CHAPTER I

THEORETICAL FOUNDATIONS OF ORGANIZATIONAL BEHAVIOR IN THE MARITIME AND INLAND WATERWAY TRANSPORT SECTOR WITHIN THE FRAMEWORK OF INDUSTRY 5.0

Organizational behaviour explores how individuals perceive, think, communicate, make decisions, and adapt to the environments in which they work (Schein, 2017; Robbins & Judge, 2019; Colquitt, LePine & Wesson, 2021; Rautrao & Nille, 2025). Within the maritime and inland waterway transport, these processes take on particular importance, as human interaction unfolds in contexts marked by high technological dependence, cultural heterogeneity, and a constant demand for coordination and accountability (Kalinov, Mednikarov & Kanev, 2014).

This chapter examines the evolution of organizational behaviour under the influence of Industry 5.0-moving from the emerging synergy between humans and intelligent technologies, through the dynamics of teamwork and leadership, to the educational and competency-based dimensions of human capital (Carayannis et al., 2022; Tyagi et al., 2023; Hasani et al., 2025).

It offers more than a theoretical overview; it serves as a reflection on the human condition in the digital age, emphasizing the indispensable balance between rationality and humanity-without which technological advancement risks losing its social purpose.

The chapter's focus is multidimensional: it traces the development of organizational behaviour within the highly technological systems of maritime and inland waterway transport; analyses the interaction between the human factor and intelligent technologies; and explores the relationship between organizational culture, values, and sustainability. Central attention is given to the role of leadership and soft skills as pillars of collective ethics and organizational effectiveness, as well as to the educational perspective through which knowledge of organizational behaviour becomes a resource for both professional growth and personal development.

Ultimately, the first chapter does more than systematise theoretical perspectives-it builds a dynamic framework for understanding the individual and the organization in the era of Industry 5.0. In this new epoch, behaviour is no longer merely a reaction to change, but a creative response-a manifestation of the human capacity to think, to innovate, and to lead within a world of continual transformation.

1.1. Organizational Behaviour in Maritime and Inland Waterway Transport

Organizational behaviour in the maritime and inland waterway transport sector is a complex web of human, technological, and structural interactions, where multiple professional domains converge: shipping operations, port management, logistics, and the cruise industry. Rather than a set of isolated processes, this environment forms a self-regulating system in which human behaviour, decision-making patterns, and communication dynamics shape the rhythm and performance of the entire sector.

The sector is marked by a distinctive level of complexity: continuous movement, spatial isolation, cultural diversity, and intense technological integration (Velikova, Nedeva & Stoyanov, 2024; Nedeva, 2021). Consequently, organizational behaviour in this context cannot be understood merely as a managerial function. It constitutes a socio-psychological and cultural system that embodies the very essence of human presence in a technologically advanced era.

The behaviour of individuals and teams in maritime and inland waterway transport has a profound influence on both organizational functioning and organizational culture (Kalinov, 2016). Whether on board a vessel, within a logistics hub, or in a cruise company, behaviour is never incidental. It reflects underlying values, perceptions, and shared norms. It serves as the invisible architect of safety and trust-a critical link between technological reliability and human responsibility.

1.1.1. Levels and Dimensions of Organizational Behaviour

In the era of Industry 5.0, organizational behaviour ascends to a new dimension-evolving from a conventional managerial tool into an expression of a profoundly human-centric philosophy. The emphasis shifts from control to collaboration, from output to meaning, and from mere rationality to conscious, reflective presence. Technologies cease to function as external instruments and instead become active partners in decision-making;

leadership transforms into an act of humanity, while adaptability emerges as a defining marker of professional maturity (Schein, 2017; Robbins & Judge, 2019; Gibson et al., 2012; Senge, 2006).

Within the maritime and inland waterway transport sector, this paradigm shift necessitates a reimagining of team dynamics on board, the relationship between people and intelligent systems, and leadership styles that foster psychological safety and continuous organizational learning. These new realities demand more than technical proficiency: they call for elevated levels of social and emotional intelligence, intercultural competence, and behavioural flexibility-essential components of human capital in the 5.0 era.

This evolution underscores the need to interpret organizational behaviour through three interconnected levels of analysis (Figure 1.1), which collectively shape the systemic framework of management and human interaction within the maritime and inland waterway transport sector.

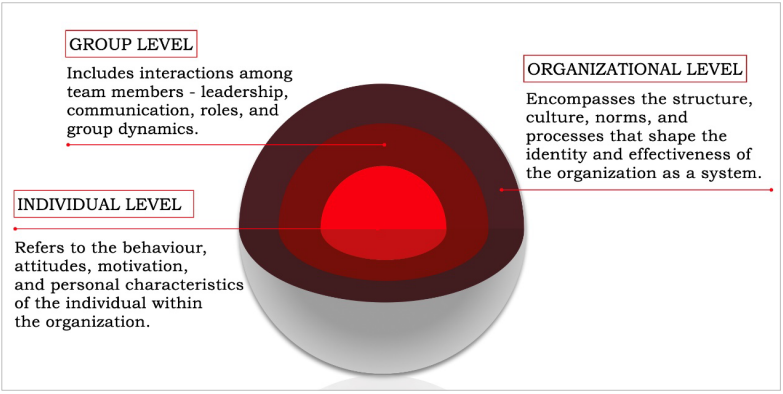

Figure 1. 1 Levels of Organizational Behaviour

In the maritime industry, these levels do not function independently but intertwine within a dynamic network of social, technological, and cultural interdependencies.

At the individual level, human engagement with technologically advanced maritime systems is evolving toward greater cognitive and behavioural sophistication. Professionals are now required to interpret complex digital interfaces, interact with algorithmic processes, and make real-time decisions under conditions of uncertainty (Sivkov, 2020). At the same time, they must exhibit emotional intelligence, communicative adaptability, and intercultural awareness-competencies increasingly recognized as essential within the modern maritime workforce (Narleva, Gancheva & Narlev, 2024).

In the logistics domain, shore-based operators manage global supply chains through highly integrated digital platforms, where even minor inaccuracies may trigger cascading operational disruptions. These dynamics align with European policies aimed at

modernization and sustainable logistics development (Bakalova, 2024; Grancharova, 2023), as well as with the standards of multimodal transport networks (Grancharova, 2021). Within this environment, sustainable ship supply models are viewed as vital for reducing environmental impact while maintaining operational continuity (Stefanova, 2025). Automation reshapes not only operational workflows but also the risk landscape-particularly in the realm of cybersecurity, which has become a central vulnerability of modern maritime systems (Krastev, 2022). Consequently, individual behaviour must integrate technological proficiency with ethical judgment and emotional maturity: the human remains the critical counterbalance to automation (Hollnagel, 2017).

From the group perspective, technological advancement transforms not only the role of the individual but also the fundamental nature of team interaction. High-tech maritime environments demand continuous coordination, shared situational awareness, and deep mutual reliance. On the bridge, navigators must maintain precise alignment despite high levels of automation. In the engine room, engineers and technicians depend on collective decision-making during alarm conditions. In ports and logistics centres, multidisciplinary teams-IT experts, operators, managers, and data analysts-function as interconnected units operating within culturally and linguistically diverse settings (Belev et al., 2017; Narleva & Velinov, 2024; Gramchev & Dimitrakieva, 2022).

In the cruise sector, group dynamics become even more intricate. Crew members not only work together but also live together, inhabit limited physical space, and share collective responsibility for passenger safety and satisfaction. Psychological safety, therefore, becomes indispensable-the shared belief that individuals can speak up, take risks, learn, and make mistakes without fear of blame or reprisal (Reason, 1997; Schein, 2017; Lechner & Mortlock, 2022). It forms the cornerstone of collective effectiveness in digitally intensive environments.

Moreover, on cruise vessels, interaction with passengers introduces an additional emotional and social layer. Crew members must display not only professional competence but also empathy, cultural sensitivity, and resilience under sustained pressure. In this sense, the group level serves as a bridge between individual capabilities and the broader organizational culture, transforming personal competencies into coherent, effective collective performance.

At the organizational level, the maritime sector is transitioning from rigid hierarchical structures to more dynamic, networked, and collaborative ones. Leadership is no longer defined primarily by authority but by the capacity to communicate, inspire, and facilitate. In high-technology environments, leaders serve as integrators of human and technological capital (Kotter, 2012; Carayannis & Morawska-Jancelewicz, 2022), aligning diverse teams around shared purposes, values, and long-term vision.

Within this evolving landscape, organizational culture emerges as a strategic determinant of success-shaping whether technologies will function as catalysts for synergy or become sources of friction. Organizations that cultivate openness, continuous learning, and trust create resilient environments characterized by adaptability and a strong collective identity (Kalinova, 2022).

In both commercial and cruise shipping, technological interconnectedness reinforces social interconnectedness. Teamwork evolves from task-based coordination to intelligent collaboration, where individuals share information, responsibilities, and situational awareness in real time (Atanasova & Teofilova, 2023).

Organizational behaviour unfolds across multiple interconnected dimensions that define how individuals perceive their environment, interact with others, and generate value within the maritime domain. Contemporary literature emphasizes not only structural distinctions but also a multidimensional framework encompassing technological, social, psychological, and cultural components (Schein, 2017; Robbins & Judge, 2019; Carayannis & Morawska-Jancelewicz, 2022).

The technological dimension captures the degree to which interactions between humans and intelligent systems influence behaviour and decision-making. In the era of Industry 5.0, this dimension gains strategic prominence: maritime professionals must balance automated processes with human intuition, preserving situational awareness and maintaining control over safety-critical operations (Hollnagel, 2017).

Modern environmental technologies further illustrate the evolving role of intelligent systems. For example, unmanned aerial vehicles equipped with thermal and multispectral sensors are increasingly used to detect and monitor plastic pollution on the sea surface-enhancing sustainable maritime governance and expanding the scope of human interpretation within technologically saturated ecosystems (Tsvetkov, 2023).

Similarly, the transformation of communication and information systems within naval structures underscores the strategic significance of digital platforms in shaping new patterns of interaction, decision-making, and operational coordination in the maritime domain (Nikolov, 2022; Nikolov, 2024). Ensuring the security of the maritime and inland waterway transport system, meanwhile, requires a nuanced understanding of the complex risks and threats that shape the operational environment and influence the organizational behaviour of maritime institutions (Stoyanov, 2017;2018).

The social dimension encompasses the dynamics of relationships, communication, and teamwork. In the multicultural, globally interconnected maritime industry, organizational effectiveness depends on the quality of social ties and the ability to build trust in remote or hybrid work environments (Gibson et al., 2012; Edmondson, 2019). Psychological safety and open communication become key factors for collective performance (Stoyanov, 2008), especially on board, where shared living and working conditions require heightened social awareness. Beyond social dynamics, the individual's internal psychological world also plays a significant role, shaping their ability to adapt and collaborate effectively.

The psychological dimension encompasses internal attitudes, motivation, emotions, and moral orientations that influence individual and group behavior. According to Senge (2006), organizations that encourage self-reflection and personal development cultivate a more resilient and adaptive culture. In the maritime environment-characterized by high demands and extended periods of isolation-emotional intelligence and stress resilience are among the most valuable behavioral competencies.

The cultural dimension relates to the values, norms, and symbols that shape the identity of maritime organizations. In a context of international mobility and multicultural crews, organizational culture serves as an integrating framework that brings meaning and predictability to behavior (Schein, 2017). Companies that deliberately cultivate a culture of trust, respect, and learning develop "social resilience"-the capacity to maintain cohesion and engagement even in environments of constant change (Kotter, 2012; Carayannis & Morawska-Jancelewicz, 2022).

The interaction among these four dimensions defines the complex nature of organizational behavior in maritime and inland waterway transport. It is simultaneously technological and human, rational and emotional, individual and collective-a system in which the human factor remains the central carrier of adaptability, creativity, and ethical responsibility.

1.1.2. Human-Centric Transformation of Organizational Behavior

Industry 5.0 introduces a qualitative shift in how interactions between humans and emerging technologies are conceptualized, as well as in how people relate to one another within an increasingly dynamic and uncertain global environment. Whereas Industry 4.0 centers on digitalization, cyber-physical systems, and artificial intelligence, Industry 5.0 adds a new and indispensable dimension-humanization, or the reintegration of human values into technological advancement.

Rather than rejecting automation, Industry 5.0 seeks to harmonize it with human creativity, ethical judgment, and emotional intelligence. Its ambition is not to replace the human through intelligent systems, but to empower the human through meaningful collaboration with technology-restoring the balance between operational efficiency and human well-being (Xu et al., 2021; Nahavandi, 2019).

Structural Transformation - From the Machine to the Human

The transition from Industry 4.0 to Industry 5.0 can be understood as a shift in the centre of gravity within the industrial system pyramid (illustrated in Figures 1.2 and 1.3).

In the Industry 4.0 paradigm, the machine occupies the apex of the system. It sets the pace, dictates the processes, and embodies the transformative force of the digital revolution. The overall logic is one of automation: systems are driven by algorithms, data flows, and predictive models, all oriented toward maximizing efficiency, precision, and speed. The human remains present but often in a limited role-primarily as an operator, supervisor, or monitor of automated processes rather than a fully empowered and equal actor within the system.

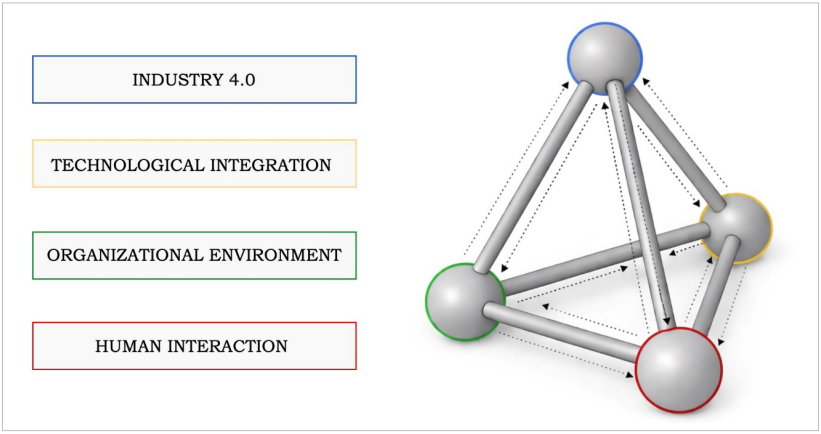

Figure 1. 2 Tetrahedral Model of Industry 4.0

With the advent of Industry 5.0, this pyramid is symbolically and conceptually inverted-the human ascends to the top. The system's focal point is no longer the machine, but human interaction itself: the arena in which technology encounters empathy, creativity, and moral responsibility. In this reoriented landscape, technological systems do not dominate human agency; instead, they are designed to amplify it, enabling individuals to engage more meaningfully, think more critically, and act with greater ethical awareness.

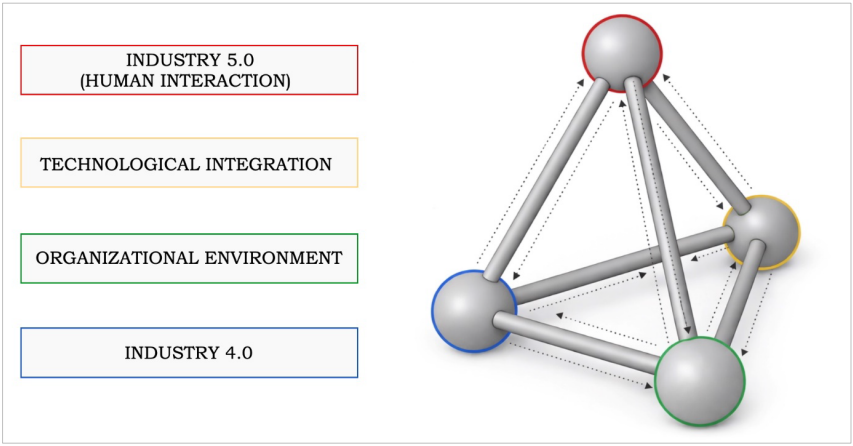

Figure 1. 3 Tetrahedral Model of Industry 5.0

The shifting of the pyramid's centre signifies a profound transformation-from technology-driven development to a genuinely human-centric paradigm. It marks a transition from a world directed by machines to one in which technologies are intentionally designed to serve the human being and uphold human values.

In this context, it becomes essential to outline the key principles of Industry 5.0, which fundamentally redefine the place of technology within the industrial ecosystem: human-centrism, sustainability, and resilience to disruptions (European Commission, 2021).

Building upon these foundational pillars, several authors (Nahavandi, 2019; Xu et al., 2021; Carayannis & Morawska-Jancelewicz, 2022) propose three complementary principles-human–cobot collaboration, ethical and responsible technologies, and industrial humanity. Together, they articulate the deeply human-focused nature of the emerging industrial paradigm.

Collectively, these principles shape a new vision of *industrial humanity* (Figure 1.4): a world in which technologies do not replace human beings but instead enable them to become *more fully human*.

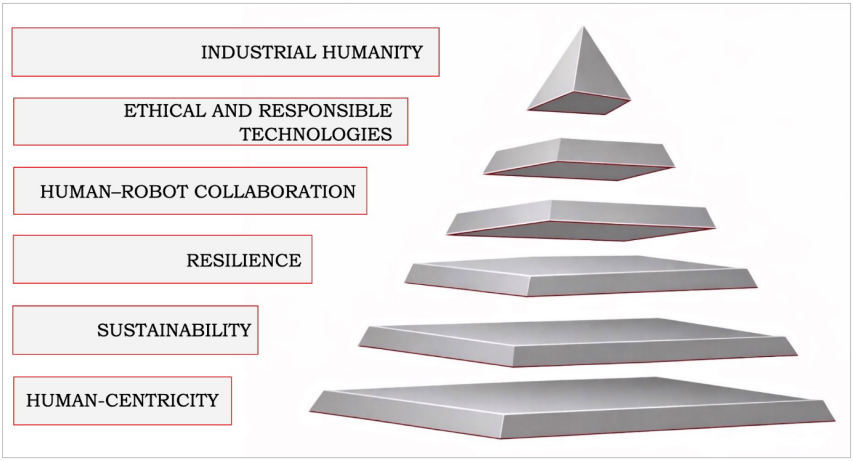

Figure 1. 4 Pyramid of the Key Principles of Industry 5.0

The pyramid illustrates the interconnected nature of the core dimensions of Industry 5.0. At its foundation lies human-centrism, which positions technology as an instrument for unlocking human potential-an ally rather than a rival. Built upon this foundation is sustainability, encompassing not only environmental considerations but also the social dimensions of industrial development. Production in the era of Industry 5.0 must align with the preservation of natural resources, social equity, and societal well-being. Above it stands flexibility and resilience, highlighting the capacity of industrial systems to adapt to and recover from disruptions. This resilience extends beyond the technological sphere to include organizational and social robustness-the ability to learn from uncertainty and transform crises into opportunities for innovation and progress.

Human–cobot collaboration and ethical, responsible technologies represent the intelligent interaction and moral parameters of technological advancement. At the apex stands *industrial humanity*-a symbol of the synthesis between innovation and values, between efficiency and meaning.

This new and distinctive form of collaboration between humans and technology presupposes a fundamental transformation in the way organizations design their processes, structures, and cultures (Koritarov, 2025). As machines assume repetitive and routine tasks, humans focus on activities that require creativity, ethical judgment, interpretation, and strategic thinking.

In this way, the foundations are laid for new models of human cooperation based on transparency, shared responsibility, and collective intelligence. Within the context of maritime and inland waterway transport, this requires rethinking how people interact in complex, multicultural, and technologically intensive environments-both on board vessels and within shore-based institutions, transport management organizations, and the broader ecosystem of maritime and inland waterway services, including tourism.

Personnel are expected not merely to execute assigned tasks but also to actively participate in innovation, demonstrate critical thinking, and adapt fluidly to technological change. A clear trend emerges toward increasing individual contribution and the strategic importance of each person's role-regardless of hierarchical position. Whereas in earlier stages the value of employees was measured by their ability to follow instructions, today it is understood as a strategic asset that must be nurtured through education, leadership, and continuous development of human capital-a key factor in organizational sustainability and innovation capacity.

This shift gives rise to a new form of organizational behaviour-one oriented toward collaboration, learning, and resilience, where team dynamics and interpersonal relationships become strategically significant for safety, efficiency, and innovation.

The transformation of organizational behaviour in maritime and inland waterway transport also requires a reimagining of leadership-from directive and controlling approaches to transformational and humanistic ones. Modern leaders serve as mediators between technology and people (Kotter, 2012; Carayannis & Morawska-Jancelewicz, 2022), between strategic priorities and human needs. They cultivate cultures of learning, knowledge sharing, and continuous improvement-pillars of organizational resilience in the age of Industry 5.0.

Thus, the transformation of organizational behaviour in the maritime transport sector is not simply a response to technological change but a profound cultural and value-driven evolution. It demands that organizations balance innovation with humanity, efficiency with well-being, and digital transformation with social responsibility. This means creating institutions that integrate humans and technology into a coherent and sustainable ecosystem (Carayannis & Morawska-Jancelewicz, 2022).

It is this balance that determines the sector's capacity to cultivate sustainable human resources and to respond effectively to the new realities of the global transport system-and it is this very balance that stands at the heart of the present monograph.

The following analytical step is therefore to explore how the human-centric paradigm of Industry 5.0 reshapes organizational culture in maritime and inland waterway transport, transforming it from a managerial instrument into a dynamic system of values, meanings, and interactions.

1.1.3. Adaptation of Organizational Culture to the Conditions of the New Industrial Era

At the foundation of organizational behaviour in maritime and inland waterway transport lies a professional maritime culture shaped by long-standing traditions, firm discipline, and rigorous safety standards. Today, however, this culture is undergoing a significant transformation-shifting from a model grounded in Hierarchy and control toward one that fosters flexibility, learning, and creativity. Adapting to rapidly evolving technologies and global market pressures requires change not only in managerial structures but also in the mindset, attitudes, and values of those working within the sector.

This adaptation is not simply a reaction to external forces; it constitutes an internal process of awareness, re-evaluation, and reconfiguration of values, norms, and behavioural patterns-a process that influences both organizations and individuals (Cameron & Quinn, 2011). In this sense, organizational culture evolves not into a mechanism of control but into a mechanism of empowerment, enabling the development of human potential. It becomes a culture that nurtures trust, shared responsibility, and continuous improvement-elements fundamental to the sustainability and long-term success of organizations in maritime and inland waterway transport (Kalinova, 2019).

According to Schein's model (2017), organizational culture manifests across three interconnected levels: artifacts, espoused values, and basic underlying assumptions. In the maritime transport sector, this transformation encompasses not only visible practices-terminology, safety rituals, operational procedures, communication norms-but also deeper attitudes toward authority, responsibility, error, and success.

At the surface level of **artifacts**, transformation is reflected in the adoption of digital navigation and monitoring tools, collaborative risk assessments, and a communication style oriented toward brief confirmations and coordinated team actions. At the level of **values**, organizations begin shifting from a narrow focus on operational discipline toward a balance between efficiency, learning, and innovation-building a culture of trust, shared responsibility, and adaptability that blends "clan" and "adhocratic" elements. At the deepest level of **basic assumptions**, fundamental understandings evolve: safety becomes a collective obligation, errors are reframed as opportunities for learning, and success is defined not merely by operational performance but by sustainable practices and psychological safety within teams.

These cultural layers manifest differently across subsectors of the maritime domain-maritime management, logistics, and the cruise industry. In maritime management, culture is expressed through formal structures, safety protocols, and standardized communication, with an emphasis on discipline, trust, and a learning-oriented approach to errors. In logistics, the culture prioritizes efficiency, technological integration, and coordination through digital platforms. In the cruise industry, values such as emotional intelligence, customer orientation, and intercultural communication prevail, whereby the passenger becomes an active participant in the experience. Schein's model (2017) thus provides a lens for tracing these cultural variations and their deep cognitive foundations, shaping a distinctive maritime cultural profile capable of adapting to the demands of Industry 5.0.

The shift from a culture of obedience and procedural compliance to one of collaboration and learning requires **double-loop learning**-not simply adjusting existing procedures