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HUMAN-CENTRIC RHETORIC IN INDUSTRY 5.0: A CRITICAL METAPHOR ANALYSIS OF ACADEMIC DISCOURSE

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Purpose: The article assesses whether the declared human-centric orientation of Industry 5.0 constitutes a genuine programme of action or a set of rhetorical devices masking the technocratic legacy of Industry 4.0.
Methodology: A corpus of 17 peer-reviewed Polish-language academic articles published between 2023 and 2025 was examined using a two-stage linguistic metaphor analysis that combined the MIPVU protocol with Critical Metaphor Analysis (CMA).
Findings: The analysis revealed a systematic divergence between declared and actual human orientation — a pattern designated academic humanwashing.
Research limitations/implications: The conclusions are limited by the relatively small, monolingual corpus and the single-researcher design.
Practical implications: The findings will help practitioners and researchers engaged with the Industry 5.0 agenda to understand the problem of human-centric rhetoric.
Social implications: The proliferation of academic humanwashing legitimises existing workplace power relations and impedes substantive public debate on the social costs of automation.
Originality/Value: The article introduces the concept of academic humanwashing as an analytical category and is the first study of Polish-language Industry 5.0 academic discourse to apply the MIPVU+CMA methodology.
Keywords: Industry 5.0, humanwashing, metaphor, critical discourse analysis.
Category of the paper: Research paper.

1. Introduction

The article analyses one of the central premises of Industry 5.0 (I5.0): the human being and their well-being. The idea of augmenting workers' competences—rather than replacing them with advancing automation and systems integration—represents a new direction in a discourse previously dominated by process optimisation, automation, and cost reduction. The question is: how will this new quality be realised? What concrete solutions have been proposed?

How has the technocratic narrative, which treats labour as a cost driver, changed? Seventeen published, peer-reviewed, Polish-language articles on I5.0 were examined. Using the MIPVU and CMA metaphor-analysis protocols, the study analysed all references to workers and labour-related issues in these texts. Metaphor analysis identified the foundational assumptions and beliefs behind the authors' understanding of the human being's role and position in industry. In the context of I5.0, it revealed the current understanding of worker well-being. The results show scholars' views on the human being in I5.0. These scholars are the source of concepts, metaphors, and perspectives that may be disseminated through academic or popular-science publications, as well as lectures and discussions on scientific management.

2. Industry 5.0 and Industry 4.0

Industry 4.0 (I4.0) is the label for the fourth wave of the industrial revolution, which acquired its name and identity in Germany in 2011 (Shadravan, Parsaei, 2023, p. 2). This revolution unfolds in the context of the digital transformation of society, itself the result of the ubiquitous application of the Internet and other advanced technologies. A distinctive feature of this new production paradigm (Lee, Lee, 2018) is the integration of a broad spectrum of intelligent digital solutions, including (Grabowska, Saniuk, Gajdzik, 2022, p. 3119; Saniuk, Grabowska, Straka, 2022, p. 3; Ersoy, 2022, p. 20; Maddikunta et al., 2022, pp. 1, 3; Nahavandi, 2019, p. 2):

1. Cyber-Physical Systems (CPS): machines and devices that respond to their environment through embedded sensors.
2. Industrial Internet of Things (IIoT): sensors, machines, devices, products, and IT systems interconnected in a network enabling effective, real-time mutual communication.
3. Cloud computing and big data analytics: production data is transmitted to cloud platforms where advanced analytics and artificial intelligence support forecasting and optimization.
4. Advanced robotics and automation: stationary and flexible robots, often integrated with vision systems, coordinated via CPS/IIoT.

The focus on production goals — cost, time, and quality — together with a high degree of technological sophistication, has entailed a radical shift in the situation of employed persons. The literature identifies a range of worker-related problems characteristic of firms implementing I4.0 principles:

1. Digital skills gaps. The convergence of digital technologies in I4.0 exposed deficiencies in workers' digital competences (Pacheco, Iwaszczenko, 2024, p. 8). These gaps fuel anxiety about job loss (Saniuk, Grabowska, Straka, 2022).

2. Technological unemployment. Advances in automation and artificial intelligence have substantially increased the risk of technological unemployment resulting from the replacement of workers by autonomous machines (Saniuk, Grabowska, Straka, 2022).
3. Dehumanisation and marginalisation of workers. I4.0 implementation focused on technology, largely minimising and overlooking the importance of workers. Their role is frequently reduced to monitoring highly automated systems, while they exercise little influence over their design or implementation (Grosse et al., 2023, p. 7749).
4. Monotonous work, high demands, and low control. The content of many roles in I4.0 has become more monotonous. Workers perform highly specialised tasks characterised by limited decision-making latitude and high workloads (Grosse et al., 2023, p. 7750). Over-automation has created the risk of "phantom gains", in which expected benefits are offset by human-factor problems and poor performance (Trstenjak et al., 2025, p. 8).
5. Psychosocial risks. Rising stress, anxiety, burnout, and absenteeism result from the new demands posed by technology adoption, doubts about workers' capacity to master it, and perceived loss of autonomy (Grosse et al., 2023, pp. 7750, 7755).
6. Privacy loss and an atmosphere of distrust. There is resistance to pervasive monitoring and data collection (wearables, sensors), leading to feelings of excessive surveillance and distrust (Grosse et al., 2023, p. 7750; Peifer, Jeske, Hille, 2022, p. 1029).
7. Safety and trust in human–robot collaboration. Shortcomings in motion-control and position-tracking systems limit safe human–robot collaboration. Safety concerns and lack of trust impede the acceptance of robots and artificial intelligence (Pacheco, Iwaszczenko, 2024, pp. 6, 8; Dwivedi, Gupta, 2024, p. 686).

The concept of Industry 5.0 first appeared in a LinkedIn post (Vollmer, 2018). It arose as a response to the negative impact of I4.0 practices on workers' situation. The fundamental transformation of how humans, societies, and enterprises function — driven by the broad application of artificial intelligence and robotics — led to job losses and a sharp rise in the demand for digital skills. The core of the I5.0 idea, therefore, consisted of defining a new form of relationship between humans and intelligent machines. The literature identifies a range of characteristics of this concept:

1. I5.0 constitutes an extension and complement to I4.0, not a successive phase of industrial development. The primary vector of development and change is the re-centring of humanistic values — such as human well-being, social development, ethics, innovation, and sustainability — within industrial processes (Mourtzis, Angelopoulos, Panopoulos, 2022; European Commission, 2021).
2. Technologies central to I4.0 — AI, IoT, cyber-physical systems — remain the technological core of industry, but the orientation shifts towards social values and the central role of the human (Chander et al., 2022).

3. From a societal perspective, I5.0 is characterised by sustainability and resilience, understood as the ability of industrial systems to generate value despite disruptions, and to adapt and regenerate (Suciu et al., 2023).
4. An integrative model of the human–machine relationship, in which the human is responsible for decisions and creativity, and the machine for repetitive tasks. Accordingly, organisations cultivate a culture of innovation and provide worker autonomy and psychological safety (Gamberini, Pluchino, 2024).
5. Lifelong learning practices and interdisciplinary worker competences (She et al., 2022).

Three of these characteristics — human-centricity, sustainability, and resilience — are identified as the defining features, the three pillars of I5.0 (European Commission, 2021).

3. Humanwashing as an Analytical Category

A review of the literature leads to the conclusion that the I5.0 idea constitutes, above all, a response to the potential social hazards arising from the proliferation of the I4.0 paradigm. It enriches the technocratic optics of 4.0 with an element of values and social sensitivity. The question concerns the actual contribution of I5.0 to the development of the contemporary production paradigm. Does I5.0 genuinely offer original solutions regarding the role of the human in contemporary industry, or does it rather constitute an attempt at the rhetorical humanisation of the I4.0 paradigm? In the latter case, the I5.0 concept could be classified as an instrument of humanwashing. This term serves as an analogy to the popular concept of greenwashing — the practice of promoting environmentally friendly programmes in order to divert attention from the organisation's activities that negatively impact the environment (de Freitas Netto et al., 2020, p. 6). Similarly, humanwashing is defined as the use of AI-assisted machines in a misleading manner that causes stakeholders and the broader public to form unintended or deliberate misconceptions about the actual capabilities of such solutions (Scorici, Schultz, Seele, 2022). One function of humanwashing, analogously to greenwashing, is to mask the potentially dangerous or adverse consequences of the popularisation of AI-assisted machines. In the context of the present study, the masked adverse consequence is understood as a threat to workers' interests.

4. Research Aim, Method, and Procedure

The empirical aim of the study is to identify the hidden assumptions about the role of the human in the I5.0 concept as they appear in scholarly publications. Analysis of hidden assumptions will enable an assessment of the degree to which the human-centric orientation declared in texts devoted to I5.0 corresponds to practical solutions — whether it constitutes a genuine programme of action or a set of rhetorical devices serving to soften the technocratic legacy of I4.0.

The study was conducted through the analysis of linguistic metaphors in academic texts on I5.0, as this method allows examination of the hidden cognitive patterns guiding the process of scientific theory construction (Boxenbaum, Rouleau, 2011). The recognition of metaphors as a legitimate and significant component of scientific theories draws directly on cognitive metaphor theory (Lakoff, Johnson, 1980), which identifies metaphors as cognitive mechanisms structuring human thought and experience. In management science, this cognitive function is particularly significant because many organisational phenomena — such as strategy, culture, leadership, and change — are inherently abstract and require metaphorical conceptualisation to become cognitively accessible (Cornelissen, 2006).

Two principal metaphor-analysis protocols were employed: CMA and MIPVU. CMA analysis can uncover assumptions present in academic discourse of which the authors themselves may be unaware (Mullet, 2018, p. 21). It examines not only the metaphors present in discourse but also what is absent — missing metaphors and marginalised conceptualisations (Cornelissen et al., 2008). The MIPVU procedure provides clear criteria for determining the metaphoricity of linguistic expressions (Steen et al., 2010). The integration of both methods enabled the systematic identification of metaphorical expressions (MIPVU) and the simultaneous interpretation of their ideological functions (CMA) within the Critical Discourse Analysis framework (Fairclough, 1995).

Texts written in Polish were selected for analysis. Many arguments supporting this choice can be reduced to the following two:

1. The procedure for identifying metaphors — in both MIPVU and CMA — is anchored in a single language system. In the case of MIPVU, the requirement concerns embedding analysis in a single lexicographic system (Steen et al., 2010, p. 32); in the case of CMA, this requirement is a condition for the correct execution of collocation analysis and the pragmatic interpretation of metaphors (Charteris-Black, 2004).
2. When Polish authors write about “Industry 5.0” or “Economy 5.0”, they are not translating but recontextualising — in Fairclough’s (2006) sense — global discourse into a local institutional and cultural context. The formulations produced through this process will be cited in academic publications, find their way into university textbooks, curricula, popular-science publications, and the strategic documents of enterprises and

institutions, shaping the way Polish management theorists and practitioners internalise the process of the fifth industrial transformation: how they think about it and how they verbalise that mental reality.

The research procedure began by retrieving texts from the BazEkon, Biblioteka Nauki, and ResearchGate publication databases. Google was also used to search the repositories of economic universities, the Warsaw School of Economics (SGH), and Kozminski University, using targeted queries.

Texts included in the research corpus were required to meet the following criteria:

1. A peer-reviewed academic text of sufficient length to enable identification of metaphorical expressions in accordance with the MIPVU procedure.
2. A text prepared and published in Polish in a scholarly journal included in the list of ranked journals maintained by Poland's Ministry of Science and Higher Education (MEiN), or in a monograph published by an academic publisher appearing on the same list.
3. The text's subject matter explicitly refers to the Industry 5.0/Economy 5.0 concept or related paradigms (Society 5.0, Logistics 5.0).

Seventeen texts meeting the established criteria were found; they were published between 2023 and 2025.

A two-stage analytical procedure combining MIPVU with CMA was applied to all expressions referring to humans/people in the work situation occurring in the texts included in the research corpus. The analytical process was conducted by the author with the support of large language models (LLMs), treated as Computational Metaphor Identification (CMI) tools (Tian, Xu, Mao, 2024). The research was conducted in parallel by the LLM and the author, with results continuously compared and verified.

5. Metaphors of the Human in the Work Situation in Industry 5.0

The presentation of findings is divided into four thematic sections:

1. Terminology — analysis of the occurrence of I5.0-characteristic terminology in the texts.
2. Worker perspective — assessment of the presence of the worker's perspective through analysis of selected indicators.
3. The job elimination problem — analysis of the approaches to the problem of job elimination found in the examined texts, i.e., one of the key problems of the I4.0 paradigm.
4. Humanwashing — analysis of the frequency and examples of humanwashing rhetoric.

5.1. Terminology

Analysis revealed a high degree of conceptual consistency across the examined texts, as evidenced by the use of an established set of terms characteristic of I5.0.

Table 1.
Presence of key Industry 5.0 terminology in the research corpus

No.	Term	Number of texts
1.	"Industry 5.0" / "Przemysł 5.0"	15 of 17
2.	"Human-centric" / "Człowiek w centrum"	14 of 17
3.	"Worker well-being"	10 of 17
4.	"Human–machine synergy"	12 of 17
5.	"Sustainable development"	13 of 17
6.	"Resilience"	9 of 17
7.	Cobots / collaborative robots	8 of 17

Source: own elaboration.

The texts do indeed contain terminology appropriate to I5.0 declarations. The following sections analyse how those declarations are realised in practice.

Table 2.
Conceptual metaphors of the human in the work situation

No.	Conceptual metaphor (no. of articles)	Example expressions
1.	Resource (15 of 17)	"human resources", "human factor", "human capital", "scarce resource", "production resource", "HR staff", "skilled workforce as a success factor"
2.	Component of a machine/system (14 of 17)	"human factor", "human's role in the system", "element of the production process", "human as a node in a communication network (man-to-machine)", "mixed work teams (humans and robots)", "substitution of human labour" (in the latter variant — the worker as a replaceable component)
3.	Raw material to be shaped (8 of 17)	"shaping attitudes", "training staff", "aligning qualifications" (a mechanical metaphor: fitting parts), "building competences", "preparing graduates" (as an educational product)
4.	Barrier / source of resistance (8 of 17)	"resistance to change", "implementation barriers stemming from worker anxieties", "fear of technology as an obstacle", "technology acceptance as a condition of successful deployment", "building worker trust" (as a managerial challenge)
5.	Useful talent (7 of 17)	"talent management", "talent acquisition", "talent as a strategic resource", "talent shortage"
6.	User/actor (6 of 17)	"system user", "technology user", "actor in the work environment", "beneficiary of solutions", "entitled person" (in a healthcare context)
7.	Supervisor/operator (9 of 17)	"the human's role is limited to monitoring intelligent systems", "humans can control the process", "machine operators", "human as controller", "supervision of autonomous systems"
8.	Servant/element in service of technology (3 of 17)	"human factor in service of technology", "human liberated by automation" (implication: previously "in service" of the machine), "worker as beneficiary" (passive recipient of decisions)

Cont. table 2.

9.	Source of errors (4 of 17)	"human factor as a source of errors", "human errors to be eliminated", "automation of dangerous and repetitive tasks" (implying human fallibility), "greater error rates arising from fatigue"
10.	Deficient/imperfect construct (13 of 17)	"skills gap", "deficiencies requiring remediation", "shortage of talented workers", "deficit of aptitudes", "necessity of reskilling", "workers requiring retraining", "insufficient worker knowledge", "the ability to rapidly acquire new skills as an indispensable condition of functioning"

Source: own elaboration.

Noteworthy is the dominance of metaphors that treat humans in an objectifying, passive manner (items 1–7), thereby distinguishing them from a decisive, active subject. Some of the metaphors applied to humans carry negative valence (items 9 and 10), whereas only one type of metaphor (item 7) grants humans decision-making capacity.

5.2. Worker Perspective

The most striking finding is the complete absence of realisation of the human-centric pillar: none of the 14 texts (Table 1, item 2) declaring this orientation contains any substantive evidence of its implementation. None analyses the material conditions of work, none examines the impact of transformation on employment from the worker's perspective, and none incorporates the voice of workers. "Human-centric" functions in the corpus as an empty label, not as an indication of the direction of actual or even declared action. The contradiction between declaration and realisation in the human-centric domain is demonstrated by findings concerning two aspects of focus on labour-related issues.

Table 3.
Representation of the worker perspective

No.	Category	Number of texts
1.	Quotations from workers' statements	0 of 17
2.	Survey studies covering non-managerial employees	0 of 17
3.	Survey studies covering managerial staff	5 of 17
4.	Trade union positions	0 of 17
5.	References to conversations with workers, collective bargaining, or implementation agreements regarding I5.0	0 of 17

Source: own elaboration.

The respondents of the survey studies referenced in 5 of the 17 texts were managers and academics. The worker is absent from every publication. Systematic omissions of issues relevant to the worker's situation are also evident.

Table 4.
Presence of labour-related topics in the texts

No.	Topics related to the work situation	Number of texts
1.	Wages and other forms of material remuneration	0 of 17
2.	Trade unions, worker representation	0 of 17
3.	Working conditions (broadly understood)	3 of 17
4.	Employment security	1 of 17

Cont. Table 4.

5.	Workers' rights	0 of 17
6.	Pay inequalities (of any kind)	0 of 17

Source: own elaboration.

An issue as fundamental as remuneration is entirely absent. The declared concern for worker well-being and the centrality of the human is operationalised exclusively through immaterial values — "engagement" or "job satisfaction" — and in no case through the actual purchasing power or economic security of workers.

5.3. The Job Elimination Problem

A further characteristic of I4.0 — and, from the worker's perspective, a problem inherent to this paradigm — is the elimination of jobs as a consequence of far-reaching automation and AI deployment. Three ways of addressing this issue were identified in the analysed texts: silence, euphemism, and neutralisation.

Table 5.
Approaches to the job elimination problem

No.	Approach	Characteristics	Number of texts
1.	Silence	Complete disregard of the problem	7 of 17
2.	Euphemism	Describing the problem through euphemisms: "relieval", "support", "synergy"	6 of 17
3.	Neutralisation	Acknowledging the issue and then pointing to its positive consequences	4 of 17

Source: own elaboration.

1. Silence (7 of 17): Texts describe the deployment of robots, cobots, and AI systems while simultaneously declaring a "human-centric" orientation, yet do not raise the question of what will happen to workers whose positions become automated.
2. Euphemism (6 of 17): Texts employ terminology that formally acknowledges the change in the worker's role while concealing its direction. "Support" suggests complementarity rather than substitution. One text informs the reader about the prospect of "relief of the worker" through automation, while also noting the possibility of automating 30% of warehouse positions.
3. Neutralisation (4 of 17): After acknowledging that automation may eliminate jobs, the claim follows that "new jobs will be created". None of the texts employing this rhetoric provides data on the balance: how many positions will disappear, how many will emerge, of what nature the new roles will be, or what employment conditions they will offer.

5.4. Humanwashing

Discursive formations of a humanwashing character are present in every article examined. They consist of the co-presence within the text of pro-social declarations alongside the silencing, euphemisation, or neutralisation of the threats to workers posed by the technologies described. The following forms of humanwashing were observed:

1. Simple (7 of 17). The text includes a declaration of human-centric orientation, but the content is devoted to technologies and efficiency, while the consequences of advancing automation and AI deployment for workers are passed over in silence.
2. Defensive (3 of 17). The threat is acknowledged and then neutralised through the rhetoric of "new jobs" or through euphemisms — that is, a difficult topic is addressed and closed without substantive analysis.
3. Technocratic (1 of 17). The reduction in jobs resulting from automation and self-organisation is presented as a positive phenomenon.
4. Meta-humanwashing (1 of 17). A corporate perspective that foregrounds capital interests is presented as an objective account of "a stage of industrial development".

6. Conclusions

The analysis above points, above all, to the conceptual difficulty involved in identifying a genuine form of realisation of the human-centric idea. Practical solutions that would enable workers to occupy a central place in the dynamic structure of organisational processes — engaging their creativity, knowledge, and intuition while avoiding the threat of job loss or the compulsion to accept difficult compromises of adaptation to the demands of a new situation — remain a matter for the future. In the analysed texts, such solutions are absent.

To designate the clear rhetorical pattern visible in all the examined articles, the term academic humanwashing is proposed, understood as a systematic divergence between the human-centric orientation declared in academic texts and the actual treatment of the worker, measured by the presence of the worker's perspective, the consideration of threats to employment, and the representation of workers' interests. The systemic character of this approach is indicated by the following observations: the disproportion between declarations and the actual adoption of the worker's perspective; the complete absence of the perspectives of workers and worker organisations; the absence of any reference to wage issues; and silence, euphemisation, or neutralisation of the problem of job elimination resulting from automation and AI deployment. The worker appears in the texts as a "human resource" to be managed, a "talent" to be acquired, an "operator" to be trained, a "source of errors" to be eliminated, or a subject requiring "attitude formation".

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