in the long run (-0.630^{**}), confirming that clean energy expansion reduces ecological pressure. This is consistent with Kirikkaleli and Adebayo (2021) and Awosusi et al. (2022). Negative

REC shocks are insignificant renewable energy withdrawal does not symmetrically worsen ecological quality, perhaps because the baseline fossil energy infrastructure absorbs the slack. Non-renewable energy (NREC): Both positive ($+1.027^*$) and negative ($+0.725^{**}$) NREC shocks significantly increase ecological footprint in the long run. This persistent positive effect-even for declining non-renewable energy-signals structural lock-in: BRICS fossil fuel infrastructure generates ecological damage regardless of marginal changes in consumption. This finding reinforces the urgency of full energy transition rather than incremental fossil reduction. Eco-innovation (ECO): Positive ECO shocks reduce ecological footprint in the long run (-0.064^{***}), confirming the environmental modernization hypothesis. However, positive ECO shocks increase footprint in the short run ($+0.081^{***}$)-a transitional cost consistent with the resource requirements and disruptions associated with scaling up environmental technologies (Wang et al., 2020; Lee and Min, 2015). Negative ECO shocks are insignificant in both periods, implying that withdrawal of eco-innovation investment does not immediately worsen ecological outcomes. Globalization (GLO): Positive GLO shocks significantly reduce ecological footprint in the long run (-0.281^*), supporting the pollution halo hypothesis: BRICS nations benefit from technology transfer and energy-efficient production practices as globalization deepens (Acheampong et al., 2022; Shahbaz et al., 2018). Negative GLO shocks are insignificant in both the long and short run, indicating that globalization contraction does not symmetrically damage BRICS ecological quality-perhaps because domestic production substitutes for traded goods.

Table 5: Asymmetric Panel ARDL Results (Dependent Variable: $\ln ECF$)

Variable	Long-Run		Short-Run	
	Coeff.	p	Coeff.	p
GDP (+)	+0.833*	0.001	+1.003*	0.000
GDP (-)	-0.384	0.392	-0.670*	0.006
REC (+)	-0.630**	0.038	n.s.	0.085
REC (-)	-0.374	0.616	-0.103	0.638
NREC (+)	+1.027*	0.000	+1.182**	0.026
NREC (-)	+0.725**	0.020	+0.836***	0.075
ECO (+)	-0.064***	0.082	+0.081***	0.055
ECO (-)	0.836	0.547	0.293	0.947
GLO (+)	-0.281*	0.001	-0.394	0.373
GLO (-)	0.762	0.273	-0.283	0.638

Note: *, **, *** denote 1%, 5%, 10% significance.

4.3 Causality Analysis

Table 6 reports Dumitrescu-Hurlin causality results. A bidirectional causal relationship exists between GDP and ECF ($W_{GDP \rightarrow ECF} = 4.656^{**}$; $W_{ECF \rightarrow GDP} = 5.832^{*}$). This feedback loop implies that deteriorating ecological quality eventually constrains economic potential—a long-run mechanism that BRICS growth models currently ignore. In the short run, BRICS growth drives ecological degradation; in the long run, ecological degradation may throttle growth through resource depletion, health costs, and regulatory backlash. Unidirectional causality runs from ECO to ECF ($W = 5.189^{*}$, $p = 0.006$), from GLO to ECF ($W = 4.906^{**}$, $p = 0.012$), from NREC to ECF ($W = 6.185^{*}$, $p = 0.000$), and from REC to ECF ($W = 4.097^{***}$, $p = 0.081$). The absence of reverse causality from ECF to these drivers confirms that ecoinnovation, globalization, and energy variables are exogenous drivers of ecological outcomes—making them actionable policy levers.

Table 6: Dumitrescu-Hurlin Causality Results

Null Hypothesis	W -stat.	$\bar{Z}$ -stat.	p
GDP $\rightarrow$ ECF	4.656	2.258	0.023**
ECF $\rightarrow$ GDP	5.832	3.339	0.000*
ECO $\rightarrow$ ECF	5.189	2.748	0.006*
ECF $\rightarrow$ ECO	2.397	0.181	0.856
GLO $\rightarrow$ ECF	4.906	2.488	0.012**
ECF $\rightarrow$ GLO	2.248	0.044	0.964
NREC $\rightarrow$ ECF	6.185	3.663	0.000*
ECF $\rightarrow$ NREC	0.972	-1.128	0.258
REC $\rightarrow$ ECF	4.097	1.744	0.081***
ECF $\rightarrow$ REC	1.823	-0.345	0.729

Note: *, **, *** denote 1%, 5%, 10% significance.

5. Conclusion and Policy Implications

This study is the first to apply nonlinear asymmetric Panel ARDL to jointly examine eco-innovation, globalization, and disaggregated energy as ecological footprint determinants in BRICS over 1990-2018. Five key conclusions emerge. (1) Economic growth asymmetrically drives ecological footprint expansion—positive growth shocks have lasting ecological costs while contractions provide only temporary relief. (2) Renewable energy's ecological benefit is asymmetric—clean energy expansion reduces footprint, but its removal is ecologically neutral, creating a ratchet-like improvement from each expansion phase. (3) Non-renewable energy causes persistent ecological damage in both directions, signalling structural fossil fuel lock-in. (4) Eco-innovation reduces ecological footprint in the long run (-0.064%) but at a short-run transitional cost—policymakers must adopt a patient investment horizon. (5) Globalization supports ecological quality exclusively through positive shocks (-0.281%), confirming PHH: technology transfer via trade and FDI improves BRICS ecological quality over the long run. Based on these findings, we offer three targeted policy recommendations. First, BRICS governments should design globalization strategy to attract technology-intensive, low-emission FDI rather than pollution-haven capital; preferential tax and regulatory treatment for clean-technology investments would accelerate PHH-consistent outcomes. Second, eco-innovation investment should be sustained beyond the short run—governments should protect eco-

innovation budgets during economic downturns when the temptation to cut R&D is highest, since the long-run ecological dividends require sustained commitment. Third, the structural lock-in of non-renewable energy demands a system-level energy transition strategy: gradual substitution is insufficient; BRICS nations need binding timelines for fossil infrastructure retirement aligned with their NDC commitments under the Paris Agreement. These recommendations reinforce SDG-7 (affordable and clean energy), SDG-13 (climate action), and SDG-17 (partnerships for technology sharing).

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