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Exploring the Characteristics of Coopetition Throughout the Coopetition Life Cycle

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Abstract **Purpose:** *This study aims to explore the phases of the coopetition life cycle (CLC), identify the perceived importance of characteristics attributable to coopetition in those phases, and recognize if the perception of the identified importance of considered characteristics changes across the phases of the CLC.*
Methodology approach: *The explorative research was conducted within the manufacturing companies operating in Poland. A comprehensive survey was conducted on a large scale, involving 1231 firms. The coopetition characteristics - 2 strategic, 6 relational, and 5 behavioral - were operationalized using scales already available in the literature whereas to operationalize the specific phases of the CLC (i.e., initiation, development, maintenance, evaluation, continuation, dormancy, termination, and reactivation) and two focus group interviews were conducted. Data analysis was implemented using descriptives and non-parametric ANOVA tests.*
Findings: *The research findings showed which phase of CLC predominates in practice, i.e., the maintenance phase. Furthermore, the study revealed that all considered characteristics are meaningful throughout nearly all phases of the CLC. However, there were slight variations in the perceived significance of coopetition characteristics among managers representing both low-tech and high-tech firms.*
Originality/Value: *It is the first research on CLC therefore as a contribution it offers the framework for the CLC, results regarding the phases in which coopetition is the most frequently utilized by manufacturing companies as well as the results showing the perceived relevance of a wide range of coopetition characteristics across particular phases of the CLC.*

Keywords coopetition process, coopetition development, coopetition evolution, coopetition characteristics, high-tech, low-tech.

INTRODUCTION

One of the seminal papers on coopetition, written by Bengtsson and Kock (2014), underscores the necessity for research to deepen understanding of the changeability of coopetition. Despite a decade has passed since the publication of this impactful review, systematic analyses of the contemporary literature on coopetition (Devece et al., 2019; Köseoğlu et al., 2019; Gernsheimer et al., 2021; Corbo et al., 2023; Meena et al., 2023) indicate that the direction emphasized by Bengtsson and Kock (2014) remains relevant. From a changeability perspective, there is an ongoing need to supplement existing knowledge and undertake research on the dynamics (Bengtsson et al., 2010b; Yami et al., 2010; Park & Kim, 2021; Katsaliaki et al., 2023), process (Bengtsson & Kock, 2014; Dahl, 2014; Köseoğlu et al., 2019; Kostis & Näsholm, 2020; Xin et al., 2023), evolution (Jakobsen & Steinmo, 2016; Ricciardi et al., 2022), and the life cycle of coopetition (Klimas et al., 2023a). Particularly intriguing is the exploration of the coopetition life cycle (CLC), as to the best of our knowledge, coopetition has not been previously analyzed from a life cycle perspective. Indeed, as argued by Garri, one of the limitations in existing coopetition research is the fact that "*little attention has been paid to explain coopetition at multiple stages*" (2021, p. 545) while to comprehensively understand coopetition, it is needed "*to observe life cycle dependencies of interfirm coopetitive relationships*" (Czakon et al., 2014, p. 141). In the same vein, a lot of scholars point to the need to explore how coopetition evolution changes (Bengtsson et al., 2010a), what coopetition phases do exist, what the pattern of a given phase is (Tidström & Åhman, 2006), how the phases of the CLC are interconnected (Dorn et al., 2016), and to discern the key relational characteristics (Chen & Miller, 2012) and specific characteristics (Dorn et al., 2016) within the sequence of cooperative/competitive interactions of coopetitors.
Simultaneously, in the context of coopetition, the literature highlights a lack of comprehensive knowledge regarding the characteristics (Bengtsson & Raza-Ullah, 2016), features (Tidström & Åhman, 2006), or attributes (Czakon et al., 2020a;

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Klimas et al., 2023b; 2025) of coopetition, as well as a dearth of studies focusing on recognizing the variability of these over time. It's worth noting that empirical research concurrently demonstrates a keen interest in specific, purposefully chosen characteristics, such as asymmetry (Pellegrin-Boucher et al., 2013; Jakobsen, 2020), dynamics (Park & Kim, 2021; Katsaliaki et al., 2023), coopetition intensity (Park et al., 2014; Chen et al., 2019), mutual dependency (Petter et al., 2014; Jacobsen, 2020), paradoxicality (Raza-Ullah et al., 2014; Bengtsson et al., 2016; Fong et al., 2021), strength (Brolos, 2009; Bengtsson et al., 2016), tensions (Tidström, 2014; Fernandez & Chiambaretto, 2016; Jakobsen, 2020; Bouncken et al., 2020; Rouyre et al., 2024), or trust (Czakon & Czernek, 2016; Kostis & Näsholm, 2020; Raza-Ullah & Kostis, 2020; Lee & Lee, 2024). Additionally, a deficit number of studies demonstrates how these characteristics, treated as variables over time (Tidström & Åhman, 2006; Czakon et al., 2014; Bengtsson & Raza-Ullah, 2016), actually change. In general, two aspects seem particularly important in the context of coopetition characteristics.

Firstly, considering the results of the systematic literature review on coopetition characteristics (Klimas et al., 2023b), it becomes intriguing to develop our understanding of coopetition characteristics, including their evolution over time in particular. Following the proposal by Klimas et al. (2025), research inquiries can be directed towards three groups of coopetition-related characteristics: strategic ones characterizing coopetition strategies adopted to generate relational rent (i.e., dynamics and paradoxicality), relational characteristics characterizing coopetitive relationships through which coopetition strategies are executed (i.e., asymmetry, complexity, intensity, mutual dependence, strength, and tensions), and behavioral characteristics characterizing coopetitors' behaviors engaged into specific coopetition strategy (i.e., formality, trust, conflict, competition intensity, and investments).

Secondly, in light of the scarcity of studies focused on CLC and the identified literature linkage between coopetition characteristics and the stage of coopetition development (see studies on the significance of complexity and velocity for the transformational path of ICT ecosystems – Basole et al., 2015), a justified and innovative avenue for investigation involves identifying coopetition characteristics throughout the CLC phases and recognition of their potential variability.

It is commonly acknowledged that coopetition is dynamic (Luo, 2007; Bengtsson et al., 2010a; b; Yami et al., 2010; Gnyawali & Park, 2011; Bengtsson & Kock, 2014; Czakon et al., 2014; Park and Kim, 2021), unstable, and thus, changeable (Czakon, 2010; Raza-Ullah et al., 2014), evolutionary (Basole et al., 2015; Ricciardi et al., 2022) or even co-evolutionary (Rouyre et al., 2024). The dynamic nature of coopetition phenomena results in the changes in coopetitive relationships between and among cooperating business rivals, their activities and behaviors, and additionally, it influences the evolution of coopetition strategies adopted by these coopetitors (Basole et al., 2015; Fong et al., 2021) and therefore, it is worth consideration. Indeed, coopetition as bringing together competitors, often fierce competitors, who, despite conflicting interests, decide to collaborate (Bengtsson & Kock, 2014) and make it challenging to "*maintain the dynamic balance*" in this cooperation (Raza-Ullah et al., 2014, p. 189) ensuring the benefits for coopetitors in long- and short-term perspective (Ricciardi et al., 2022). Notably, current research within the strategic management literature indicates that purposefully aligning strategic moves with product, organizational, technological, and industry life cycle phases enhances firm performance and strategic advantage (Struckell et al., 2021). In contrast, such considerations in coopetition literature are currently limited. Keeping this in mind, we find it relevant to explore the characteristics assigned with coopetition in the subsequent phases of the CLC as well as their changeability across the coopetition development path. We believe this knowledge will facilitate the intentional shaping of specific characteristics, either longitudinally or in specific phases of coopetition, thereby increasing opportunities for coopetition success (for instance, it has been proven for trust – Raza-Ullah & Kostis, 2020).

In light of the above, this paper aims to explore the phases of the CLC, identify the perceived importance of characteristics attributable to coopetition in those phases, and recognize if the perception of the identified importance of considered coopetition characteristics changes across the phases of the CLC. To achieve our goal, we designed and carried out an explorative investigation as the addressed phenomenon is little known and recognized - no CLC model is available in the current body of knowledge and there is no knowledge on the changes of the coopetition characteristics over time. This study has been focused on answering three research questions:

- RQ1. What are the phases of the CLC utilized by coopeting companies, and in which phase are they the most often?
- RQ2. How is the importance of characteristics attributed to coopetition perceived in different phases of the CLC?
- RQ3. Is the perception of the importance of characteristics attributed to coopetition significantly variable throughout the CLC?

To address the above questions successfully, firstly, we run a preliminary qualitative investigation through two focus group interviews to identify (and conceptualize) the phases of the CLC. The core research investigation was focused on specification of the most frequently exploited phase of CLC (ref. to RQ1) as well as the recognition of the levels and changes in coopetition

characteristics across those phases (ref. to RQ2 and RQ3) using a quantitative, large sample study (N=1231) focused on "*exploration for discovery*" (Stebbins, 2001, p. 3). In our study, we investigate two strategic (paradoxicality and dynamics), six relational (asymmetry, complexity, intensity, mutual dependence, strength, and tensions) and five behavioral (competition intensity, conflict, formality, investments, and trust), characteristics for which the measurement scales are already available in the literature (Klimas et al., 2025) and their perceived importance in the specific phases of CLC (i.e., initiation, development, maintenance, evolution, continuation, dormancy, termination, and reactivation) which have been adopted from IOR literature and verified in a preliminary, qualitative focus group interviews. Our exploration focuses on manufacturing companies operating in Poland, aiming to capture the contingencies related to industry-specific dynamics of coopetition (Czakon et al., 2014; Dorn et al., 2016; Meena et al., 2023). Regarding the survey, we selected respondents (managers from firms with experience in engaging in coopetition) from 909 low-tech and 322 from high-tech industrial firms. To gather data, we used a mixed-mode approach using CATI, CAWI, and CAWI supported by the phone and then employed descriptives and non-parametric ANOVA tests to analyze collected data.
This study advances our understanding of coopetition by unveiling the pivotal characteristics that shape coopetition strategies, coopetitive relationships, and coopetitors' behaviors across particular CLC phases. By identifying nuances in the perceived importance of thirteen characteristics assigned to coopetition (e.g., asymmetry and conflict have been found as perceived the least or even not relevant in the managers' opinions), the research provides valuable insights for managers, emphasizing the dynamic nature of coopetition and challenging sector-specific assumptions. Moreover, our study contributes to the scarce literature on the CLC, offering the multi-stage framework of CLC, shedding light on the extensive coopetition process, the possibly non-linear evolution of coopetition, and offering a nuanced perspective on how firms in different sectors differentiate in strategic aspects.

THEORETICAL BACKGROUND

Coopetition Life Cycle

On the management sciences ground, understanding the trajectory and specificity of the development of phenomena is acknowledged as crucial for rational, planned coordination of actions and activities that should be adapted to the stage at which a given phenomenon is located. In fact, the concept of the life cycle is one of the key concepts in the field of management, including, for instance, marketing management (product life cycle, brand life cycle), innovation management (technology life cycle), and strategic management (industry life cycle). However, among the existing models, none depict the CLC, even though coopetition and each of its phases likely have their own specificities and require different approaches in terms of managerial coordination or leveraging coopetition.
When it comes to the relational perspective, the interest in the relationship life cycle has increased since the seminal works of Ford (1980) and Dwyer et al. (1987). Since then, it is believed that the relationship evolves, for instance, through some sequential and predictable phases of development (the stage-based approach, even though it is not the only one possible, is the dominant one in the area of inter-organizational relationships – Batonda & Perry, 2003). While coopetition falls within the perspective of the inter-organizational analysis (Dorn et al., 2016; Minà & Dagnino, 2024), the phases of coopetition development have not received significant attention from researchers yet. Basically, on the coopetition ground, while Dorn et al. (2016) have utilized the life cycle concept to illustrate the progression of coopetition research, other studies have investigated the life cycle-related factors influencing coopetition, such as the alliance life cycle (Raza-Ullah et al., 2018), industry life cycle (Basole et al., 2015; Park & Kim, 2021; Xu et al., 2021), or ecosystem life cycle (Struckell et al., 2021). Nonetheless, although the life cycle concept emerges somehow in coopetition research, it remains underutilized in the context of coopetition's developmental trajectory. Therefore, in line with Dahl's (2014) recommendations, we consider it essential to focus on the CLC, particularly examining changes across its life phases, develop our understanding of the evolution of the coopetition process (Monticelli et al., 2018).
Coopetition is a highly challenging strategy (Bengtsson & Kock, 2014) with a high failure rate (Chin et al., 2008). However, due to the potentially significant benefits for participants - not only in terms of achieving the goals or coopetition performance but also more broadly in firm performance - many (and increasingly more) organizations decide to engage in coopetition (Crick, 2021; Gernsheimer et al., 2021). From a managerial perspective, actions and activities aimed at coordination or behaviors that reduce the potential risk of failure become crucial. In this context, research on factors of coopetition success and durability is essential, including the characteristics of coopetition (Klimas et al., 2023). Given the cognitive gaps regarding the CLC (Dagnino, 2009; Dahl, 2014; Chiambaretto & Fernandez, 2016; Garri, 2021; Klimas et al., 2023a; Minà & Dagnino, 2024), it is

worthwhile to explore if those characteristics change over time. The coopetition dynamics, including exploration through CLC perspective (Dahl, 2014), are still recommended as areas for future research (Minà & Dagnino, 2024; Klimas et al., 2023a) – for instance given the perspective of tensions within coopetition, Efrat et al. (2022) argue that coopetition has an impact on the development of tensions since its formation but "*more knowledge on the relationship between coopetition formation and the mitigation of tension* [overt coopetition utilization – our note], *which are crucial for coopetition performance, is needed*" (p. 530). In coopetition literature, it is crucial to note the absence of comprehensive research addressing the CLC, especially in recognizing the phases in which coopetition can be implemented, spanning from inception to termination.

All in all, the interest in the CLC seems to be also justified in the light of ongoing discussions regarding the (essential and distinguishing) paradoxical nature of coopetition (Bengtsson & Kock, 2014) being full of dynamic and complex tensions (Albert-Cromarias et al., 2022) that affect coopetitors and coopetition all the time. In particular, the dynamic tensions faced by coopetitors refer to value creation (Ryan-Charleton, & Gnyawali, 2022), value co-creation and capturing (Gelei & Dobos, 2024), value configuration (Camargo & Meirelles, 2024), value appropriation (Manzhynski et al., 2024), value destruction (Albert-Cromarias et al., 2022), or social value devolution (Chim-Miki et al., 2023; Nascimento et al., 2023). Basically, in the context of value, little is known in the temporal perspective and that is why scholars "*recommend research on the development of value and its capture over time*" (Bouncken et al., 2020a, p. 12). The value-related dilemmas based on the paradoxical nature of coopetitive strategies (Bengtsson & Raza-Ullah, 2024; Camargo & Meirelles, 2024; Raza-Ullah & Kostis, 2020), expose process-oriented approaches which result from balancing between convergent and divergent interests - a cooperative focus on creating more excellent value and a competitive approach to appropriation of benefits from the value created. These value-oriented approaches provide fragmentary mentions of coopetition in terms of changing characteristics, e.g., emotional, behavioral ones (Ryan-Charleton & Gnyawali, 2022) or relational characteristics (Gelei & Dobos, 2024). However, these references are far from attempts at a comprehensive understanding of their variability and changeability over time. Nonetheless, for research on the variability of value creation and appropriation mechanisms to be conducted, we would first need to understand the model of the CLC during which these mechanisms change.

Considering existing findings associating coopetition with the life cycle concept, it is fair to state that while exploring the CLC is justified, no studies have been dedicated to this topic. Dorn et al. (2016) classified coopetition research into three phases: initiation, managing and shaping, and evaluation. These phases diverge in functions and theoretical perspectives, influenced by the delicate balance between competition and cooperation levels (Park et al., 2014; Ritala & Tidström, 2014; Minà et al., 2015; 2020; Fong et al., 2021). This work adopts quite a holistic approach to the life cycle. However, it is primarily conceptual and characterizes coopetition research, not the coopetition process.

Regarding empirical papers incorporating the CLC perspective, they - although fragmentary and qualitative – reveal valuable avenues for research. For instance, Gnyawali and Park (2011) considered the Samsung-Sony case of coopetition and presented a two-stage framework of coopetition's dynamic evolution, including formation and evolution. This approach, complemented by incorporating a third phase associated with performance, has also been employed by Park and Kim (2021) in their study on the dyadic coopetition among industry giants in the smartphone sector. Furthermore, Tidström and Åhman (2006), based on a longitudinal case study within the construction industry in Finland, outlined the following stages of coopetition relationship: pre-start, harmony, consideration, disengagement, communication, and post-ending. Despite their emphasis on the ending stage, they observed that the process is non-linear, and the ending may start at the very beginning of the relationship, and the ending process may already have begun at a stage of harmony. Building on Tidström and Rajala's (2016) single case study which concentrates on coopetition practices from a multilevel perspective, the pre-coopetition (pre-start) phase embodied the unintentional condition of coopetition. However, they categorize this phase as the initial one before (2) silent coopetition, and next, (3) active coopetition and (4) forced coopetition. On the other hand, Bonel and Rocco (2007), relying on an Italian case study, concentrated on the final phase of coopetition - the execution, wherein the authors emphasized that "*studies focusing on the phenomenon of coopetitive relationship formation or death outweigh those dealing with their evolution*" (2007, p. 71). Alternatively, Garri (2021) indicates three stages of coopetition: initiation, knowledge-enhancement, value-co-creation, and enhanced performance-competitive advantage, thus skipping the pre-relational phase and not ending the relationship. In contrast, Fong et al. (2021), through a multiple case study on the relationships among Macau's tour operators, identified three stages in the evolution path of coopetitive relationships. They, however, included re-coopetition issues as part of this path, specifically highlighting the coordination of competition as a phase preceding the emergence of simultaneous cooperation and competition and expansion of coopetition.

Summing up, besides the exceptions mentioned above, the majority of coopetition literature neglects comprehensive and empirical examination of the evolution of coopetitive relations over the life cycle (Dahl, 2014; Dorn et al., 2016) while "*the life cycle of coopetition (…) is rather used as a side issue*" (Klimas et al., 2023b, p. 893). Typically, the life cycle is used

non-comprehensively, such as focusing on a selected phase of the cycle (e.g., Bonel and Rocco, 2007; Xu et al., 2021), or is considered as a side aspect, for instance, as a change mechanism (Dahl, 2014; Garri, 2021) or control variable (Xu et al., 2021). Moreover, there is a lack of consensus regarding the number of phases in the CLC, their existence, cyclicality, and some research only concentrates on specific phases. Therefore, it can be postulated that CLC necessitates the establishment of a conceptual framework marked by precise coopetition parameters (Chen & Miller, 2012; Dorn et al., 2016), for instance, characteristics describing coopetition in terms of strategic, relational, and behavioral aspects (Klimas et al., 2025).

Changeable Characteristics Related to Coopetition

Coopetition relationships are shaped by the initial expectations of the partners involved, which develop throughout their duration as these relationships are managed (Dorn et al., 2016). Since coopetitive relationships are formed by specific characteristics, these characteristics also evolve throughout the coopetition's evolutionary process (Klimas et al., 2023) as coopetition is highly dynamic and changes over time (Chiambaretto & Fernandez, 2016). Also, the research on coopetition characteristics indicates their variability, which, when viewed through the lens of the life cycle perspective, may suggest that these characteristics may differ in various phases and, at the very least, may be perceived differently by managers. According to Dorn et al. (2016), as the coopetitive relationship is managed over time, the partners' expectations change due to the learning process that occurs during its course, as well as the varying experiences of the partners.

The literature on coopetition offers limited insights into how the characteristics of coopetition evolve. Only sparse information can be found suggesting that such changes occur concerning certain characteristics of coopetition, hence understanding the overall variability of coopetition characteristics is essential (Klimas et al., 2023), as different phases of the CLC may influence how these characteristics are perceived by managers from one side and how these characteristics change according to the specific phase of coopetition from other side. For example, the literature focusing on different coopetition's characteristics shows that coopetition is a dynamic (Czakon et al., 2014; Akpinar & Vincze, 2016; Chen et al., 2019) and paradoxical phenomenon (Park et al., 2014; Dorn et al., 2016; Bengtsson & Raza-Ullah, 2016) where connections between partners change over time also in terms of the intensity of paradoxicality and the speed (Czakon et al., 2014). Next, in coopetition, the successively and longitudinally built trust (one of the most frequently investigated characteristics of coopetition) plays a crucial role as one of the primary mechanisms by which the intensity of coopetition (another characteristic) enhances the performance of relationships (Raza-Ullah & Kostis, 2020) through collaborative experiences (Monticelli et al., 2018). Moreover, the changeable trust serves as a central element in the tensions and conflicts (further two characteristics) that arise within coopetitive environments, making it particularly challenging to establish trusting relationships between direct competitors (Lascaux, 2020). Also given the perspective of paradox theory, it is emphasized that contradictory yet interrelated elements exist under coopetition and endure over time, generating changeable tensions that cannot be permanently resolved but can be managed through cyclical interactions (Manzhynski & Biedenbach, 2023). All in all, it is commonly acknowledged that coopetition is full of tensions and conflicts (Tidström, 2014; Dorn et al., 2016) which, on the one hand, change and on the other hand are triggers for change of coopetition and its specificity (Minà & Dagnino, 2024) and can lead to changes in the development of coopetition, including the transition of coopetition to the next phase of the life cycle. According to Kostis et al., (2024) managing these tensions can change the coopetitive relationship, leading to transition from one phase of coopetition to another. In this context, while mutual dependence (also considered as a coopetition characteristic) is important for the longevity of relationships (another characteristic) and helps understand why firms seek long-term relationships, it may also be the key to understanding how firms navigate these tensions and maintain cooperation over time (Jakobsen, 2020). Although cooperation and competition coexist in coopetition, the intensity of competition and cooperation (other features of coopetition) changes over time (Park & Kim, 2020). As suggested by Dorn et al. (2016), coopetition partners may change their behavior from being more cooperative to becoming more competitive, while others lose interest and reduce their commitment to the partnership. Moreover, Park and Kim (2021), demonstrated that over time, the behaviors of coopetitors and the variations in coopetition strategies they employ change. Given the above, it can be assumed that changes in coopetitors' behaviors (behavioral characteristics like trust or conflict), coopetitive relationships (relational characteristics like tensions, mutual dependence or coopetition intensity), and coopetition strategies (strategic characteristics including paradoxicality and dynamics) do change over time, and do change across the phases of CLC.

Nonetheless, despite the above, we still have limited understanding of the changes in the coopetition phenomena (Devece et al. 2019; Bouncken et al. 2020a,b; Gari, 2021; Crick & Crick 2021b) and the explanation for its evolutionary development over time (Gelei & Dobos, 2024), including the changes of characteristics assigned to coopetition (Klimas et al., 2023a). Simultaneously, as managers should closely monitor the intentions and activities of individual partners of coopetitive relationship (Dorn et al., 2016), they need to understand how coopetition characteristics change over time. Better knowledge is needed to understand

how organizations can effectively manage coopetitive relationships (Manzhynski & Biedenbach, 2023). This may indicate the necessity to provide reasoning for research on the CLC and coopetition characteristics, including the coopetition characteristics specific (or at least identifiable) to a particular phase of the CLC. This paper is our response to fill the research gap related to the hidden logic of coopetition (Minà & Dagnino, 2024), namely, to investigate the characteristics assigned to coopetition through the CLC.

In this perspective, linking CLC and coopetition characteristics, it is noteworthy to consider the relatively new interaction perspective, wherein coopetition is perceived as a continuously evolving inter-organizational relationship that is relatively highly variable over time due to ongoing interactions among engaged coopetitors. These interactions mutually influence each other in real-time and shape the future behaviors and activities of coopetitors as well as their future interactions (Kostis et al., 2024). Adopting this perspective, it is reasonable to assume that interactions will likely impact behavioral characteristics (determined by coopetitors' actions) and relational characteristics (characterizing coopetitive relationships) of coopetition. It can also be inferred indirectly that, probably over the longer term, strategic characteristics (related to the coopetition strategies adopted by individual coopetitors) may also be influenced. Therefore, from an interaction perspective (Kostis et al., 2024), it can be assumed that characteristics attributed to coopetition will change over time and, consequently, throughout the life cycle of coopetition involving specific partners.

In summary, we argue that investigating the CLC regarding the perceived levels and relevance of coopetition characteristics would be reasoned. Firstly, as coopetition characteristics remain under-researched (Klimas et al., 2023b). Secondly, as changeable nature of coopetition characteristics (Czakon et al., 2014) can be potentially grasped across particular phases of the CLC. Given a more pragmatic perspective, we believe that in-depth exploration of the characteristics related to coopetition enables decisions on what to do (or not to do) to intentionally shape the characteristics over time in order to balance the tensions between cooperation and competition across the CLC and thus efficiently handle coopetition dynamics (Bengtsson et al., 2010a). Furthermore, focusing on the coopetition characteristics can stimulate the emergence of coopetition, and reveal the development process, which may ultimately affect not only coopetition (Basole et al., 2015; Fong et al., 2021) and its success (Klimas et al., 2025) but also firm performance (Minà & Dagnino, 2024).

METHOD

Our field study, based on identified gaps in knowledge (ref. to the CLC and particularly to coopetition characteristics across CLC), was directed towards exploration for discovery (Stebbins, 2001) by addressing three research questions: (1) what are the phases of the CLC utilized by coopeting companies and in which phase are they the most often, (2) how is the importance of characteristics attributed to coopetition perceived in different phases of the CLC, and (3) is the perception of the importance of characteristics attributed to coopetition significantly variable throughout the CLC?

Fulfilling the goal related to exploration and theory building regarding the levels and variability of characteristics assigned to coopetition across the different phases of the CLC required preparatory research activities. The key issue was that while the literature addresses the topic of characteristics, it does not provide a CLC model. Therefore, before undertaking the main research focused on the posed research questions, preliminary actions were taken to verify and adapt the life cycle model of broader inter-organizational relationships (IOR; using the framework by Klimas et al., 2023) to the context of specific IORs, namely coopetition relationships (Bills et al., 2021). Only after establishing the CLC model (presented later in this part of the paper) was it possible to seek answers to the research questions posed.

Variables

This study explores a diverse array of variables, with the majority focusing on coopetition characteristics and one specifically addressing the phases of the CLC.

Regarding coopetition characteristics, we explore two strategic (paradoxicality and dynamics), six relational (asymmetry, complexity, intensity, mutual dependence, strength, and tensions), and five behavioral (competition intensity, conflict, formality, investments, and trust) characteristics within the scope of our study. The survey questionnaire adopted the scales developed and tested by Klimas et al. (2025) and thus consisted of altogether 77 Likert-scale-based questions for two strategic characteristics, six relational characteristics, and five behavioral characteristics. The internal consistency of measurements was checked using Cronbach's alpha, and all alphas taped into the recommended tolerance range (Table 1) ranging from 0.7 to 0.95 (Bland & Altman, 1997; DeVellis, 2003).

Table 1. Measurement of coopetition characteristics adopted from Klimas et al. (2025)

Coopetition characteristics	Cronbach's α
Strategic characteristics	
Paradoxicality – 7 items inspired by: Crick & Crick, 2019; Raza-Ullah, 2020; Ricciardi et al., 2022.	0.8048
Dynamics – 7 items inspired by: Osarenkhoe, 2010; Czakon et al., 2014; Bouncken et al., 2018; Kwon et al., 2020; Jakobsen, 2020; Amata et al., 2021.	0.885
Relational characteristics	
Asymmetry – 6 items inspired by: Osarenkhoe, 2010; Pellegrin-Boucher et al., 2013; Raza-Ullah et al., 2014; Dorn et al., 2016; Lechner et al., 2016; Monticelli et al., 2018; Yoo et al., 2019; Jakobsen, 2020; Kwon et al., 2020; Munten et al., 2021; Meena et al., 2022; Yoo et al., 2022.	0.8418
Complexity – 5 items inspired by: Geurts et al., 2022	0.8669
Intensity – 6 items inspired by: Petter et al., 2014; Raza-Ullah & Kostis, 2020.	0.8654
Mutual dependence – 5 items inspired by: Petter et al., 2014; Jakobsen, 2020; Garri, 2021; Muthusamy & Dass, 2021.	0.7801
Strength – 8 items inspired by: Shi et al., 2009; Dorn et al., 2016; Klimas et al., 2021	0.8796
Tensions – 5 items inspired by: Bouncken et al., 2017; Bouncken et al., 2018; Jakobsen, 2020; Lascaux, 2020; Raza-Ullah, 2020	0.8828
Behavioral characteristics	
Formality – 5 items inspired by Liu et al., 2010; Bouncken et al., 2020; Amata et al., 2022; Telg et al., 2023	0.9213
Competition intensity – 6 items inspired by: Bouncken & Friedrich, 2012; Bouncken & Kraus, 2013; Chen et al., 2020; Bouncken et al., 2020; Rai et al., 2023	0.8587
Conflict – 6 items inspired by: Sharma et al., 2015; Dorn et al., 2016; Gast et al., 2015; Chai et al., 2020; Jakobsen, 2020	0.9032
Investments – 5 items inspired by: Liu et al., 2015; Petter et al., 2014; Klimas et al., 2023b	0.8650
Trust – 6 items inspired by: Bouncken & Friedrich, 2012; Monticelli et al., 2018; Peng et al., 2018; Bouncken et al., 2020; Chai et al., 2020; Lascaux, 2020; Raza-Ullah & Kostis, 2020	0.8874

Source: Own calculations using Statistica.

To measure the CLC, due to the deficit of such a model in the coopetition literature, we have chosen to verify and adapt the life cycle model of IOR (Klimas et al., 2023). This verification and adaptation were made using two focused group interviews (FGI) (Millward, 1995), acknowledged as suitable in the context of validation and development of the proposed measurement approach (Powell et al., 1996). Our FGIs were finished and analyzed before implementing our core research investigations as they were used as a preparatory research activity.

The interviews took place in May and June 2022 and were carried out by a research company, with the authors serving as passive observers throughout the study. The interview participants were managers representing manufacturing companies experienced in coopetition, classified as low-tech (LT, first FGI) and high-tech (HT, second FGI) companies. In each interview, six managers participated, and the duration of each FGI was around 120 minutes. The interview guide presented and deeply discussed the course of the CLC concerning the basic model of the inter-organizational relationship life cycle (based on Klimas et al., 2023). During the study, emphasizing the dynamic, developmental, and evolutionary nature of coopetition, the FGI participants were asked to relate to the basic life cycle, including identifying elements that were consistent, different, missing, or unnecessary in the light of their and their companies' experiences with coopetition strategies, coopetitive relationships, and coopetitive behaviors. Based on the obtained opinions and ongoing discussions, a CLC model (Table 2) was developed and used in the quantitative research.

Table 2. Coopetition life cycle (CLC) framework

Initiation phase
Initiation: first contact, formal establishment of a relationship, checking mutual compatibility/convergence, considering and establishing common goal. Early development: a high, although declining rapidly, level of uncertainty and distance, a low, but increasing dynamically level of trust, commitment, mutual adaptation, significant, valuable and fast changes in exchange of resources.
Development phase
The first experience of coopetition- initiation of operational-level activities; systematic and gradual strengthening of coopetition through recognition of partner's competencies; mutual planning of activities; setting priorities and formalizing coopetition details; regular contacts and socialization (enrichment of inter-organizational relationships with interpersonal ones resulting from frequent communication and operational contacts); relatively low level of engagement in partner and shared business affairs but systematic and quite significant increase of commitment and investments. Development of personal relationships and mutual trust.

Maintenance phase		
Stabilization of partners' commitment in the relationship; management and ongoing operational shaping of coopetition; systematically pursuing the objectives set by joint agreement, negotiation and self-control; slowing down further mutual adjustments of coopetitors through agreements and management mechanisms; continuing mutual investments in the relationship but at a stable level.		
Evaluation phase		
Verification of coopetition and its efficiency; assessment of experiences gained through cooperation with a competitor; evaluation of costs and benefits arising from staying in the relationship and terminating ties with resources.		
Continuation phase	***Dormancy phase***	***Termination phase***
The agreement is continued, renewed, or a new cooperation agreement is signed (targeting new shared goals). The implementation of additional joint initiatives ensues; Maintaining commitment to the relationship at the same or higher level; Sustaining or increasing the transfer of resources between partners.	Stagnation of coopetition or the formal agreement is dissolved, but certain bonds, interactions, ties, exchanges are exploited or maintained. There is mutual communication (or even insignificant flows of other resources) as partners recognize opportunities or options for future coopetition.	The agreement is terminated, resulting in the cessation of flows of any resources, including formal (and perhaps informal) communication. Partners do not see any need for further cooperation, therefore no bonds, interactions, ties, or exchanges are exploited or even silently maintained.
Reactivation phase		
The relationship is re-born as partners re-engage in the execution of assigned operational actions, and thus exchanges of resources appear again. Partners re-start coopetition as prior obstacles have disappeared so the resource re-starts to flow.		

Source: Based on Klimas et al. (2023) and own qualitative research (2 focus group interviews with managers representing manufacturing companies classified as Low-Tech or High-Tech).

Importantly, concerning the reference IOR life cycle model (Klimas et al., 2023), an evaluation phase (which was suggested by the FGIs participants and is also additionally consistent with the suggestions of Dorn et al., 2016) and a reactivation phase (which was discussed by managers and is also additionally consistent with the suggestions of Tidström and Rajala, 2016, indicating the possibility of active actions by coopetitors after periods of silence) was introduced into the developed CLC model. First, our interlocutors pointed out the need for temporal evaluation, including the reasoning for its continuation based on mutual engagement, as well as the adequacy of strategic assumptions in the context of market dynamics - "*Assessment is crucial! Well, yes, because a change in the market situation might force me to renegotiate contracts with partner, and that's already a significant factor in the tug of war, or even in breaking the tie altogether*" (HT_V). Second, quite typical for participants there is a coopetition reactivation, for instance: "*In our case, the first business contact happened a while ago, with an old director, but the cooperation didn't materialize. It only took place once a new director came on board*" (HT_III); "*Then, after a few years, we no longer felt like cooperating, because there was still this lingering sense that it wasn't entirely fair (*it refers to the partner's opportunistic behavior – our note)*. But when people changed, and the market changed, sometimes it's worth trying to come back*" (LT_II). Additionally, the division of life cycle phases into sub-phases (passive, active, and reactivation) was abandoned; as for the respondents of FGI, the phases are relatively internally coherent, and (at least in their opinions) it was not justified to divide them further.

In the quantitative study, we employed the CLC model, developed through the verification of FGIs as outlined in Table 2, to identify the dominant phase of the CLC and assess the level of individual characteristics across different phases. The following eight potential phases were considered: initiation phase; development phase; maintenance phase; evaluation phase; continuation of cooperation phase; dormant phase; termination phase; and reactivation phase.

It is worth noting that respondents were initially asked to choose and focus on the most important coopetition in their company's past experiences. Selecting a particular coopetition case was pivotal for determining its developmental phase and evaluating the significance of individual characteristics within that specific coopetition instance. In terms of identifying of CLC phases, considering the variable and evolving nature of coopetition, respondents were requested to specify which of the outlined CLC phases (Table 2) most accurately encapsulates the specificity, state, character, and development stage of the chosen coopetition case.

Quantitative data gathering and sampling

The first stage of the research entailed carefully selecting a sample group of 1200 representatives. Our large-scale surveying was run in one specific national and industry context, namely manufacturing enterprises. Given the scarcity of studies spanning multiple industries (Strese et al. 2016; Estrada & Dong, 2020), the survey was run in a group of manufacturing enterprises with no specific industry restrictions. As coopetition is claimed as applicable and beneficial for firms operating in a wide range of industries (Gast et al., 2015), however when it comes to the previous research, this dominates in the high-tech

firms (Basole et al., 2015; Garri, 2021; Park & Kim, 2021) (also focused on coopetition characteristics – e.g. Bouncken et al., 2020; Jakobsen, 2020; Xu et al., 2021). Considering that coopetition is claimed to be industry sensitive phenomena (Czakon et al., 2014) we saw it important not to limit the scope of our study to one industry. Instead, we decided to investigate manufacturing companies. Moreover, given the asymmetrical focus on high-tech firms of previous research interests, we decided to collect and compare the data from manufacturing companies classified either as high-tech or low-tech according to the Polish Classification of Business Activity (https://www.biznes.gov.pl/pl/tabela-pkd). To facilitate comparisons among quotas associated with manufacturers varying in technological intensity, the selection process entailed including companies that met predefined study criteria, thereby categorizing them as representatives of either the Low-Tech or High-Tech sectors. The Low-Tech sector included businesses from two sections of the Polish Classification of Business Activities (PKD), while High-Tech from eleven sections. Information was gathered from managers who represented industrial firms with a background in engaging in coopetition from both low-tech and high-tech industrial firms.

It is worth highlighting the deliberate narrowing of the target sample to one country, which is typical and even recommended in coopetition research (e.g., Meena et al., 2023). This approach also helps minimize the variation in the included sub-samples in aspects other than the intended one, namely the level of technological advancement.

Between December 2022 and March 2023, quantitative data were acquired by a mixed-mode approach, utilizing CATI, CAWI, and CAWI supported by the phone. A reputable research agency conducted the process (under sound supervision of the research team) and successfully received a higher number of questionnaires - a total of 1231. These questionnaires were obtained from 909 low-tech firms and 322 high-tech firms, where respondents were 600 managers responsible for inter-organizational relationships, 626 executive employees engaged in inter-organizational relationships, and 5 marketing specialists.

Quantitative data Analysis

Before proceeding to the primary analyses focused on the research questions (RQ1-RQ3), the normality of the distribution of all core variables was assessed. Considering the sample size (N=1231), normality testing of variable distributions was conducted using two tests: Lilliefors (applied to large samples) and Shapiro-Wilk (typically used for samples below 2000 observations). The results of both tests for all characteristics indicated a lack of normality in the distributions (p-value below 0.05, as shown in Table 3), implying the necessity of employing non-parametric ANOVA during the final analyses and using median values (rather than means) for comparisons.

Table 3. Normality and descriptives of raw data

Coopetition characteristics	Normality tests					Descriptives				
	N	max D	p-value Lillefors	W	p-value Shapiro-Wilk	Mean	Confidence -95%	Confidence +95%	Median	SD
Strategic characteristics										
Dynamics	1231	0.113	p < .01	0.972	0.000	4.125	4.065	4.185	4.286	1.067
Paradoxicality	1231	0.072	p < .01	0.976	0.000	4.806	4.760	4.852	4.857	0.828
Relational characteristics										
Asymmetry	1231	0.103	p < .01	0.975	0.000	3.960	3.917	4.003	**4.000**	0.769
Complexity	1231	0.102	p < .01	0.974	0.000	4.500	4.439	4.561	**4.600**	1.090
Intensity	1231	0.070	p < .01	0.983	0.000	4.554	4.506	4.601	**4.500**	0.849
Mutual dependence	1231	0.076	p < .01	0.981	0.000	4.658	4.608	4.708	**4.600**	0.902
Strength	1231	0.064	p < .01	0.986	0.000	4.928	4.882	4.975	**4.875**	0.833
Tensions	1231	0.104	p < .01	0.980	0.000	3.589	3.529	3.648	**3.600**	1.065
Behavioral characteristics										
Competition intensity	1231	0.073	p < .01	0.987	0.000	4.586	4.530	4.641	4.500	0.993
Conflict	1231	0.078	p < .01	0.989	0.000	4.374	4.307	4.440	4.167	1.191
Formality	1231	0.098	p < .01	0.941	0.000	4.760	4.693	4.828	5.000	1.204
Investments	1231	0.098	p < .01	0.977	0.000	4.551	4.492	4.610	4.600	1.057
Trust	1231	0.093	p < .01	0.982	0.000	5.043	4.996	5.090	5.000	0.838

Source: Own calculations using Statistica.

The main analysis was conducted in three stages, each addressing a specific research question. First, the phase of the life cycle in which the surveyed firms undertake coopetition was determined using frequency analysis. In the second stage, by utilizing the median, the meaning of sets of strategic, relational, and behavioral characteristics attributed by managers across different phases of the CLC was determined. Finally, in the third stage, employing non-parametric ANOVA, specifically the Kruskal-Wallis test, initially, the study examined whether the significance of characteristics varies significantly across different phases of CLC. Then, multiple comparative tests were employed to confirm and specify the results (including identifying phases between which the perception of the significance of individual characteristics significantly differs).

RESULTS

The presentation of the analysis results followed the sequence of our research questions. Therefore, initially, we identified the phases of the CLC through which coopetition of manufacturing companies is executed and shown the phase in which they are present in the most often. Following this, we determined the significance attributed to characteristics in various CLC phases and subsequently examined whether the perception of this significance significantly changes across different phases of the CLC.

Phases of Coopetition Utilized by Manufacturing Companies

The first research question aimed at exploring if all of the assumed phases of CLC (Table 2) are identifiable in practice and in which phases of the life cycle the surveyed manufacturing companies are (ref. to RQ1). Our analysis initially focused on identifying the life cycle phase of coopetition about which managers assessed the importance of the examined characteristics assigned to coopetition phenomena. As the results (Table 4) indicate, most surveyed coopetitions are in the maintenance phase (N=392 firms, 31.84%). The least number of respondents identified coopetition that had already ended as the key coopetition in evaluating its characteristics (N=16 firms; 1.3%).

Table 4. Phases of coopetition adopted by manufacturing companies

Phases of CLC	Full sample		High-Tech		Low-Tech	
	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage
Initiation	69	5.61%	17	5.28%	52	5.72%
Development	199	16.17%	60	18.63%	139	15.29%
Maintenance	392	**31.84%**	107	**33.23%**	285	**31.35%**
Evaluation	178	14.46%	56	17.39%	122	13.42%
– Continuation	317	25.75%	69	21.43%	248	27.28%
– Dormancy	42	3.41%	6	1.86%	36	3.96%
– Termination	16	**1.30%**	3	**0.93%**	13	**1.43%**
Reactivation	18	1.46%	4	1.24%	14	1.54%
In total	**1231**	**100.00%**	**322**	**100.00%**	**909**	**100.0%**

Source: Own calculations using Statistica.

Interestingly, a significant 25.75% of responses (N=317 firms) pertained to coopetition in the continuation phase. In general, continuation has been shown as the most common scenario following the evaluation phase (other possible scenarios at this stage of development: dormancy 3.45% and termination 1.30% of the total responses), which may suggest a relatively high satisfaction with the assessment of the coopetition progress in the earlier stages of the life cycle. Considering the technological advancement of surveyed firms, one may notice that it is hard to find differences in terms of the life cycle phases of the utilized coopetition.

The Perceived Relevance of Coopetition Characteristics Across the Phases of CLC

Next, considering both the characteristics and the phases of CLC, we aimed at recognition of the perceived relevance of the characteristics across the coopetition development path (ref. to RQ2). In general, the results suggest that all considered characteristics are deemed significant, with medians consistently above the midpoint of the measurement scale, across all phases of the CLC - Table 5. Specific exceptions arise, notably with conflict and asymmetry, as they generally exhibit the least significance across individual phases compared to other coopetition characteristics. On the one hand, conflict in the initiation,

termination, and reactivation phases seems to be considered unimportant for managers (medians below the midpoint). On the other hand, asymmetry seems to be perceived as not so relevant in evaluation, dormancy, and reactivation.

Table 5. Coopetition characteristics across the phases of coopetition life cycle (CLC)

Coopetition characteristics	Strategic characteristics		Relational characteristics						Behavioral characteristics				
Phase of coopetition life cycle (CLC)	Dynamics	Paradoxicality	Asymmetry	Intensity	Complexity	Mutual dependence	Strength	Tensions	Competition intensity	Conflict	Formality	Investments	Trust
Full sample N=1231													
Initiation	4.00	4.71	4.00	4.42	4.20	4.20	4.75	3.40	4.50	3.83	4.60	4.60	**5.00**
Development	4.14	**5.00**	4.00	4.67	4.40	4.60	4.88	3.60	4.67	4.33	**5.00**	4.80	**5.00**
Maintenance	4.14	4.86	4.00	4.50	4.60	4.80	5.00	3.60	4.50	4.67	5.00	4.60	**5.17**
Evaluation	4.29	**5.00**	3.83	4.50	4.80	4.60	**5.00**	3.60	4.50	4.50	**5.00**	4.50	**5.00**
– Continuation	4.43	4.71	4.00	4.50	4.60	4.60	4.88	3.40	4.50	4.00	**5.00**	4.40	**5.00**
– Dormancy	**4.64**	4.29	3.83	4.21	4.00	4.20	4.25	3.00	4.33	4.00	4.20	4.20	4.50
– Termination	4.43	4.14	4.08	4.13	4.20	4.00	4.00	3.50	4.00	3.08	**5.00**	4.30	4.00
Reactivation	4.36	4.50	3.91	4.50	4.30	4.50	4.81	3.10	4.67	3.92	**5.00**	4.40	4.83
High-Tech N = 322													
Initiation	4.14	4.86	3.50	4.50	4.20	4.80	4.75	3.00	4.33	3.83	5.00	4.80	5.00
Development	4.57	5.07	3.83	4.75	4.80	5.00	5.00	3.60	4.83	4.33	5.30	5.00	5.17
Maintenance	4.43	5.00	3.83	4.67	4.80	4.80	5.00	3.80	4.50	4.67	5.20	4.80	5.00
Evaluation	4.29	5.00	3.83	4.42	4.60	4.40	4.88	3.60	4.33	4.67	5.10	4.20	5.00
– Continuation	4.43	4.86	3.83	4.58	4.60	4.60	4.88	3.40	4.67	4.00	5.00	4.40	5.00
– Dormancy	4.43	3.93	3.75	4.25	3.80	4.10	4.13	3.30	4.58	3.83	3.90	4.10	4.50
– Termination	4.43	4.00	4.17	4.17	4.20	3.80	4.25	3.60	4.00	2.83	5.20	4.60	4.00
Reactivation	4.29	4.07	4.08	4.25	4.30	4.50	4.44	3.20	4.58	3.92	4.80	3.80	4.42
Low-Tech N = 909													
Initiation	4.00	4.50	4.17	4.33	4.30	4.20	4.69	3.60	4.50	3.92	4.60	4.40	5.00
Development	4.00	4.71	4.17	4.58	4.40	4.60	4.63	3.60	4.50	4.33	4.80	4.60	5.00
Maintenance	4.00	4.86	4.00	4.42	4.60	4.80	5.00	3.60	4.50	4.67	5.00	4.60	5.17
Evaluation	4.14	5.00	3.83	4.63	4.80	4.80	5.00	3.40	4.50	4.33	5.00	4.60	5.00
– Continuation	4.29	4.71	4.00	4.42	4.50	4.60	5.00	3.60	4.50	4.00	4.80	4.40	5.00
– Dormancy	4.64	4.29	3.83	4.21	4.10	4.20	4.25	3.00	4.33	4.00	4.20	4.30	4.50
– Termination	4.43	4.14	4.00	3.83	4.20	4.00	3.88	3.40	4.00	3.17	5.00	4.20	4.00
Reactivation	4.43	4.64	3.83	4.58	4.60	4.50	4.94	3.10	4.67	3.92	5.00	4.70	5.00

Source: Own calculations using Statistica.

Concerning individual phases and levels of significance attributed to various strategic, relational, and behavioral characteristics, it can be observed that there is considerable variability in the importance of these characteristics. On the one hand, the generally perceived relevance of all of the characteristics varies across the stages of CLC, and it is the highest in the maintenance and evaluation phases (whereas just slightly lower in the development and continuation) while it is the lowest in the termination phase (whereas just slightly higher in the dormancy phase). Conversely, varying significance levels are attributed to different characteristics depending on the phase of the CLC. Furthermore, diverse characteristics are identified with the highest and lowest importance in the opinion of the surveyed managers.

In the initiation phase, managers accord the highest importance to trust, which may be crucial for initiating collaboration with partners that are (often direct) competitors. Simultaneously, conflict is perceived as the least significant, potentially owing to its limited emergence at this stage or being overlooked by the emphasis on a shared goal and other arguments in favor of coopetition. Then, in the development phase, paradoxicality, formality, and trust are deemed most important, while dynamics appears to be the least relevant. The significant role assigned to paradoxicality and formality may stem from the real operational-level collaboration involving the actual transfer of resources (including intangible ones) between competitors, which may require special attention to formal solutions.

According to managers' opinions in the maintenance phase, the extreme importance of characteristics is shaped similarly to the development phase. However, in addition to trust and formality, strength is also important. Dynamics continues to be perceived as the least important, possibly because it is inherently integral to coopetition (Czakon et al., 2014; Klimas et al., 2023), and thus, it is accepted and tolerated but also it may be minimized through the strong formalization of relationships and trust-based coordination mechanisms.

In the evaluation phase, the specificity of coopetition appears to gain particular importance, as four characteristics reach the highest ranks: paradoxicality, strength, formality, and trust. Dynamics continues to be the characteristic with the least perceived importance. Overall, in the evaluation phase, all characteristics are attributed the highest significance compared to other phases, which may indicate their crucial role in the development path of coopetition (the further trajectory depends on its progress: continuation, dormancy, or termination), confirming the assumptions made by Dorn et al. (2016).

If coopetition is continued, trust and formality are consistently perceived as the most important, while investments are considered the least important. This may be due to the maintenance of existing coopetition, its goals and assumptions, where no new, changed, or increased mutual investments may be required.

Then, if after evaluation coopetition goes into a dormant phase, an overall decrease in the perceived importance of all considered characteristics can be observed. Moreover, dynamics, often considered a characteristic of relatively low importance in previous development phases, exhibits the highest perceived significance for coopetition in this phase. Complexity and conflict are characterized by the least perceived importance during dormancy, which is quite logical as the interactions are passive (if any).

Following the evaluation, coopetition may also be terminated. In this case, formality assumes the greatest importance, likely due to the necessity of fair settlement and the definitive end of cooperation between competitors without harm to either party. Conflict is assigned the least significance (the lowest median among all characteristics and all considered phases at 3.08), which is understandable when cooperation ends, as the matter of being in conflict with a partner with whom paths diverge becomes inconsequential.

Then, if coopetition is reactivated, the characteristics perceived as important situation seems to stabilize. Formality is again perceived as the most important, while conflict is seen as the least important. It is noteworthy to observe the level of perceived importance of trust, which in this phase (excluding the situations of dormancy or termination where there is no resource exchange and pro-cooperative interactions) has a value below 5. This may signal that confidence has emerged without requiring specific "care" for inter-organizational trust, but it may also suggest a lower level of trust in coopetition, thereby indicating a higher risk of opportunistic behaviors.

When it comes to the median levels across low-tech and high-tech firms, these levels are generally very close, although slight differences can be observed. Regarding the phase in which characteristics are generally attributed the greatest significance, for high-tech firms, it is the development phase (followed by the maintenance phase), while for low-tech firms, it is the maintenance and evaluation phases. Formality and trust are the characteristics with the highest attributed significance in both types of firms. In the case of high-tech firms, trust seems to have slightly greater significance than formalization, whereas for low-tech firms, it is the opposite. In both cases, the attribute with the least significance in managers' opinions is asymmetry.

Changeability of the Perceptions about the Relevance of Coopetition Characteristics Across the Phases of the CLC

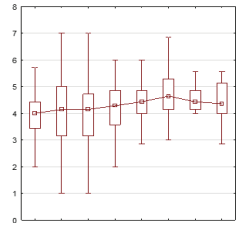
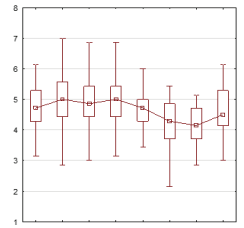
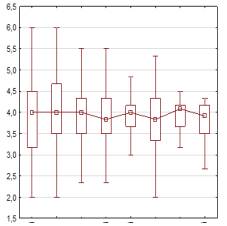
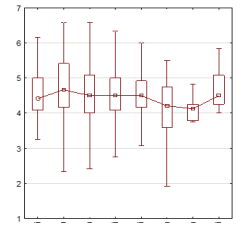
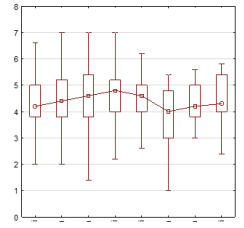
Finally, our study aimed to verify whether the perception of the importance of characteristics attributed to coopetition significantly changes throughout the CLC (ref. to RQ3). The brief analysis of the medians of the perceived relevance of considered characteristics suggests that they differ across the development phases of coopetition. Nonetheless, a brief analysis of descriptives is not sufficient to say that the differences are significant; further analyses were carried out. Considering the results of testing the assumption of normal data distribution, the analysis of differences in the perception of the importance of particular characteristics started with nonparametric ANOVA using the Kruskal-Wallis test and multiple comparison analyses.

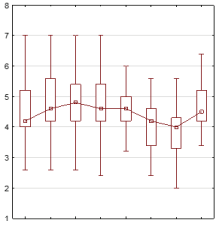
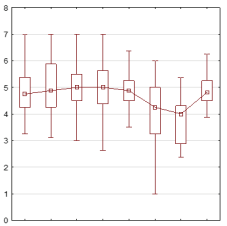
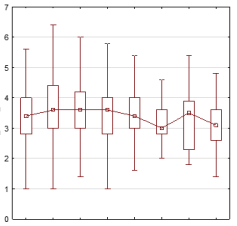
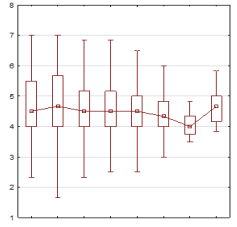
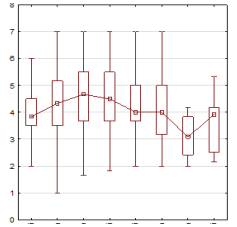
For the collected data, the values of the Kruskal-Wallis test statistic range from 9.06 to 56.38 and are statistically significant for twelve out of thirteen characteristics assigned to the coopetition phenomenon.

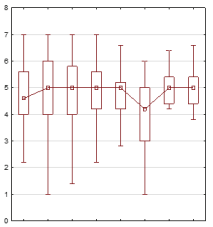
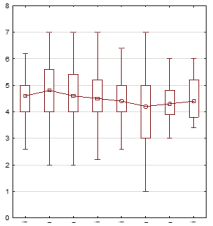
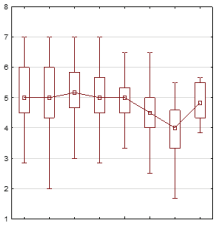
The only exception is asymmetry, for which managers' perceptions do not show any statistically significant differences regarding individual phases of coopetition. This means that, in general, the perceptions of the rest of the considered characteristics show significant differences in the life cycle phases. However, the testing does not indicate between which phases or what type of differentiation in assessments occurs. Therefore, multiple comparison analyses were carried out.

The results of multiple comparison tests in a quantitative-visual form are presented in summary in Table 6. All in all, our results point to our three (out of thirteen) characteristics for which the perceived meaning does not change across the CLC: asymmetry, tensions, and competition intensity.

Table 6. Kruskal-Wallis tests - the p-value for multiple comparisons (two-sided)

Phases of CLC	I	D	M	E	- C	- Dr	- T	R	Graphical representation	Main results	Main managerial implications
STRATEGIC - DYNAMICS											
Initiation (I)		1.000	1.000	1.000	1.000	0.088	1.000	1.000		The perception of the meaning of dynamics generally increases during the development of coopetition, being significantly higher in the development phase than in the dormant phase and also higher in the maintenance phase than in the termination phase. However, it significantly decreases when coopetition transitions from dormancy to termination.	The significance of coopetition dynamics seems to become more pronounced after the evaluation phase. This is a moment when it is worth paying more attention to it.
Development (D)	1.000		0.082	1.000	1.000	0.004	1.000	0.508			
Maintenance (M)	1.000	0.082		1.000	1.000	0.888	0.006	1.000			
Evaluation (E)	1.000	1.000	1.000		1.000	1.000	1.000	1.000			
– Continuation (C)	1.000	1.000	1.000	1.000		0.040	1.000	1.000			
– Dormancy (Dr)	0.088	0.004	0.888	1.000	0.040		0.003	1.000			
– Termination (T)	1.000	1.000	0.006	1.000	1.000	0.003		0.945			
– Reactivation (R)	1.000	0.508	1.000	1.000	1.000	1.000	0.945				
STRATEGIC - PARADOXICALITY											
Initiation		1.000	0.355	1.000	1.000	0.000	1.000	0.004		The perception of paradoxicality remains relatively stable, with exceptions in phases that may follow the evaluation. Particularly, in the dormancy phase, it is perceived as significantly less important than in the initiation and maintenance phases. It is also noteworthy that paradoxicality is evaluated as more significant in the reactivation phase than in initiation, continuation, or termination.	The interplay of competition and cooperation appears to be particularly important in all active phases of coopetition. Therefore, addressing paradoxes remains crucial continuously until coopetition is dormant or terminated.
Development	1.000		1.000	1.000	1.000	0.138	1.000	0.222			
Maintenance	0.355	1.000		1.000	0.526	0.014	0.243	0.087			
Evaluation	1.000	1.000	1.000		1.000	1.000	1.000	1.000			
– Continuation	1.000	1.000	0.526	1.000		0.000	1.000	0.005			
– Dormancy	0.000	0.138	0.014	1.000	0.000		0.000	1.000			
– Termination	1.000	1.000	0.243	1.000	1.000	0.000		0.005			
Reactivation	0.004	0.222	0.087	1.000	0.005	1.000	0.005				
RELATIONAL - ASYMMETRY											
Initiation Development Maintenance Evaluation – Continuation – Dormancy – Termination Reactivation	In light of the Kruskal-Wallis test results, "Asymmetry" does not show any significant differences with respect to individual phases of coopetition (test statistic = 9.06; p-value = 0.248).									The perception of the importance of asymmetry shows no variability during the duration of coopetition. Furthermore, throughout the CLC, it is assessed as relatively less significant.	The low weights assigned to asymmetry, coupled with the absence of differences in its perception, suggest that asymmetry should not be a barrier to forming coopetition and maintaining it over the long term.
RELATIONAL - INTENSITY											
Initiation		1.000	1.000	1.000	1.000	0.036	1.000	0.063		Regarding the perceived relevance of coopetition intensity, it significantly decreases in dormancy phase when compared to initiation and continuation phases. Another significant difference refers to increase of its perception between continuation and reactivation.	As the meaning of coopetition intensity is rather stable across the CLC, it deserves continuous monitoring. Nonetheless, managers should be aware that if coopetition is reactivated, then the perceived meaning of its intensity may gain in strength.
Development	1.000		1.000	1.000	1.000	0.482	1.000	0.290			
Maintenance	1.000	1.000		1.000	0.371	0.141	1.000	0.165			
Evaluation	1.000	1.000	1.000		1.000	0.833	1.000	0.353			
– Continuation	1.000	1.000	0.371	1.000		0.002	0.773	0.010			
– Dormancy	0.036	0.482	0.141	0.833	0.002		0.067	1.000			
– Termination	1.000	1.000	1.000	1.000	0.773	0.067		0.107			
Reactivation	0.063	0.290	0.165	0.353	0.010	1.000	0.107				
RELATIONAL - COMPLEXITY											
Initiation		0.545	1.000	1.000	1.000	0.002	1.000	1.000		As coopetition develops, the perception of its complexity increases. However, the significant increase comes when coopetition taps into dormancy phase (ref. to initiation, maintenance, continuation, and termination phases).	Given that the perception of coopetition intensity increases across the phases of CLC, managers should be ready for the need of more intense coordination of more complex coopetition relationships. Only if coopetition is dormant, due to the passive nature of coopetition in this phase coordination may not be at the top of their interest.
Development	0.545		1.000	1.000	1.000	1.000	1.000	1.000			
Maintenance	1.000	1.000		1.000	1.000	0.030	1.000	1.000			
Evaluation	1.000	1.000	1.000		1.000	1.000	1.000	1.000			
– Continuation	1.000	1.000	1.000	1.000		0.026	1.000	1.000			
– Dormancy	0.002	1.000	0.030	1.000	0.026		0.009	1.000			
– Termination	1.000	1.000	1.000	1.000	1.000	0.009		1.000			
Reactivation	1.000	1.000	1.000	1.000	1.000	1.000	1.000				

Phases of CLC	I	D	M	E	- C	- Dr	- T	R	Graphical representation	Main results	Main managerial implications
RELATIONAL - MUTUAL DEPENDENCE											
Initiation		1.000	1.000	1.000	1.000	0.021	1.000	0.032		Mutual dependence is the next relational attribute for which its perception increases together with coopetition development but decreases if coopetition turns into a dormant or terminated relationship and increases again if coopetition is reactivated.	Our study provides evidence that mutual dependency is perceived as important and increasing if coopetition is active. For the managers, it means that if coopetitive relationships are utilized, they should remember that firm's activity, including its strategic movements are not fully independent from the activity and strategic movements of coopetitors.
Development	1.000		1.000	1.000	0.632	1.000	1.000	0.447			
Maintenance	1.000	1.000		1.000	0.406	0.072	0.585	0.078			
Evaluation	1.000	1.000	1.000		1.000	1.000	1.000	0.631			
– Continuation	1.000	0.632	0.406	1.000		0.001	1.000	0.004			
– Dormancy	0.021	1.000	0.072	1.000	0.001		0.001	1.000			
– Termination	1.000	1.000	0.585	1.000	1.000	0.001		0.006			
Reactivation	0.032	0.447	0.078	0.631	0.004	1.000	0.006				
RELATIONAL – STRENGTH											
Initiation		1.000	1.000	1.000	1.000	0.000	1.000	0.000		The perception of the meaning of coopetition strength develops systematically. The majority of significant differences in its perception refer to two phases. Firstly, the perception of its relevance decreases significantly in dormancy (if compared to initiation, maintenance, continuation, and termination). Secondly, the perception of its relevance significantly increases in reactivation (if compared to all of the phases excluding evaluation and dormancy).	Given our results regarding the level and perception of the meaning of coopetition strength, managers should be aware that the strengths develop across the CLC, and it will be harder to terminate the relationship at hoc. It may suggest to the need to build up a high level of relational capability, including the capability of ending the relationship (Mitręga & Pfajfar, 2015).
Development	1.000		1.000	1.000	1.000	0.110	0.703	0.016			
Maintenance	1.000	1.000		1.000	1.000	0.000	1.000	0.000			
Evaluation	1.000	1.000	1.000		1.000	0.440	1.000	0.051			
– Continuation	1.000	1.000	1.000	1.000		0.001	1.000	0.000			
– Dormancy	0.000	0.110	0.000	0.440	0.001		0.000	1.000			
– Termination	1.000	0.703	1.000	1.000	1.000	0.000		0.000			
Reactivation	0.000	0.016	0.000	0.051	0.000	1.000	0.000				
RELATIONAL - TENSIONS											
Initiation		1.000	1.000	1.000	1.000	1.000	1.000	1.000		Our analysis shows the perception of tensions as not significantly changeable across the CLC.	Considering that perceived relevance of tensions remain significantly unchanged, continuous monitoring of tensions is recommended. Given the considerable body of knowledge in the area of tensions, it seems that particular attention should be paid to monitoring tensions related to information flows.
Development	1.000		1.000	1.000	1.000	1.000	1.000	1.000			
Maintenance	1.000	1.000		1.000	1.000	0.759	1.000	1.000			
Evaluation	1.000	1.000	1.000		0.521	1.000	0.463	1.000			
– Continuation	1.000	1.000	1.000	0.521		0.245	1.000	1.000			
– Dormancy	1.000	1.000	0.759	1.000	0.245		0.176	1.000			
– Termination	1.000	1.000	1.000	0.463	1.000	0.176		1.000			
Reactivation	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
BEHAVIORAL - COMPETITION INTENSITY											
Initiation		1.000	1.000	1.000	1.000	1.000	1.000	0.376		Another attribute which perception was found as significantly unchangeable across the coopetition development path there is competition intensity. Even though the box plot shows a slight decrease in the termination phase, this decrease of its perception is not significant.	The perception of competition intensity determined by competitive actions undertaken by coopetitors does not change significantly in the coopetition process. It is recommended to remember that coopetition link the firm has with competitors and that is why the firm should be ready for opportunistic behaviors all of the time.
Development	1.000		1.000	1.000	1.000	1.000	1.000	0.249			
Maintenance	1.000	1.000		1.000	1.000	1.000	1.000	0.404			
Evaluation	1.000	1.000	1.000		1.000	1.000	1.000	0.574			
– Continuation	1.000	1.000	1.000	1.000		0.870	1.000	0.052			
– Dormancy	1.000	1.000	1.000	1.000	0.870		1.000	1.000			
– Termination	1.000	1.000	1.000	1.000	1.000	1.000		0.319			
Reactivation	0.376	0.249	0.404	0.574	0.052	1.000	0.319				
BEHAVIORAL - CONFLICT											
Initiation		0.010	0.156	0.258	1.000	0.603	1.000	0.001		The perception of the role of conflict increases together with coopetition development, so long as the coopetitive relationship is active. On the one hand, its perception significantly decreases in the termination phase. On the other hand, its perception significantly increases in reactivation (when compared to initiation, maintenance, continuation, and termination).	Our results suggest that managers should be aware of continuously growing role of conflict across the CLC. Notably, they should consider, that the role of conflict probably will gain in importance if their firm decide to reactivate coopetitive relationship.
Development	0.010		1.000	1.000	0.337	1.000	0.001	1.000			
Maintenance	0.156	1.000		1.000	1.000	1.000	0.001	0.048			
Evaluation	0.258	1.000	1.000		1.000	1.000	0.108	1.000			
– Continuation	1.000	0.337	1.000	1.000		1.000	0.496	0.013			
– Dormancy	0.603	1.000	1.000	1.000	1.000		0.166	0.643			
– Termination	1.000	0.001	0.001	0.108	0.496	0.166		0.000			
Reactivation	0.001	1.000	0.048	1.000	0.013	0.643	0.000				

Phases of CLC	I	D	M	E	- C	- Dr	- T	R	Graphical representation	Main results	Main managerial implications
BEHAVIORAL - FORMALITY											
Initiation		1.000	1.000	1.000	1.000	0.003	1.000	1.000		Regarding the box plots for all of the considered characteristics assigned to coopetition, the perception of the relevance of formality takes the most stable form. Indeed, its perception decreases only when coopetition turns into a passive form, mainly in dormancy but also in the termination phase.	Formality is perceived as highly important across the CLC (the only exception is the dormancy phase). From a managerial standpoint, it means that all the time formal arrangements and hierarchical coordination mechanisms should have a priority.
Development	1.000		1.000	1.000	1.000	0.523	1.000	1.000			
Maintenance	1.000	1.000		1.000	1.000	0.016	1.000	1.000			
Evaluation	1.000	1.000	1.000		1.000	0.478	1.000	1.000			
– Continuation	1.000	1.000	1.000	1.000		0.006	1.000	1.000			
– Dormancy	0.003	0.523	0.016	0.478	0.006		0.010	0.480			
– Termination	1.000	1.000	1.000	1.000	1.000	0.010		1.000			
Reactivation	1.000	1.000	1.000	1.000	1.000	0.480	1.000				
BEHAVIORAL - INVESTMENTS											
Initiation		1.000	1.000	1.000	1.000	0.677	1.000	1.000		The perceived investments remain rather stable. The perception of their relevance significantly decreases in the continuation phase when compared to the level reached in the maintenance and dormancy phases.	Managers should be ready for continuous investments of both tacit and material resources across the CLC as their perceived meaning is significantly lower only if coopetition in continued (probably the investments made so far are sufficient) or turns into dormant (as it takes passive form or relationship).
Development	1.000		1.000	1.000	1.000	1.000	1.000	1.000			
Maintenance	1.000	1.000		1.000	0.010	1.000	0.058	1.000			
Evaluation	1.000	1.000	1.000		1.000	1.000	1.000	1.000			
– Continuation	1.000	1.000	0.010	1.000		0.013	1.000	1.000			
– Dormancy	0.677	1.000	1.000	1.000	0.013		0.055	1.000			
– Termination	1.000	1.000	0.058	1.000	1.000	0.055		1.000			
Reactivation	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
BEHAVIORAL – TRUST											
Initiation		1.000	1.000	1.000	1.000	0.012	0.688	0.000		Trust in the perception of managers is successively developed across the CLC. Nonetheless, its perceived importance significantly decreases if coopetition become dormant or is terminated. Notably, trust is revealed as perceived as significantly more important if coopetition is reactivated (ref. to comparison to the levels assigned to it in initiation, development, maintenance, continuation, and termination phases).	Our study supports prior claims about meaningful role of trust in coopetition. Therefore, managers should take care of building it up in the subsequent coopetition phases. Moreover, our study shows that the perception of its relevance significantly increases if coopetition is reactivated. Therefore, if the firm decides to reactivate coopetition, it should pay very special attention to trust-building mechanisms.
Development	1.000		1.000	1.000	1.000	0.009	1.000	0.000			
Maintenance	1.000	1.000		1.000	1.000	0.021	0.022	0.000			
Evaluation	1.000	1.000	1.000		1.000	1.000	1.000	0.266			
– Continuation	1.000	1.000	1.000	1.000		0.001	1.000	0.000			
– Dormancy	0.012	0.009	0.021	1.000	0.001		0.000	1.000			
– Termination	0.688	1.000	0.022	1.000	1.000	0.000		0.000			
Reactivation	0.000	0.000	0.000	0.266	0.000	1.000	0.000				

Note: Characteristics found as not significantly changing are given in italics.

Median 25%-75% Range of non-outliers

Source: Own calculations using Statistica.

DISCUSSION AND CONCLUSIONS

This article aligns itself and further develops a dynamic (Luo, 2007; Gnyawali & Park, 2011; Czakon et al., 2014; Park & Kim, 2021), evolutionary (Bonel & Rocco, 2007; Monticelli et al., 2018; Riccardi et al., 2022; Rouyre et al., 2024), process-oriented (Bengtsson & Kock, 2014; Dahl, 2014; Kostis & Näsholm, 2020; Xin et al., 2023) perspective of coopetition, as well as the research stream on managers' perception in the field of coopetition (Bengtsson et al., 2016; Czakon et al., 2020). In a more specific view, our research scope directly corresponds with future research directions specified by coopetition scholars - "*more research on the development and evolution of coopetitive relationships*" (Jakobsen & Steinmo, 2016, p. 101). Essentially, our study takes a further step towards a comprehensive understanding of CLC and coopetition characteristics and offers practical implications for strategic decision-makers.

More specifically, this paper contributes to three key aspects to the body of coopetition knowledge.

Firstly, by recognizing the perceived importance of characteristics attributed to coopetition strategies, coopetition relationships, and coopetitors' behaviors across the phases of the CLC, the study advances knowledge regarding coopetition characteristics. This aligns with the identified research need in the literature (Bengtsson & Raza-Ullah, 2016; Dorn et al., 2016; Klimas et al., 2023b). Notably, the research identified asymmetry and conflict as characteristics of least perceived importance in all CLC phases. This may suggest that despite the existence of different types of asymmetries (Czakon, 2009; Jakobsen, 2020) and diverse forms of conflicts (Chai et al., 2020; Rajala & Tidström, 2021) among coopetitors, they are not perceived as significant when considering the utilization of coopetition. Hence, they may not have a substantial impact on its course. Furthermore, in general, among the coopetition characteristics examined so far, it can be observed that crucial importance has been attached to tensions (Devece et al., 2019; Gernsheimer, et al., 2020) and trust (Lascaux, 2020), which are strongly linked to the success factors of coopetition, as well as firm performance. From the perspective of our study, both of these characteristics were identified as significantly perceived throughout the CLC (Tables 5 and 6). However, further analyses also uncovered that the perceived importance of tensions remains constant over time, consistently maintaining a high rating for this relational characteristic. In contrast, the importance of trust, while consistently perceived as very important (highest medians in the study), demonstrates variability in the perceived significance (there are phases in which this importance is critically essential – mainly initiation and development). Regarding tensions, our study confirms that they are constantly experienced by coopetitors, necessitating continuous monitoring and control in the subsequent phases of the coopetition process (Rouyre et al., 2024), even at the very beginning of coopetition (Efrat et al., 2022). On the other hand, concerning trust, our study confirms its paramount importance (Czakon & Czernek, 2016; Katsaliaki et al., 2023) but also indicates that it is variable and should not be taken for granted. On the contrary, it needs to be nurtured because the line between trust and distrust can be very thin (Kostis & Näsholm, 2020; Raza-Ullah & Kostis, 2020; Schiffling et al., 2020; Lee & Lee, 2024).

Secondly, by evolving the perception and empirically recognizing the CLC, the study expands existing knowledge about coopetition realization and its developmental path. Previous studies in this area have been scarce and selective (Tidström & Åhman, 2006; Dorn et al., 2016; Struckell et al., 2021; Minà & Dagnino, 2024) whereas knowledge about coopetition evolution would be essential (Jakobsen, 2020). In this specific research area of coopetition, our study offers the very first conceptual framework of the CLC. Furthermore, our study provides empirical results regarding the phases in which coopetition is most commonly found in high-tech and low-tech manufacturing firms (Table 5), demonstrating that coopetition can develop non-linearly. Indeed, we provide original evidence for non-linear (or even cyclic) development path of coopetition as we identify coopetitors whose coopetition transitions into continuation, dormancy, or termination after the evaluation phase (three options are possible depending on the specific case), as well as those which reactivate coopetition. This remains in line with prior qualitative findings suggesting the possibility of non-linear development of a coopetition process (Tidström & Åhman, 2006) as well as showing that a coopetition process may cover active and passive (silent) stages (Tidström & Rajala, 2016).

Thirdly, by subjecting low-tech and high-tech firms to comparative analyses, the study indicates that not every aspect of coopetition will be a differentiating factor, and therefore, coopetition is not firmly sector-dependent in every aspect, as suggested by the literature (Czakon et al., 2014). In particular, the study identified only four characteristics that differentiate low-tech and high-tech firms, namely dynamics, paradoxicality, asymmetry, and formality, suggesting that differentiation, and thus the contextuality of coopetition, may mainly concern the strategic level (dynamics and paradoxicality being two identifiable strategic-level characteristics characterizing coopetition strategies – Klimas et al., 2025).

In addition to the outlined theoretical contribution, the results of the conducted research also hold practical significance. Firstly, they indicate to managers that characteristics attributed to coopetition strategies (i.e., dynamics and paradoxicality), coopetition

relationships (i.e., competition intensity, investments, and trust), and coopetitors (i.e., complexity, coopetition intensity, mutual dependence, strength, and tensions) are significant in the context of the coopetition process (Tables 5 and 6). Therefore, these characteristics, recognized as important for coopetition, should be continuously monitored and purposefully shaped. Secondly, based on our research results, most of the examined characteristics, through consistently perceived as important, exhibit changes in their perceived significance over time (Tables 5 and 6). Hence, depending on the stage of coopetition development, considering the variability in the perceived importance of these characteristics, it may be crucial to pay closer attention to specific strategic, relational, and behavioral characteristics as commented in detail in the last column of Table 6. Thirdly, our research indicates that two relational characteristics, namely asymmetry and conflict, are not generally perceived as important during the CLC. This suggests that even with a high level of asymmetry or conflict between coopetitors, as long as there is a common interest, coopetition can be implemented as those characteristics are not relevant.

Like any research endeavor, our study reveals limitations that might influence the obtained results, interpretations, and drawn conclusions. In our case, the primary limitation is considered to be the restriction of the research to manufacturing companies operating in Poland. However, it is essential to note that coopetition is recognized as a phenomenon influenced by its context (Czakon et al., 2014; Dorn et al. 2016), and research in this area typically maintains a national focus (Meena et al., 2023). Furthermore, while studies on coopetition often confine themselves to a single industry (commonly deliberately chosen are high-tech industries - Basole et al., 2015; Gast et al., 2015; Park & Kim, 2021), our study was conducted on a diverse and exceptionally extensive sample of manufacturing companies (N=1231) classified under thirteen different types of business activity. Nevertheless, in pursuit of cumulative knowledge development about coopetition (Gnyawali & Song, 2016), we encourage the replication of this study in other countries and different industry types, such as, for instance, creative or service industries. Finally, our study focused on assessing the significance of individual coopetition characteristics in different phases of the CLC that the examined companies were experiencing. To complement and deepen our results, as well as to heed recommendations for conducting longitudinal research within the field of coopetition (Bouncken et al., 2020; Xu et al., 2021), an intellectually stimulating direction for research could be long-term qualitative studies exploring individual development paths of different types of coopetitors. Such studies could focus on the entire life cycle of coopetition, allowing an exploration of how the perceived importance of particular coopetition attribute changes in a specific case (or a set of cases in the context of multiple case studies).

Apart from the general research directions guided by the limitations of our study, we would like to emphasize three particular avenues for research that we consider as valuable for the cumulative knowledge development. First, our research strongly suggests the crucial role of trust among all the considered characteristics (Table 5). Taking into account not only our results but also the findings of previous studies that consistently emphasize the essential role of trust in coopetition (Czakon & Czernek-Marszałek, 2016; Kostis & Näsholm, 2020; Raza-Ullah & Kostis, 2020; Lee & Lee, 2024) future research on the critical role of trust in coopetition are reasoned. Indeed, trust has already been identified as a necessary condition for innovation output in inter-organizational relationships (Valk et al., 2016). Therefore, following new analytical opportunities and methodological recommendations for applying necessary condition analysis (Dul, 2020) in research within coopetition (Bouncken et al., 2020; Klimas et al., 2022), we see the verification of whether trust is a necessary condition for the formation and maintenance of coopetition as an interesting, and knowledge-expanding direction for empirical inquiry.

Second, this study revealed the perceived relevance of a wide range of characteristics assigned to coopetition. In the future, it would be interesting to test if those characteristics are interlinked and how. Thus far, it has been established that coopetition intensity, one of the characteristics examined in our study, not only promotes a balance of coopetition but is also linked with a partner's importance and expert power (Bouncken et al., 2020). It may suggest that coopetition characteristics are not mutually independent, but instead, some of them may be used to strengthen or weaken others. Similarly, in the context of coopetition drivers, Klimas et al. (2022) found that among a wide range of external and internal coopetition factors, there are interdependencies, including interdependencies not only based on sufficiency logic but on necessity logic too.

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Declaration of not using generative AI in scientific writing

We did not use generative artificial intelligence (AI) and AI-assisted technologies in the writing or subsequent stages of the research process**.** We used Chat GPT4.0 as a tool for proofreading and translations of some parts of our paper.

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