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The Relationship Between Epistemological Stance, Mode of Reasoning and Methodological Approach: Critical Realism as the Basis for Research into Supply Chain Resilience

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Abstract:

This article highlights the importance of ensuring coherence between the epistemological stance, the mode of reasoning, and the research methodology in scientific inquiry, particularly in the analysis of supply chain resilience.

In the face of the complexity of modern logistics systems, critical realism emerges as an appropriate paradigm, as it reconciles the causal explanation of positivism with the interpretive understanding of the social sciences. Supported by abductive reasoning, this approach enables the progressive construction of knowledge through continuous interaction between theory and empirical observation. Methodologically, the use of a mixed-methods approach—combining qualitative and quantitative tools—promotes a comprehensive understanding of the phenomenon under study. Altogether, this framework provides a coherent basis for examining supply chain resilience in a manner that is both rigorous and context-sensitive.

Keywords: Supply chain resilience, critical realism, abductive reasoning, mixed methods.

1- INTRODUCTION

All scientific research is based on a clear epistemological position, ensuring consistency between the conception of knowledge, the mode of reasoning and the methodology adopted. In the field of management sciences, where the phenomena studied are often complex, multidimensional and contextualised, this consistency is essential to ensure the validity and relevance of the results produced.

In the field of management, and more specifically in supply chain management, contemporary economic and organisational changes have led to a re-examination of these foundations in order to better understand complex phenomena such as supply chain resilience.

The study of supply chain resilience, understood as the ability of a supply chain to anticipate, absorb, adapt and recover from disruptions (Moukadem, K & Elkharraz, A, 2024), is now a major issue in the field of supply chain management (SCM). Indeed, supply chain resilience is not a simple or one-dimensional phenomenon; it involves organisational

processes, behavioural dynamics, physical structures and social representations (KADA, A & Bahi, S., 2021). This multidimensional nature requires in-depth reflection on the epistemological foundations of research and on the consistency between stance, reasoning and method.

The paradigm of critical realism is consistent with this logic of coherence. Situated at the crossroads of positivism and interpretivism, it postulates the existence of an objective reality, but admits that this can only be imperfectly apprehended through the researcher's cognitive and social constructs (Bhaskar, 1998). This paradigm thus provides a suitable framework for studying organisational phenomena such as supply chain resilience, which involve both structural dimensions and interpretative processes.

This work therefore aims to present and justify the epistemological position adopted in the context of research on supply chain resilience. The aim is to show how the critical realism paradigm provides a coherent conceptual and methodological foundation that is consistent with the nature of the phenomenon under study and the objectives of the research.

The article is divided into four main sections. The first provides an overview of supply chain resilience, highlighting its multidimensional nature. The second section presents the epistemological foundations of the research, highlighting the characteristics of critical realism and the reasons for adopting it as a reference framework for studying supply chain resilience. The third part will examine the mode of reasoning favoured in this paradigm, emphasising the relevance of the abductive approach, which allows empirical observations to be linked to theoretical frameworks through an iterative and reflexive process. Finally, the fourth part will present the methodological approach adopted, based on a mixed approach combining qualitative and quantitative methods, in order to ensure an in-depth and contextualised understanding of the phenomenon under study.

2- Supply chain resilience: a complex and multidimensional concept

Supply chain resilience is now a key issue for organisations operating in an environment characterised by uncertainty and increased frequency of disruptions (Christopher & Peck, 2004). It refers to the ability of a logistics system to anticipate, absorb, adapt and recover from a crisis while maintaining a satisfactory level of performance (Ponomarev & Holcomb, 2009). This concept goes beyond simple business continuity; it reflects a dynamic ability to adapt and learn, rooted in the structural and functional complexity of contemporary supply chains (Wieland & Wallenburg, 2013).

The complexity of the concept stems from its multidimensional nature, involving organisational, technological, human and strategic dimensions (Tukamuhabwa et al., 2015; Chen, H. & Ivanov, D., 2019).

ly, resilience relies on flexible structures, redundant resources and the ability to quickly reorganise flows and processes in the event of disruptions (Brandon-Jones et al., 2014). Effective coordination, fluid communication and collaborative governance strengthen the system's resilience to shocks (Christopher & Peck, 2004).

From a technological perspective, integrated information systems and digital technologies are essential levers. Tools such as artificial intelligence, real-time traceability and scenario simulation support early risk detection and rapid decision-making (Hosseini et al., 2019; Aydiner, A., 2017). These technologies contribute to greater supply chain integration, a key attribute of resilience (K. Moukadem and A. Elkharraz, 2019; K. Moukadem and A. Elkharraz, 2024).

The human dimension also plays a decisive role. The skills, responsiveness and collective learning capacity of stakeholders play a crucial role in how the chain responds to crises (Sinapin, M. N., 2020). Mutual trust, leadership and organisational culture promote behavioural and relational resilience among logistics partners (Scholten et al., 2015).

Finally, at the strategic level, resilience is based on a proactive approach to risk management and a systemic view of the supply chain (Biedermann et al., 2018). It involves a balance between efficiency and redundancy, flexibility and robustness, short-term and long-term (Sheffi Y., 2005). This integrative approach leads to resilience being conceived not as a static state, but as an evolving process of organisational transformation and learning (Wieland & Durach, 2021).

Thus, supply chain resilience is not limited to post-crisis recovery capacity; it is part of a systemic dynamic that articulates resources, technologies, behaviours and strategies. Understanding this multidimensional complexity is essential for designing supply chains that are not only able to withstand disruptions, but also to leverage them to strengthen their competitiveness and sustainability.

3- Epistemological paradigms and positioning adopted

In order to understand the methodological choices made in a piece of research, it is first necessary to consider the epistemological level (Nassou Y. and Bennani Z., 2024).

Epistemology refers to "a branch of philosophy specialising in the study of theories of knowledge" (Gavard-Perret et al 2012). This latter quires what science is by discussing the nature, method or value of knowledge (Perret and Séville, 2007, p.13).

Epistemological positioning indicates how researchers conceive of reality and provides them with clear answers about "the nature of the reality they think they understand, the relationship they have with their research subject, and the process by which they produce knowledge" (Thiéart, 2014).

All research work aimed at studying and producing knowledge is influenced by major schools of thought, known as epistemological paradigms. These paradigms require not only methodological reflection, but also clarification of the object to be studied and a coherent justification of how knowledge will be legitimised.

3-1 Classical epistemological paradigms

"An epistemological paradigm is a conception of knowledge shared by a community, based on a coherent system of founding hypotheses relating to the questions studied by epistemology" (M.L. Gavard-Perret et al., 2012). It is therefore a way of seeing and understanding knowledge according to a well-defined system.

The epistemological paradigm is closely linked to the initial ontological postulate. It reflects the way in which knowledge is produced and the nature of the relationship between the researcher and the phenomenon being studied.

A review of various works and studies in management science highlights the existence of three major epistemological paradigms that are commonly identified: the positivist, interpretivist and constructivist paradigms. Kuhn (1983) considers these paradigms to be reference frameworks that enable researchers to align themselves with a particular school of thought.

We will not detail each of these paradigms, as the purpose of this section is solely to present and justify the paradigm chosen for our study.

The table below summarises the main existing epistemological paradigms, with their founding assumptions, as well as their specific purpose and modes of justification.

Table 1: Epistemological positions of the three major paradigms

	Positivism	Interpretativism	Constructivism
Status of knowledge	Ontological hypothesis: There is an essence specific to the object of knowledge	Phenomenological hypothesis: The essence of the object cannot be attained	
Nature of reality (Ontology)	Independent subject/object Deterministic hypothesis The world is made up of necessities	Subject/object dependency Intentionalist hypothesis The world is made up of possibilities	
Subject/object link (epistemology)	The researcher does not act on the observed reality	The researcher interprets what the actors have said; the actors themselves interpret the object of research	The researcher co-constructs interpretations or projects with the actors
Pathway of theoretical knowledge	Discovery Search for causes Privilege given to Explanation	Interpretation Search for motivation of actors Privilege given to Understanding	Construction Search for purposes Privilege given to Construction
Objectives	Explaining reality	Understand	Construct
Criteria for validity	Verifiability Conformability Refutability	Idiography Empathy (revealing the experience of the actors)	Adequacy Teachability

Source: (Allard-Poesi & Moréchal, 2003; Perret and Séville, 2003; Lecocq, 2012)

Furthermore, since the 1970s, a wide variety of epistemological approaches have developed. These include, for example, post-positivism – or critical realism – pragmatism and postmodernism (Nassou Y. and Bennani Z., 2024).

3-1 Contemporary epistemological paradigms

Gavard-Perret et al. (2012) identify six contemporary epistemological paradigms: three from the positivist tradition—logical positivism, scientific realism and critical realism—and three from constructivism—radical constructivism, interpretivism and constructivism as defined by Guba and Lincoln. However, in their summary, the authors retain only five paradigms, discarding logical positivism, which they consider to be of little or no real relevance to current research in management sciences.

3-3 Epistemological framework adopted: critical realism as the basis for research on supply chain resilience

3-3-1 Presentation of the chosen paradigm: Critical realism

The epistemological position is "*a set of positions that guide the research process*" (Giordano, 2003, p. 17).

In this research, we opted for the post-positivist paradigm of "critical realism," which rejects certain fundamental principles of positivism.

Several researchers doubt the relevance of the positivist conception, which is considered not only ontologically and epistemologically imperfect, but also responsible for many problems relating to modern society (Patomaki and Wight, 2000).

Critical realism, as discussed by Bhaskar (1975, 1998), is therefore positioned as an alternative to the positivist and interpretivist paradigms, as it draws on elements of both paradigms to provide new approaches to the development of knowledge (Rapin et al., 2020).

Critical realism challenges the nature of reality (ontology) as considered by positivists. This paradigm stipulates that reality exists but can only be imperfectly understood due to the cognitive limitations of human beings and the essentially irreducible nature of phenomena (Robson, 2011). In the same vein, Myers (1997) notes that "*although individuals can act to change their social reality, they are limited by various forms of social, cultural and political domination.*"

In this sense, Trochim and Donnelly (2007) state that critical realists recognise that all observations are fallible and contain errors, and that all theories are revisable. The same authors argue that the term 'critical realism' refers to the fact that existing reality must be subjected to critical examination in order to facilitate the closest possible, but never perfect, juxtaposition of reality. More specifically, in critical realism, reality exists independently of human beings' representation

of it, while knowledge of reality is only one vision among others, through which researchers attempt, by accumulating data and information, to construct the knowledge that allows them to access this reality.

Bhaskar (1998) proposes an ontological structure of reality that divides reality into three domains: the empirical real, the actual real and the deep real.

- Deep reality: Includes the generating mechanisms, structures (sets of interrelated objects and practices) and rules that govern the occurrence of events. This level is also called the "structural level" or "deep reality" because knowledge of it is inaccessible to human perception (Lawson, 1997).
- The actual real: Refers to the subset of the deep real that includes events occurring when generative mechanisms are implemented, regardless of whether or not they are observed by humans.
- The empirical real: This is the level directly observed by human beings; it corresponds to individuals' perception of events that occur in the "actual real".

Based on this structure, researchers only observe the empirical domain; the domains of the current and the real are not necessarily known to them and are not subject to observation, which distinguishes critical realists from positivists.

Thus, positivists seek universal laws that explain phenomena, while critical realists recognise that all observation is fallible and may be erroneous. Consequently, theories are not fixed and can be changed.

3-3-2 Justification for the choice of paradigm

Several researchers agree on the relevance of critical realism as an epistemological framework for supply chain management (SCM) research (Dobson et al., 2007; Mingers, 2004; Mutch, 2002; Rotaru et al., 2014; Adamides et al., 2012). This approach conceives of reality as an open system (Bhaskar, 1998), the understanding of which requires taking into account multiple dimensions—social, organisational, environmental, and technological—that may exert a causal influence on the phenomena observed (Wynn & Williams, 2012).

Critical realism offers a way of articulating this (Bhaskar, 1978; Fleetwood, 2005; Easton, 2010). It posits that reality exists independently of the observer, but that our knowledge of this reality is always mediated by social constructs. Researchers can thus seek to identify the underlying mechanisms that explain observable phenomena, without

claiming to have access to absolute truth (Bhaskar, 1975; Collier, 1994).

Critical realism is particularly fruitful for studying the resilience of supply chains. This paradigm allows for the combination of **structural** analysis (relationships between actors, flows, networks) and **interpretative** analysis (perceptions, learning, representations). It thus promotes a **multidimensional** approach, taking into account both the root causes (structures, resources) and the generating mechanisms (decisions, interactions) that explain resilience capacity (Ketchen & Craighead, 2020).

From this perspective, in the context of supply chain resilience, we are faced with an environment composed of several interacting structures. Each has the potential to impact the existing situation and generate events. Critical realism allows us to combine the analysis of material structures (networks, flows, interdependencies) with that of interpretative processes (representations, decisions, learning). It therefore allows for an explanatory and comprehensive reading of the dynamics of resilience.

In this respect, we consider that the reality of our research subject exists in itself, independently of our observation. Our role as researchers is to seek to explain its various dimensions, broken down into several factors. These factors are determined on the basis of existing theories (information processing theories, dynamic capabilities, etc.), previous conceptual and empirical work, but also through the perception that actors give to the resilience of their organisations' supply chains.

The nature of the reality studied does not allow us to produce objective and universal knowledge, but rather to contribute to the understanding of a contextualised reality. Thus, the nature of the knowledge to be produced is subjective and remains imperfectly comprehensible due to the intellectual limitations of human beings, the irreducible nature of the phenomenon of supply chain resilience, the fallibility of measurements, and the difficulty of accessing different levels of stratification. With this in mind, we are therefore convinced that what is knowable is only empirical reality (the set of human perceptions that occur in the current reality).

Consistency between the choice of an epistemological stance and the transition to instrumentation is essential for producing valid and reusable scientific knowledge (Charreire Petit and Durieux, 2007).

In this sense, the choice of modes of reasoning and appropriate methodology is critical. We specify the choices made in this regard in the following sections.

4- Reasoning mode of the research s on supply chain resilience

4-1 Methods of reasoning in management sciences

In management science, we can distinguish between two research paths that support the development of knowledge: exploration and testing. Exploration refers to work that aims to propose innovative theoretical results through the search for explanation and understanding. Testing, on the other hand, aims to put one or more theoretical or methodological objects to the test in reality. The objective is to produce an explanation by evaluating the relevance of a hypothesis, model or theory (Charreire Petit and Durieux, 2007; Thiétart et al., 2014).

These two research paths are characterised by distinct modes of reasoning. The first path (exploration) adopts an inductive and/or abductive approach, while the second adopts a deductive or hypothetical-deductive approach.

The management science literature distinguishes between three types of reasoning: deduction, induction and abduction.

- Deduction

Deduction is primarily a means of demonstration (Grawitz, 2000). It involves "*testing a theory through hypotheses or putting a certain amount of previously developed knowledge to the test in specific situations*" (Gavard-Perret et al., 2008, p.29). A deduction is characterised by the fact that, if the hypotheses initially formulated are true, then the conclusion must necessarily be true (Charreire and Durieux, 1999).

Deduction is the reasoning behind the hypothetical-deductive approach. The latter consists of developing one or more hypotheses and then testing them against reality, with the aim of judging the relevance of the initial hypothesis (Thiétart et al., 2014).

- Induction

Induction is a conjectural inference that concludes: 1) from the observed regularity of certain facts to their constancy; 2) from the observation of certain facts to the existence of other facts that are not given but have been regularly linked to the former in previous experience (Morfaux, 2011). In other words, it is a form of reasoning that moves from the specific to the general, from facts to laws, from effects to causes, and from consequences to principles (Thiétart et al., 2014).

- Abduction

Abduction is "the operation which, not belonging to logic, allows us to escape the chaotic perception we have of the real world by attempting to conjecture on the relationships that things actually have [...]. Abduction consists of drawing conjectures from observation, which must then be tested and discussed " (Koenig, 1993). Abduction involves a successive back-and-forth process between empirical and theoretical work in order to "understand the empirical situations studied and construct intelligible representations of them, with a view to gradually building knowledge in relation to already accepted knowledge" (Gavard-Perret et al., 2008).

Table 2: The process of knowledge construction and associated reasoning

Knowledge construction process	Mode of reasoning	Characteristic of the mode of reasoning
Test	Deductive	Hypothetical-deductive approach: Hypotheses are tested against the reality under study.
Theoretical exploration	Inductive	Based on the observation of specific phenomena and without prejudging the facts, universal laws and theories are developed.
Empirical exploration		
Hybrid exploration	Abductive	Based on the observation of specific phenomena and using an existing conceptual framework, the researcher proposes explanations that will subsequently be tested and discussed.

Furthermore, Teddlie and Tashakkori (2009, p. 89) emphasise that researchers must draw on all forms of reasoning in order to acquire the most comprehensive knowledge possible. According to these authors, researchers must reason "abductively when exploring data, discovering a model or suggesting hypotheses using appropriate categories; deductively when constructing logical and testable hypotheses based on other plausible hypotheses; and inductively when seeking an approximation of the truth in order to establish beliefs for future research".

In the same context, Thiéart et al. (2014) argue that deductive and inductive logic are used in a complementary manner in the development of scientific knowledge.

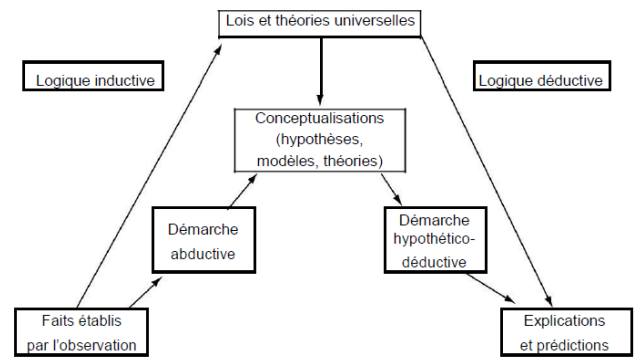


Figure 1: Modes of reasoning and scientific knowledge (Thiéart et al., 2014, p.82)

According to the diagram, deductive reasoning moves from the general to the specific, while inductive reasoning takes the opposite path, moving from the specific to the general. These two types of reasoning are distinguished by whether or not the inferences made are demonstrative. The inferences of inductive or abductive reasoning are considered non-demonstrative or uncertain, while the propositions of deductive reasoning are developed in a certain manner (Thiéart et al., 2014).

2-2 The reasoning method adopted

The justification for the epistemological positioning of our research led us to opt for abductive reasoning as being well suited to the critical realist epistemological paradigm (David, 2004; Mingers, 2006; Locke, 2010; Avenier & Thomas, 2012).

The abductive approach is favoured by critical realist researchers because, according to the ontological and epistemic presuppositions of critical realism, the objective of scientific research is to formulate plausible explanations for the generative mechanisms that govern events (Bhaskar 1979, 1998; Lawson 1997, 2003; Archer et al. 1998). Indeed, an epistemological paradigm that does not recognise a certain subjectivity on the part of the researcher is difficult to reconcile with abduction (Hallée and Garneau, 2019). Researchers are not automatons immune to sensitivity and preference, and they cannot completely disregard their "biases" and theoretical perspectives (Anadón & Guillemette, 2007).

The abductive approach is fruitful if the researcher's objective is to develop an understanding of a "new" phenomenon, or to discover new things, new variables and new relationships (Alvesson and Skoldberg, 1994). It is essentially about generating new concepts and developing theoretical models,

rather than confirming existing theories (Hallée, Y., & Garneau, J. M., 2019).

The study of supply chain resilience remains a new and under-explored topic that requires further explanation. Given that the aim of abduction is often exploratory, this reasoning is well suited to the purpose of this work. The abductive research approach aims to understand a recent phenomenon and allows for the development of a new theory, in the form of new hypotheses or propositions, or the refinement of existing ones (Dubois and Gadde, 2002; Kovacs and Spens, 2005).

In this context, Modell (2009, p. 213) observes that "*abduction does not proceed directly from empirical observations to theoretical inferences, as is the case in purely inductive research, but relies heavily on theories as mediators to obtain explanations*". Indeed, it is illusory, even dangerously blind, to think that one can approach a phenomenon without any preconceptions (Guillemette, 2006, p. 33).

Our work is part of an abductive approach. Our abductive reasoning is justified by the combination of research phases resulting from back-and-forth movements between different theoretical and empirical frameworks, as shown in the following figure

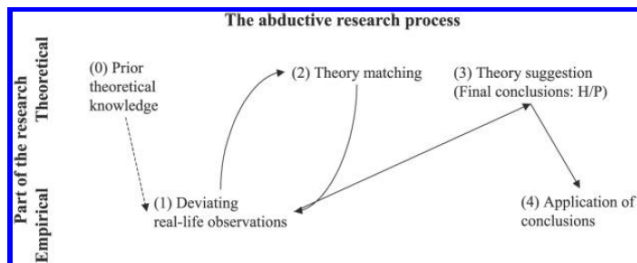


Figure 2: The abductive research process
(Kovács & Spens, 2005)

According to this process, the researcher begins with preconceptions and theoretical knowledge. Our research will initially lead us to analyse the literature relating to the concepts used in order to formulate a provisional theoretical model.

The empirical starting point with a deviation in observation should not lead to the idea that an abductive research process can only begin with a surprise. On the contrary, the researcher can also consciously introduce a creative element by applying a new theory or framework to existing phenomena. It is in this context that we have used the abductive perspective to study the resilience of the supply chain, which remains an under-explored area.

The aim of this process is to understand a new phenomenon (Alvesson and Skoldberg, 1994) and to propose new theories in the form of new hypotheses or propositions (Andreewsky and Bourcier, 2000). In this regard, abductive reasoning begins with a deviation that requires observation (point 1 in the figure) and ends with hypotheses or propositions (point 3 in the figure). These hypotheses/propositions must be applied in an empirical setting (Alvesson and Skoldberg, 1994; Wigblad, 2003).

With this in mind, our abductive approach will initially enable us to go beyond a simple description of a phenomenon (Charreire Petit and Durieux, 2007), by moving back and forth between observations and theoretical knowledge throughout the research.

The path of exploration will lead us to formulate one or more working hypotheses, which will help us to reflect on and structure all of our observations.

5- Methodological approach

Once we have decided on our epistemological stance and mode of reasoning, we will explain the factors that motivated our choice of a "mixed approach".

According to Gartiser and Dubois (2005), "*the epistemological paradigm in which a problem is framed has a strong influence on how it is solved. It is therefore necessary to align the method used to manipulate knowledge, i.e. the problem-solving process, with the paradigm.*" The use of a research method is often the result of a methodological and epistemological choice.

Our critical realist epistemological position legitimises the use of new empirical research methods and paves the way for methodological pluralism based on the use of both quantitative and qualitative methods (Cruickshank, 2003; Olsen et al., 2005).

The epistemological assumptions associated with critical realism have led us to consider a methodology based on triangulation and the use of multiple methods (Wynn and Williams, 2012). Furthermore, Risjord et al. (2001) point out that this method is commonly used in abductive-inspired research.

The mixed method is defined as "*research in which the researcher collects and analyses data, integrates results, and draws inferences using both qualitative and quantitative approaches or methods in a single study or research programme*" (Tashakkori and Creswell, 2007, p. 4).

A methodological approach is described as mixed when the researcher combines quantitative and qualitative data/methods in the same study (Johnson and Onwuegbuzie, 2004).

Mixed methodologies therefore aim to take advantage of both quantitative and qualitative methods in order to address a complex subject (Kaur et al., 2019). The goal of mixed methodologies is not to replace one of the approaches, but rather to take advantage of each approach, minimising their respective strengths and weaknesses, and obtaining a rich set of data through multiple data collection (Benbasat et al., 1987; Johnson and Onwuegbuzie, 2004).

Although mixed methods are widely developed in several disciplinary fields (sociology, psychology, education, etc.), their rise in the field of management sciences only began about twenty years ago with research notably in management (Humerinta-Peltomaki et al., 2006); entrepreneurship (Hohenthal, 2007); marketing (Koller, 2008) and supply chain management (Golicic & Davis, 2012).

Supply chain management is a relatively new and complex discipline, and therefore many of the phenomena of interest in this field are also new and complex, lending themselves to mixed methods (Golicic & Davis, 2012). Supply chain resilience is a prominent phenomenon in current supply chain research and an example of a fertile area that could benefit from a mixed approach.

Resilience is a complex and multidimensional research topic that requires a mix of empirical and analytical research methods to develop theory and evaluate its implementation (Ali et al., 2017). The use of mixed methods in this research setting is recommended for robust analysis to capture a broader understanding of supply chain resilience practices (Pettit et al., 2013; Pereira et al., 2014).

In our research, we opted for an exploratory method in which the qualitative approach is a prerequisite for the quantitative approach (Creswell and Plano-Clark, 2011). In other words, there is first an analysis of qualitative data, which takes priority in answering the research questions. Then there is a quantitative phase that allows us to test or generalise the qualitative results from the first experiment.

Generally, before choosing an initial research approach, researchers are advised to seriously consider the question: "What do we know about this phenomenon?" (Golicic & Davis, 2012). If the answer implies that the objective of the research is to develop an understanding of new or complex phenomena, then the qualitative approach is generally the best starting point. If the researcher aims to take a more general

view in order to explain relationships or demonstrate the cause and effect of well-documented concepts, then the quantitative path is often more appropriate.

The design of mixed methods research begins with the choice of an initial research approach, then progresses through the circles illustrated in (Figure 3), and then between the qualitative and quantitative approaches of the circles.

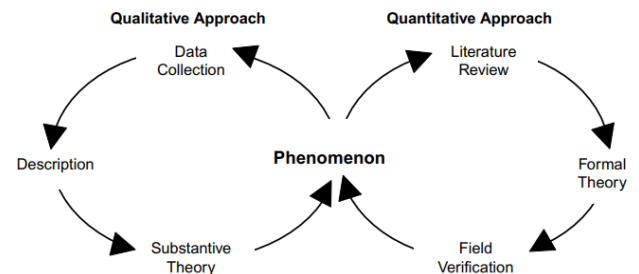


Figure 3: Mixed methods process (Golicic et al2005)

When the qualitative approach is chosen as a starting point, the goal is generally to understand the phenomenon in its context (Hirschman, 1986). As a rule, researchers observe phenomena in the field in order to "*make sense of or interpret phenomena in terms of the meaning that people give them*" (Denzin and Lincoln, 2005, p. 3).

Qualitative methods are particularly effective for: understanding the nature of personal experiences, providing information that is difficult to obtain using quantitative methods, understanding the underlying meanings of human interactions and relationships in organisational environments, or conducting research in areas where there is little prior knowledge (Mello and Flint, 2009, p. 108).

In the same vein, Miles and Huberman (2003) emphasise that the qualitative approach is the obvious choice when dealing with new and little-studied topics, which is certainly the case here. Indeed, the issue of supply chain resilience is recent and has been little studied (Evrard Samuel and Ruel, 2013).

On the other hand, quantitative methods are often used to construct and test a formal theory that explains and predicts a phenomenon of interest (Golicic & Davis, 2012). The quantitative approach involves an in-depth examination of the relevant literature in order to develop a conceptual framework that specifies the relevant variables and the expected relationships between them (Bickman and Rog, 1998).

In our research, the qualitative study will allow us to better understand the phenomenon and identify the variables to be studied (Creswell, 2009). However, the qualitative study alone

is not suitable for this research. A quantitative study will broaden the scope of research on supply chain resilience.

It therefore seems essential to combine both types of methods (qualitative and quantitative) in order to study supply chain resilience.

CONCLUSION

This study highlights the importance of an explicit epistemological position to ensure the consistency and rigour of scientific research, particularly when examining a complex phenomenon such as supply chain resilience. By adopting the paradigm of critical realism, abductive reasoning and a mixed methodology, the researcher is able to articulate the ontological, logical and methodological dimensions in a harmonious and fruitful manner.

Critical realism is distinguished by its ability to transcend the dichotomy between positivism and interpretivism. It acknowledges the existence of an objective reality while recognising that knowledge of this reality remains partial and socially mediated. This framework allows for the analysis of both the material structures and social representations that shape organisational phenomena. In the case of supply chain resilience, this approach promotes an integrated understanding of the mechanisms that generate it, the interactions between actors and the dynamics of post-crisis reconstruction.

The use of abductive reasoning is consistent with this approach. It is based on a constant back-and-forth between theory and observation, allowing for the covery of new explanations and the gradual adjustment of conceptual models. This mode of reasoning contributes to enriching theoretical understanding while maintaining a strong empirical foundation.

Methodologically, the mixed approach, combining qualitative and quantitative methods, offers a framework that is particularly suited to the multidimensional nature of the phenomenon under study. It allows us to link understanding and generalisation, meaning and measurement, while minimising the limitations inherent in each approach. This methodological pluralism, consistent with the postulates of critical realism, reinforces the scientific credibility of the results.

Ultimately, this articulation between paradigm, reasoning and method provides a robust foundation for research in supply chain management. It invites us to rethink resilience as a systemic and relational process, in which structures, actors

and collective learning interact. Beyond the phenomenon under study, this framework opens up fruitful research perspectives for understanding complex organisational phenomena in a world characterised by uncertainty and constant change.

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