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Navigating Gender Nuances: Assessing the Impact of AI on Employee Engagement in Slovenian Entrepreneurship

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Abstract: Background: Our research delved into exploring various selected facets of AI-driven employee engagement, from the gender perspective, among Slovenian entrepreneurs. Methods: This research is based on a random sample of 326 large enterprises and SMEs in Slovenia, with an entrepreneur completing a questionnaire in each enterprise. Results: Findings suggest that there are no significant differences between male and female entrepreneurs in Slovenia regarding various aspects of AI-supported entrepreneurial management practice including the following: AI-supported entrepreneurial culture, AI-enhanced leadership, adopting AI to reduce employee workload, and incorporating AI tools into work processes. The widespread integration of AI into entrepreneurship marks a transition to a business landscape that values inclusivity and equity, measuring success through creativity, strategic technology deployment, and leadership qualities, rather than relying on gender-based advantages or limitations. Our research also focused on the identification of gender differences in path coefficients regarding the impact of the four previously mentioned aspects of AI on employee engagement. While both genders see the value in using AI to alleviate employee workload, the path coefficients indicate that female entrepreneurs report higher effectiveness in this area, suggesting differences in the implementation of AI-integrated strategies or tool selection. Male entrepreneurs, on the other hand, appear to integrate AI tools into their work processes more extensively, particularly in areas requiring predictive analytics and project scheduling. This suggests a more technical application of AI in their enterprises. Conclusions: These findings contribute to understanding gender-specific approaches to AI in enterprises and their subsequent effects on employee engagement.

Keywords: entrepreneurship; artificial intelligence; AI-supported entrepreneurial culture; AI-enhanced leadership; adopting AI to reduce employee workload; incorporating AI tools into work processes; employee engagement



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1. Introduction

In a rapidly changing world where technological advancements are reshaping our everyday lives, entrepreneurs of all genders face unique challenges and opportunities. A key competency emerging as crucial for success in this dynamic environment, regardless of gender, is the ability to understand and apply systems thinking in conjunction with artificial intelligence (AI) [1–3]. Integrating AI into business strategies is crucial for entrepreneurs of both genders as it levels the playing field and opens new avenues for innovation and success [2,4]. AI provides tools for data analysis, predictive modeling, and operational efficiency that can transform existing patterns into actionable strategies and innovations, thereby ensuring equal opportunities for success for entrepreneurs regardless of gender [5]. However, despite the optimistic views of AI as a democratizing force, it is important to consider diverse perspectives on its impact on different demographic groups, including gender. Research such as Szalavetz’s study highlights the challenges of adopting AI in dependent market economies, illuminating the complexities of major power rivalries and

their implications for innovation [6]. These findings emphasize the need for a nuanced approach to AI in entrepreneurship, acknowledging both the potential to enhance innovation and the risks of exacerbating existing disparities. For instance, Friederici et al. [7], in their study of digital entrepreneurship in Africa, highlight the unique challenges and opportunities presented by the digital economy outside the Silicon Valley paradigm. They argue that while digital technologies offer unprecedented opportunities for innovation, their impact is deeply intertwined with local economic, social, and political contexts, which can significantly influence the effectiveness and reach of such technologies. Insights from their study underscore the importance of considering the broader ecosystem within which digital and AI innovations are deployed.

AI has become a key factor in innovation and technological advancement in the modern business world. Its usage ranges from automating basic processes to enhancing strategic decision-making and leadership [8,9]. In the context of entrepreneurship leadership, AI is not just a tool for optimizing operations but also a means for transforming traditional leadership styles and practices [9,10]. AI is profoundly impacting the landscape of entrepreneurship, influencing how female and male entrepreneurs approach business challenges and opportunities [11]. While AI offers tools for data analysis, predictive modeling, and operational efficiency, its utilization can differ between genders [10,12–16].

Studies suggest that female entrepreneurs may prioritize AI for market research and customer experience enhancement, focusing on building relationships and understanding consumer needs [12,17]. Conversely, male entrepreneurs often leverage AI more for operational efficiency and scaling business operations. These tendencies reflect broader patterns in entrepreneurial strategy and decision-making [13].

For several reasons, understanding the differences in how male and female entrepreneurs utilize AI is critical. Firstly, it helps design tailored support and resources more effectively for diverse entrepreneurial needs [18]. Secondly, AI's ability to diminish biases in decision-making and resource allocation is crucial for fostering a balanced entrepreneurial ecosystem [19]. Recognizing these distinctions also aids in appreciating the unique strengths that each gender brings to entrepreneurship [20]. As AI technology advances, it becomes vital in bridging leadership and strategic gaps, enabling entrepreneurs of all genders to leverage their unique abilities for business success and innovation. This understanding is essential for nurturing a more inclusive and efficient entrepreneurial environment [1]. Understanding the gender differences in entrepreneurs' use of AI is crucial for employee engagement. AI influences the work environment significantly, affecting employee engagement from both male and female entrepreneurs' perspectives [21]. Female entrepreneurs often use AI to enhance relationship-building and address consumer needs, fostering an inclusive work culture. In contrast, male entrepreneurs may employ AI for operational efficiency, creating a more results-driven atmosphere [22–24]. However, AI is also reducing these gender differences in leadership styles and usage. Its objective and data-driven nature promotes a uniform approach to leadership, enabling informed, unbiased decision-making that benefits all employees. This technological evolution is helping level the playing field, resulting in more gender-neutral practices in leadership and AI applications in business [14,19]. Integrating AI into modern business practices is not just transforming operational efficiencies but transforming the structure of organizational leadership and employee engagement. Our research delves into this paradigm shift, focusing on how AI is being leveraged to enhance employee engagement in Slovenian enterprises. We particularly investigate gender dynamics in this context, exploring whether there are distinctive approaches between male and female entrepreneurs in utilizing AI for this purpose. The contribution of our research is multifaceted. The exploration of AI in the entrepreneurial context specifically highlights the intricate dynamics of its use among male and female entrepreneurs, focusing on AI-supported entrepreneurial culture, AI-enhanced leadership, adopting AI to reduce employee workload, and incorporating AI tools into the work processes and employee engagement. This nuanced approach not only reveals the unique challenges and opportunities that AI presents in the realm of business

but also underscores the critical role of gender dynamics in the application of technological innovations. By understanding how male and female entrepreneurs differently leverage AI in enterprises and the subsequent effects on employee engagement, this study provides vital insights into the broader implications of AI in shaping inclusive and effective business practices.

In this article, we focus on exploring the differences in the use of AI between female and male entrepreneurs. AI is becoming a key factor in entrepreneurship and plays a significant role in reducing traditional gender gaps. However, there is a lack of research directly addressing whether there are specific differences in the use of AI between female and male entrepreneurs. The contribution of this article is to fill this research gap. Our study aims to determine whether and how AI affects the reduction in or emphasis of gender differences in entrepreneurship. With this, we aim to understand the role of AI better in the entrepreneurial environment and its potential role in shaping a more equitable business world. Our research contributes to the growing discourse on the role of AI in business, offering novel insights into the gender dynamics of AI-enhanced employee engagement processes. Our findings provide valuable insights into how enterprises can better leverage AI's potential to improve business practices and enhance employee engagement, regardless of the entrepreneur's gender. By understanding these dynamics, enterprises can create more inclusive, effective, and innovative working environments, contributing to sustainable success and competitiveness.

2. Literature Review and Hypotheses

2.1. Female and Male Entrepreneurs

The research conducted by Guzman and Kacperczyk [20] illuminates gender disparities within the entrepreneurial landscape, particularly in high-growth ventures. Their findings reveal that female-led ventures are significantly less likely than their male counterparts to secure external funding, with a 63-percentage point gap in venture capital acquisition. This gap originates not only from differential access to resources but is also entwined with gender biases and the initial growth orientation of startups. They highlight that 65 percent of this gender gap is due to women being less likely to establish ventures that signal growth potential to investors. Even after accounting for this orientation, a residual gap of 35 percent persists, suggesting significant ongoing investor biases against female entrepreneurs.

Rugina and Ahl [25] discuss how women entrepreneurs in Central and Eastern Europe are perceived and influenced by both legacy socialist ideologies and emerging neoliberal market economies. They identify the following five prevailing constructs: women as untapped economic resources, casualties of gendered industrial cultures, lacking relevant skills, solutions to social problems, and in need of encouragement. These constructs underscore the complexities women face in navigating entrepreneurship within these regions.

Vijayakumar's study [23] of 132 women entrepreneurs in South India explores the relationship between emotional intelligence and leadership styles. It reveals that educational level significantly impacts both emotional intelligence and leadership effectiveness, suggesting that higher emotional intelligence enables women to employ both transactional and transformational leadership styles more effectively.

The insights from Sabharwal et al. [26] highlight the broader applicability of gendered leadership styles in the entrepreneurial context. They suggest that female entrepreneurs, like female MPA directors, may leverage transformational leadership to foster innovation, motivate teams, and navigate entrepreneurship challenges with a focus on collaboration and empathy.

Lastly, the study by Rummana et al. [27], which examines 200 entrepreneurs in Bangladesh using the Technology Acceptance Model, explores gender differences in perceived usefulness, user-friendliness, and ICT usage. Their findings reveal that while male entrepreneurs generally display higher levels of flexibility and perseverance, female entrepreneurs report significantly higher perceptions of system usefulness and user-

friendliness. Both genders associate higher ICT usage with innovativeness, underscoring the universal importance of leveraging technology for business advancement.

2.2. AI-Supported Entrepreneurial Culture: Gender Perspectives in Entrepreneurial Contexts

Women make significant contributions to the entrepreneurial landscape, though their involvement generally remains less than that of their male counterparts. The disparity in entrepreneurial activity between genders is influenced globally by diverse cultural norms and societal stereotypes [28]. Integrating AI into this context has become pivotal for entrepreneurial success in the rapidly evolving business environment. AI-driven tools and systems profoundly impact entrepreneurial culture by influencing decision-making, communication flows, and employee engagement [29]. For instance, AI can automate routine tasks, freeing time for creative and strategic endeavors, and thereby fostering innovation and efficiency [30]. Furthermore, AI's data analytics capabilities provide insights into market trends and consumer behavior, enhancing business responsiveness and adaptability to market needs.

While the benefits of AI in reshaping organizational culture are clear, the interaction with AI significantly varies between male and female entrepreneurs [10,12]. Chae and Goh [11] found that female entrepreneurs effectively leverage digital entrepreneurship to enhance venture performance, especially when demonstrating high levels of specific innovativeness. They often use AI to improve customer experience and conduct market research, employing a more intuitive and empathetic approach to meet customer needs effectively [8]. Conversely, the application of AI across businesses, particularly in shaping organizational culture, tends to be consistent across gender lines. Both male and female entrepreneurs recognize the value of AI in enhancing efficiency, improving decision-making processes, and fostering a culture of innovation and adaptability [4].

This uniform approach to AI integration suggests a shared understanding of its strategic importance, transcending traditional gender norms. AI is increasingly viewed as a tool for universal empowerment [2], with capabilities like data analytics, machine learning, and automation providing equal opportunities for all entrepreneurs to enhance their business processes. As such, AI acts as a catalyst for creating an inclusive and dynamic work environment where decisions are data-driven and processes are optimized for efficiency [31]. Therefore, the following hypotheses are proposed:

H1.0: *There is no statistically significant difference in AI-supported entrepreneurial culture between male and female entrepreneurs.*

H1.1: *There is a statistically significant difference in AI-supported entrepreneurial culture between male and female entrepreneurs.*

2.3. AI-Enhanced Leadership in Entrepreneurship: Bridging the Gap between Female and Male Entrepreneurs

When delving into the distinctions between male and female leadership styles, research indicates [26,32] a tendency for women to lean more toward transformational leadership. This style, often characterized by motivation, inspiration, and a focus on team-building and collaboration, contrasts with the more traditional leadership approaches commonly seen in male leaders [26,32]. Men in leadership roles frequently emphasize aspects such as administration, policy formulation, setting organizational priorities, communicating their strategic vision to stakeholders, and embodying the roles of advocates and role models [26,33]. Female entrepreneurs tend to exhibit a more empathetic leadership style, which can foster a more inclusive and supportive work environment. This approach enhances team collaboration and encourages a more holistic understanding of stakeholder perspectives. In contrast, male entrepreneurs often prioritize their roles' structural and strategic aspects, focusing on operational efficiency, policy implementation, and goal-oriented strategies [34–36]. However, modern approaches to leadership, such as transformational leadership, emphasize the importance of adaptability, empathy, and collaboration—qualities often attributed to

female leaders [37]. AI promises to bridge these differences. With the aid of data analytics, machine learning, and advanced information processing, AI enables entrepreneurs, regardless of gender, to make more informed and objective decisions [8]. AI can contribute to reducing bias and promote a more inclusive working environment. Historically, the discourse around leadership and employee engagement has been influenced by gender norms and biases. However, with the advent of AI, there is a potential to transcend these traditional barriers [5,38]. AI's data-driven and objective frameworks provide a unique opportunity to assess and address employee needs and engagement strategies in a more egalitarian and unbiased manner [39]. According to this, the following two hypotheses are proposed:

H2.0: *There is no statistically significant difference in AI-supported leadership styles between male and female entrepreneurs.*

H2.1: *There is a statistically significant difference in AI-supported leadership styles between male and female entrepreneurs.*

2.4. Bridging the Gender Divide: Adopting AI to Reduce Employee Workload in Entrepreneurship

The incorporation of AI into various business practices has marked a significant transformation, introducing a broad spectrum of applications across numerous industries. AI's impact is extensive and varied, including streamlining repetitive tasks, markedly improving customer interactions, and notably increasing workforce efficiency. Crucially, AI plays a pivotal role in reducing human error and foreseeing potential crises, thereby reshaping the way businesses operate [40]. The concept of algorithmic management is becoming more prominent in the business world. This approach involves the use of algorithms for handling managerial functions [41]. Businesses are increasingly entrusting algorithms with responsibilities such as selecting personnel, distributing tasks, organizing schedules, and evaluating employee performance [1]. New technologies have the potential to both enhance and detract from work design, significantly impacting various aspects of the employee experience. These innovations can lead to improved work structures and processes, boosting employee health, well-being, and engagement and enhancing overall performance [41].

Also, Nahar [42] found that men and women perceive and use technology differently. For instance, men are often more confident in adopting new technologies and perceive them as more useful than women, who may show hesitancy and lack confidence in using such technologies. This difference in perception and usage can significantly impact how male and female entrepreneurs integrate technology into their business processes, including those aimed at reducing their employees' workload.

H3.0: *There is no statistically significant difference in adopting AI to reduce employee workload between male and female entrepreneurs.*

H3.1: *There is a statistically significant difference in adopting AI to reduce employee workload between male and female entrepreneurs.*

2.5. Artificial Intelligence in Entrepreneurship: A Comparison of Incorporating AI Tools into Work Processes between Male and Female Entrepreneurs

Technology is increasingly instrumental in supporting women entrepreneurs in their quest for social innovation, functioning in two key capacities. Firstly, technology itself can be the medium of social innovation, where innovative technological solutions directly address social challenges. This involves developing new technologies or leveraging existing ones to create positive social change. Secondly, technology is an enabler, providing the tools and platforms for women entrepreneurs to implement their social innovation ideas. This includes using technology for communication, data analysis, and reaching wider audiences to drive social change [15]. A study focusing on entrepreneurs in Malaysia [43]

found distinct differences in the use of information and communication technology (ICT) between male and female entrepreneurs. It noted that male entrepreneurs tended to be more flexible and persevering, while risk-taking propensity was a more significant determinant of technology usage among female entrepreneurs. Interestingly, both male and female entrepreneurs associated innovativeness with technology usage, but female entrepreneurs showed higher perceptions of the system's usefulness and ease of use. However, overall ICT usage and the use of basic and advanced systems for administrative, planning, and control purposes did not significantly differ based on gender. A more recent exploration of gender differences in technology use, as discussed by the European Institute for Gender Equality [44], reveals nuanced patterns. It suggests that societal norms and relations, which are influenced by technological transformations, shape the relationship between gender and technology. Women often face higher anxiety than men regarding IT use, leading to lower self-efficacy and perceptions of technology requiring more effort. This is compounded by gender norms affecting self-perceptions of technological proficiency. Furthermore, women are generally more concerned about digital technologies and tend to have more negative perceptions of them compared with men. Despite this, the ownership and use of digital technologies hold significant potential for the economic empowerment of women and increasing gender equality. According to Giuggioli and Pellegrini [39], the use of AI in entrepreneurship shows significant impacts and opportunities, regardless of the entrepreneur's gender. AI technologies, integral to innovations like the Internet of Things, Augmented Reality, and blockchain, are transforming entrepreneurial processes, including venture creation, decision-making, and operational performance enhancement. Hence, the following two hypotheses are proposed:

H4.0: *There are no statistically significant differences in the incorporation of AI tools into work processes between male and female entrepreneurs.*

H4.1: *There is a statistically significant difference in the incorporation of AI tools into work processes between male and female entrepreneurs.*

2.6. AI Ethical Considerations in Entrepreneurship

AI has emerged as a critical element in decision-making across various sectors, emphasizing the need for thorough ethical scrutiny. Fundamental to the responsible use of AI is transparency and fairness in algorithmic decision-making, ensuring users understand the basis of AI's conclusions, and addressing potential biases through ethical foresight and inclusive technology development [45–47]. Ethical challenges, particularly concerning privacy, surveillance, and transparency, necessitate a delicate balance between technological advancement and the protection of employee rights [46]. Gender considerations add complexity, as biases in AI algorithms may reinforce workplace gender disparities [48,49]. Moreover, AI's automation potential raises concerns about job displacement, especially in roles vulnerable to automation, prompting the need for strategies to reskill and upskill employees to ensure an inclusive transition to AI-driven practices [50,51]. Incorporating AI into business operations extends beyond technical issues to encompass cultural and organizational adjustments. Adapting to AI requires shifts in organizational structures, cultures, and mindsets, overcoming resistance to change, misunderstandings about AI's benefits, and the alignment of AI with strategic objectives. These challenges often vary by gender, influenced by differing leadership styles, resource access, and prevailing gender norms [47,49,52].

2.7. Comparative Analysis Model of AI Utilization in Male and Female Entrepreneurship to Increase Employee Engagement

In enterprises where at least half of the executive positions are held by women, there is a noticeable enhancement in employee engagement and belief in the company's mission. According to Renzulli [53], such enterprises score higher in how inspired employees feel, showing greater autonomy and engagement and a higher likelihood to recommend the

company's products. This evidence underscores the positive impact of female leadership on workplace dynamics and performance.

In today's digital age, integrating AI into business strategies is essential for keeping pace with rapid changes and managing complex information flows [54]. AI equips entrepreneurs with crucial insights for effective decision-making and strategy development, which is vital for maintaining competitiveness in a dynamic market [18,19]. Gilal et al. [55] emphasize that successful leadership relies on personal traits rather than gender, advocating for a gender-balanced approach in technology development to ensure products and services are equitable.

AI's role extends beyond enhancing decision-making; it also drives business development and encourages traditional businesses to adopt new technologies [56,57]. This transformation is not just about improving operational efficiency but also about fostering a more engaged and innovative workplace [58,59]. Deloitte's research [60] highlights that effective AI integration depends on organizational culture, trust, data fluency, and change management. When properly managed, AI can relieve entrepreneurs of administrative burdens, freeing them to focus on employee development and engagement strategies, thereby improving overall workplace morale and career development [61]. Thus, we proposed two hypotheses as follows:

H5.0: *There is no statistically significant difference in the path coefficients in using AI to enhance employee engagement between male and female entrepreneurs.*

H5.1: *There is a statistically significant difference in the path coefficients in the use of AI to enhance employee engagement between male and female entrepreneurs.*

Figure 1 presents a comparative analysis of AI utilization to enhance employee engagement in enterprises led by male and female entrepreneurs. In the following, we examined the path coefficients, which present the strength and direction of the relationships between various constructs, such as AI-supported entrepreneurial culture, AI-enhanced leadership, adopting AI to reduce employee workload, incorporating AI tools into work processes, and employee engagement. The path coefficients helped us better understand how and to what extent the constructs in the model influence each other. This allowed us to determine which variables have stronger or weaker effects as when comparing male and female entrepreneurs. We identified which gender has higher values in these connections, providing insights into how male and female entrepreneurs leverage AI differently to increase their employees' engagement. This comparison will shed light on potential differences in approaches to implementing AI strategies between genders and how these approaches affect employee engagement in their enterprises.

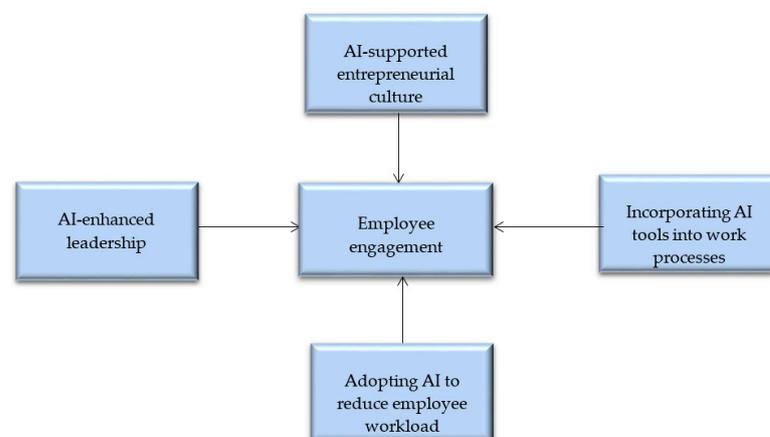


Figure 1. Comparative analysis of AI utilization for employee engagement in male- and female-led enterprises.

3. Materials and Methods

3.1. Data and Sample

This research involved a randomly selected sample of 326 SMEs and large enterprises in Slovenia. To be classified as a small-sized enterprise, a company must meet at least two of the following criteria within a fiscal year: (1) maintaining an average workforce of no more than 50 individuals, (2) generating annual net sales of up to EUR 8 million, and (3) having total assets worth up to EUR 4 million, under the provisions of ZGD-1 [62]. A medium-sized enterprise must meet two of these criteria: (1) the average number of employees during the financial year does not exceed 250, (2) net sales revenue does not exceed EUR 40 million, and (3) the value of assets does not exceed EUR 20 million. In contrast, large enterprises are defined by exceeding the following specific thresholds: (1) employing more than 250 people on average during a fiscal year, (2) achieving net sales revenue of over EUR 40 million, and (3) owning total assets exceeding EUR 20 million, as delineated in ZGD-1 [62]. The sample's makeup showed a distribution with 52.76% being large enterprises and 47.24% SMEs. The participant composition in this study included 54.91% male and 45.09% female entrepreneurs. The distribution of entrepreneurs by length of employment in the sample was as follows: 24.85% of entrepreneurs had employment length ranging from 11 to 20 years. The most significant portion of the sample, 42.02%, fell within the employment length of 31 to 40 years. Those with an employment length of 21 to 30 years comprised 31.29% of the total sample. Respondents with an employment duration of over 41 years constituted 1.84% of the sample.

3.2. Research Instrument

We used a questionnaire that was a closed-type 5-point Likert-type scale. Items for the AI-supported entrepreneurial culture construct were adopted from Dabbous et al. [63], and items for the AI-enhanced leadership and employee engagement construct were adopted from Wijayati et al. [4]. Items for the adoption of AI to reduce employee workload construct were adopted from Qiu et al. [64]. Items for the incorporation of AI tools into work processes construct were adopted from Wamba-Taguimdje et al. [1] and Niederman [65].

3.3. Statistical Analysis

To address the complexity of assessing the impact of AI on employee engagement across gender nuances in Slovenian entrepreneurship, this study employed a variety of statistical tests, each chosen for its specific ability to analyze the data in a way that aligns with the research objectives. The Mann–Whitney U test and SEM were pivotal in this analytical process, offering insights into the nuanced relationships and differences that may exist between male and female entrepreneurs' use of AI. In the initial phase, the Kolmogorov–Smirnov and Shapiro–Wilk tests were conducted to assess the normality of the data distribution. Given that the results indicated the data were not normally distributed ($p < 0.001$), we opted for a non-parametric approach for two independent samples—the Mann–Whitney U Test was used to examine statistically significant differences between entrepreneurs based on gender. The Mann–Whitney U Test was utilized to compare differences between male and female entrepreneurs on various aspects of AI-supported entrepreneurial management practices (AI-supported entrepreneurial culture, AI-enhanced leadership, adopting AI to reduce employee workload, and incorporating AI tools into work processes).

We also used structural equation modeling for our data analysis. Within this framework, we constructed a model and analyzed the differences regarding constructs between male and female entrepreneurs (Figure 1). Moreover, we compared the model between male and female entrepreneurs and analyzed the path coefficients. Thus, SEM was chosen for its ability to analyze complex relationships between observed and latent variables. This method allowed us to construct a model that reflects the understanding of how AI impacts employee engagement, incorporating multiple variables and their inter-relations simultaneously. The use of SEM enabled us to test the hypothesized model of the impact of

AI on employee engagement, accounting for the mediating effects of gender differences and providing a comprehensive understanding of the direct and indirect relationships between variables. We used structural equation modeling (SEM) and employed WarpPLS 8.0 as our software tool of choice. The selection of WarpPLS 8.0 was informed by its multitude of benefits and distinctive features not commonly found in other programs. A principal benefit we recognized is its ability to clearly define non-linear relationships between pairs of latent variables [66]. For assessing validity, we scrutinized both the average variance extracted (AVE) and the composite reliability (CR) [66]. The variance inflation factor (VIF) was utilized to detect any multicollinearity issues [67]. Moreover, both the Mann–Whitney U test (Tables 1–4) and SEM are valid in analyzing the research data as they allow for a nuanced examination of the differential impacts of AI on male and female entrepreneurs and their practices concerning employee engagement. These methods complement each other, with the Mann–Whitney U test providing a preliminary understanding of the differences between genders, and SEM offering a detailed analysis of the complex relationships and underlying factors contributing to these differences. This dual approach ensures that the findings are robust, reliable, and reflective of the intricate dynamics at play in the impact of AI on employee engagement within the context of Slovenian entrepreneurship. Additionally, we adhered to the quality criteria for indicators outlined in Table 5 to evaluate the reliability of our model. Also, Table 6 shows key quality assessment indicators of the research model.

4. Results

In the following, we present descriptive statistics and the results of the Mann–Whitney U test for each construct in related to the use of artificial intelligence between male and female entrepreneurs. Table 1 shows descriptive statistics and the Mann–Whitney test results for the AI-supported entrepreneurial culture construct.

Table 1. Descriptive statistics and the results of the Mann–Whitney test for the AI-supported entrepreneurial culture construct.

AI-Supported Entrepreneurial Culture	Mann–Whitney U	Asymp. Sig. (2-Tailed)	Male Entrepreneurs			Female Entrepreneurs		
			Mean	Median	Std. Deviation	Mean	Median	Std. Deviation
The enterprise’s culture is very responsive and changes easily.	13,943.000	0.216	4.11	4.00	0.944	4.01	4.00	1.019
We use AI technology in any part of our business.	14,144.000	0.313	4.06	4.00	1.131	3.75	4.00	1.079
There is a shared vision of what enterprise will be like in the future.	14,183.000	0.320	4.02	4.00	0.907	3.81	4.00	1.394
Policies of the enterprise are clearly defined.	14,847.000	0.786	4.27	4.00	1.140	4.19	4.00	1.102
Employees fully understand the goals of our enterprise.	13,702.000	0.119	3.89	4.00	1.330	4.06	4.00	0.931
The enterprise’s management provides information to employees in a timely manner.	14,359.000	0.422	4.13	4.00	1.105	4.10	4.00	1.079
Employees are familiar with all the services/products we offer/produce in our enterprise.	14,274.000	0.380	4.12	4.00	1.017	4.08	4.00	1.049

The results in Table 1 show no significant differences between male and female entrepreneurs in AI-supported entrepreneurial culture. On average, both male and female entrepreneurs agree that their companies' policies are clearly defined, their companies' management provides information to employees in a timely manner, and employees are familiar with all the services/products they offer/produce in the enterprise. In addition to these items, male entrepreneurs, on average, show marginally higher agreement than female entrepreneurs that their enterprises' culture is very responsive and changes easily. In the context of using AI technology in any part of the business, again, males reported a higher average agreement than females; however, on average, both genders agree with this statement. Males are usually more confident when responding to such questions. On the other hand, female entrepreneurs achieve a higher average agreement regarding the statement that employees fully understand the goals of their enterprise. The Mann–Whitney U test for all items is $p > 0.05$, which implies that the differences in the responses between male and female entrepreneurs are not statistically significant. This implies that both male and female entrepreneurs share similar views regarding the incorporation of AI into their entrepreneurial culture. Thus, we accepted the hypothesis H1.0: There is no statistically significant difference in AI-supported entrepreneurial culture between male and female entrepreneurs.

Both male and female entrepreneurs may have similar levels of exposure to and access to AI technologies, leading to a common understanding and approach to integrating AI within their business practices. Also, uniformity in educational programs or professional training for entrepreneurs may result in a shared level of knowledge and skill in applying AI to business, leading to similar responses. There may be increasing gender parity in entrepreneurship, with women attaining similar levels of empowerment, resource access, and opportunities as their male counterparts, which is reflected in their similar perspectives on AI [15,34,42]. Table 2 presents descriptive statistics and the Mann–Whitney Test results for the AI-enhanced leadership construct.

The results in Table 2 show that on average, male entrepreneurs exhibited a marginally higher level of agreement with the statements compared with female entrepreneurs. Males are usually more confident when responding to such questions. Notably, both male and female entrepreneurs displayed a shared perspective on the development of a clear vision for AI in their departments ($p > 0.05$). This convergence suggests a general agreement across genders on the importance and approach to strategic AI planning. Similarly, when it comes to understanding and resolving business problems using AI, the responses from both genders indicated a comparable level of competence ($p > 0.05$). This implies mutual confidence in leveraging AI for effective problem-solving, regardless of gender. Furthermore, the results show that entrepreneurs of both genders are equally adept at anticipating future business needs and proactively designing AI solutions. This forward-thinking approach signifies a gender-neutral perspective in AI integration for future business requirements. Additionally, the ability to work collaboratively with various stakeholders, such as data scientists, employees, and customers, to identify opportunities that AI might bring was perceived similarly by both male and female entrepreneurs ($p > 0.05$). This trend points toward a common acceptance of collaborative methods in maximizing the benefits of AI across different entrepreneurial environments. An important finding of this study is the similar view of male and female entrepreneurs on the presence of strong leadership supporting AI initiatives and their commitment to AI projects within their organizations. This reflects a widespread recognition of the pivotal role of leadership in successfully adopting and integrating AI technologies. Moreover, this study highlights that both genders view their organizations as having a culture of open communication and effective problem-solving, especially in AI-related contexts ($p > 0.05$); however, in this case, female entrepreneurs achieve a higher average agreement. This could indicate a broader trend in transparency and agility in dealing with AI challenges in the entrepreneurial world. Lastly, the provision of necessary training for dealing with AI applications was seen similarly by entrepreneurs of both genders. This underscores the recognized importance of education and skill devel-

opment in fostering effective AI implementation. Thus, we accepted the hypothesis H2.0: There is no statistically significant difference in AI-supported leadership styles between male and female entrepreneurs. Overall, these findings suggest a notable parity between male and female entrepreneurs in their approach and attitude toward AI-enhanced leadership. This parity reflects a broader trend in the entrepreneurial world, where gender differences are diminishing in the face of technological advancements and the evolving role of leadership in business innovation. Table 3 presents descriptive statistics and the Mann–Whitney Test results for the adoption of AI to reduce employee workload construct.

Table 2. Descriptive statistics and the Mann–Whitney Test results for the AI-enhanced leadership construct.

AI-Enhanced Leadership	Mann–Whitney U	Asymp. Sig. (2-Tailed)	Male Entrepreneurs			Female Entrepreneurs		
			Mean	Median	Std. Deviation	Mean	Median	Std. Deviation
We developed a clear vision for what was going to be achieved by our department.	14,822.000	0.762	4.05	4.00	1.014	4.02	4.00	1.079
We are able to understand business problems and to direct AI initiatives to solve them.	14,624.500	0.612	3.89	4.00	1.136	3.80	4.00	1.243
We are able to anticipate future business needs of functional managers, suppliers, and customers and proactively design AI solutions to support these needs.	14,555.500	0.567	3.76	4.00	1.038	3.74	4.00	1.152
We are able to work with data scientists, other employees, and customers to determine opportunities that AI might bring to our enterprise.	14,757.000	0.707	3.83	4.00	0.901	3.71	4.00	1.046
Employees have strong leadership to support AI initiatives and are commitment to AI projects.	14,914.000	0.841	3.75	4.00	1.196	3.73	4.00	1.302
In the enterprise prevails open communication and we solve employees' problems on the spot.	15,073.000	0.973	3.72	4.00	0.995	3.98	4.00	1.074
Employees are provided with the required training to deal with AI applications.	14,596.500	0.579	3.85	4.00	0.833	3.82	4.00	0.777

In Table 3, which examines the construct of Adopting AI to reduce employee workload, a subtly higher average agreement with the related statements is observed among female entrepreneurs compared with their male entrepreneur counterparts. While the median response for both male and female entrepreneurs was 4.00, the mean value of statements from female entrepreneurs was slightly higher. This suggests that female entrepreneurs may perceive AI as more effective in reducing the workload on administrative staff. When it comes to AI's capability to take orders and complete tasks, which is a direct measure of workload reduction, again, female entrepreneurs reported marginally higher mean scores. This could suggest that they are more optimistic about the practical applications of AI in day-to-day business activities, valuing its potential to enhance operational efficiency. In the realm of AI aiding in searching and analyzing information, female entrepreneurs again manifested a marginally higher mean response. This perspective could indicate a

keen awareness of AI's time-saving and efficiency-boosting capabilities, particularly in handling data-intensive tasks. Lastly, the belief that AI can help in getting jobs done and save employees' work time was also more pronounced among female entrepreneurs. This slightly higher agreement aligns with a pragmatic view where the immediate benefits of AI in enhancing workplace productivity are particularly valued. The inclination of female entrepreneurs to express a slightly higher agreement with these statements about AI's role in reducing workload might stem from a variety of factors. For example, Jahnvi and Perwez [68] and Castrillon [69] summarize that it could be influenced by a more pronounced emphasis on efficiency and work-life balance or a pragmatic approach toward technology adoption focusing on tangible benefits. Additionally, it might reflect a more people-centric approach in business management, where the well-being and efficiency of employees are given priority. The Mann–Whitney U test shows that there are no statistically significant differences between male and female entrepreneurs in adopting AI to reduce employee workload ($p > 0.05$); thus, we confirm hypothesis H3.0: There is no statistically significant difference in adopting AI to reduce employee workload between male and female entrepreneurs. Table 4 shows descriptive statistics and the Mann–Whitney test results for the incorporation of AI tools into work processes construct.

Table 3. Descriptive statistics and the Mann–Whitney Test results for the adoption of AI to reduce employee workload construct.

Adopting AI to Reduce Employee Workload	Mann–Whitney U	Asymp. Sig. (2-Tailed)	Male Entrepreneurs			Female Entrepreneurs		
			Mean	Median	Std. Deviation	Mean	Median	Std. Deviation
The AI technology applied in our enterprise can take orders and complete tasks, which reduces the workload of employees.	14,190.000	0.336	4.01	4.00	1.354	4.08	4.00	1.274
The AI technology applied in our enterprise can communicate with users/customers, which reduces the workload of employees.	15,005.500	0.917	3.73	4.00	1.315	3.95	4.00	1.312
The AI technology applied in our enterprise can search and analyze information, which reduces the workload of employees.	13,951.000	0.220	3.92	4.00	1.315	4.06	4.00	1.259
Artificial intelligence can help in getting the job done, which saves employees work time.	14,295.000	0.391	3.86	4.00	1.193	4.02	4.00	1.289

The results in Table 4 indicate that both male and female entrepreneurs, on average, agree that their enterprise has a digital transformation strategy, including AI adoption, followed by their enterprise utilizing AI technologies for work design to plan new tasks and use predictive analytics tools to improve work. Male entrepreneurs display a slightly higher average level of agreement with all items related to incorporating AI tools into work processes, except for using chatbots to improve work and using AI technologies for work design, where female entrepreneurs have a marginally higher average agreement. For example, Chae and Goh [11] found that male entrepreneurs are more likely to engage in digital entrepreneurship. This trend could be attributed to factors such as the historical predominance of males in tech-related fields, gender-specific network and resource access, and societal attitudes toward technology and risk-taking. The results of the Mann–Whitney U test indicate that there are no statistically significant differences between genders ($p > 0.05$) in the incorporation of AI tools into work processes (Table 4). The proactive incorporation of

AI tools into work processes underscores a strategic alignment with digital transformation goals, showcasing a commitment to leveraging advanced technologies to drive business success. This alignment is evident across male and female entrepreneurs, reflecting a shared understanding of AI's strategic importance in modern business practices [11,38,39]. Therefore, we confirmed hypothesis H4.0: There are no statistically significant differences in incorporating AI tools into work processes between male and female entrepreneurs.

Table 4. Descriptive statistics and the Mann–Whitney Test results for the incorporating AI tools into work processes construct.

Incorporating AI Tools into Work Processes	Mann–Whitney U	Asymp. Sig. (2-Tailed)	Male Entrepreneurs			Female Entrepreneurs		
			Mean	Median	Std. Deviation	Mean	Median	Std. Deviation
Our enterprise uses program and portfolio structures for managing projects.	14,630.500	0.611	4.02	4.00	1.138	3.87	4.00	1.132
Our enterprise has a digital transformation strategy, including AI adoption.	13,887.500	0.200	4.21	4.00	1.025	4.18	4.00	1.084
Our enterprise uses AI technologies for work design.	13,964.000	0.188	4.14	4.00	1.128	4.17	4.00	1.179
Our enterprise uses AI technologies to plan new tasks.	13,944.000	0.221	4.11	4.00	1.073	4.08	4.00	1.017
Our enterprise uses AI technologies in projects to create teams.	13,321.500	0.061	3.76	4.00	1.134	3.62	4.00	1.064
We use chatbots (Digital Assistants) to improve our work.	13,471.000	0.286	3.91	4.00	1.027	3.97	4.00	0.775
We use Predictive Analytics Tools to improve our work.	14,496.000	0.492	4.10	4.00	0.627	4.06	4.00	0.583
We use Robotic Process Automation to improve the work.	14,542.500	0.542	3.85	4.00	0.827	3.83	4.00	1.015
We use project scheduling software (it helps in planning, tracking, and analysis of projects) to improve our work on a project.	13,608.500	0.104	4.08	4.00	0.765	4.00	4.00	0.781
We use Resource Scheduling software (it helps allocate resources like equipment rooms, staff, and other resources) to improve our work on a project.	14,661.500	0.630	3.98	4.00	0.837	3.76	4.00	0.839

In the second step of our study, structural equation modeling was utilized to estimate path coefficients, focusing on the differences between female and male entrepreneurs in relation to AI constructs and its impact on employee engagement, for the model presented in Figure 1. We compared the structural models for both genders, analyzing the path coefficients to gain insights into the influence of various constructs in the model on each other. This analysis not only illuminated the distinct approaches and perceptions of male and female entrepreneurs toward AI but also highlighted specific areas where interventions can be made to enhance AI adoption and its benefits across genders. By pinpointing these differences, this study provides actionable insights for developing more inclusive AI

strategies that accommodate female- and male-led enterprises' unique needs and strengths. Table 5 serves as an integral component of this research, showcasing the results of a factor analysis conducted to assess various AI-related constructs within the organizational setting. It systematically presents the reliability of measurement scales by Cronbach's alpha, sampling adequacy via KMO and Bartlett's test, communalities, and factor loadings for each item under study.

The results presented in Table 5 reveal that both the measure of sampling adequacy and Bartlett's test of sphericity for each variable confirm the appropriateness of applying factor analysis. The communalities for all five constructs exceed 0.40; thus, no variables were discarded. Moreover, all factor loadings are higher than 0.60. All measurement scales demonstrate high reliability (all Cronbach's alpha > 0.80). In addition to the results in Table 5, the total variance explained for AI-supported entrepreneurial culture is 63.767%, the total variance explained for AI-enhanced leadership is 65.098%, the total variance explained for adopting AI to reduce employee workload is 74.425%, the total variance explained for incorporating AI tools into work processes is 76.510%, and the total variance explained for employee engagement is 84.209%. Table 6 presents model fit and quality indicators.

Table 5. Factor analysis results.

Item	Factor Label	Cronbach's Alpha	Communalities	Factor Loadings
The enterprise's culture is very responsive and changes easily.	AI-supported entrepreneurial culture	0.807	0.778	0.882
We used AI technology in any part of our business.			0.726	0.852
There is a shared vision of what the enterprise will be like in the future.			0.737	0.859
Policies of the enterprise are clearly defined.			0.849	0.921
Employees fully understand the goals of our enterprise.			0.670	0.818
The enterprise's management provides information to employees in a timely manner.			0.842	0.918
Employees are familiar with all the services/products we offer/produce in our enterprise.			0.729	0.854
KMO = 0.837; Bartlett's Test of Sphericity: Approximate Chi-Square = 1691.035, $p < 0.01$				
We developed a clear vision for what was going to be achieved by our department.	AI-enhanced leadership	0.823	0.881	0.924
We are able to understand business problems and to direct AI initiatives to solve them.			0.864	0.911
We are able to anticipate future business needs of functional managers, suppliers and customers and proactively design AI solutions to support these needs.			0.682	0.816
We are able to work with data scientists, other employees and customers to determine opportunities that AI might bring to our enterprise.			0.734	0.860
Employees have strong leadership to support AI initiatives and are committed to AI projects.			0.715	0.846
Open communication prevails in the enterprise, and we solve employees' problems on the spot.			0.655	0.809
Employees are provided with the required training to deal with AI applications.			0.749	0.876

Table 5. Cont.

Item	Factor Label	Cronbach's Alpha	Communalities	Factor Loadings
KMO = 0.755; Bartlett's Test of Sphericity: Approximate Chi-Square = 1004.118, $p < 0.01$				
The AI technology applied in our enterprise can take orders and complete tasks, which reduces the workload of employees.	Adopting AI to reduce employee workload	0.834	0.876	0.936
The AI technology applied in our enterprise can communicate with users/customers, which reduces the workload of employees.			0.754	0.827
The AI technology applied in our enterprise can search and analyze information, which reduces the workload of employees.			0.759	0.867
Artificial intelligence can help in getting the job done, which saves employees work time.			0.732	0.810
KMO = 0.717; Bartlett's Test of Sphericity: Approximate Chi-Square = 700.189, $p < 0.01$				
Our company uses program and portfolio structures for managing projects.	Incorporating AI tools into work processes	0.812	0.748	0.865
Our company have a digital transformation strategy, including AI adoption.			0.889	0.944
Our company uses AI technologies in projects for work design.			0.885	0.941
Our company uses AI technologies in projects to plan new tasks.			0.860	0.927
Our company uses AI technologies in projects to create teams.			0.813	0.883
We use chatbots (Digital Assistants) to improve our work on a project.			0.750	0.866
We use Predictive Analytics Tools to improve our work on a project.			0.881	0.938
We use Robotic Process Automation to improve our work on a project.			0.732	0.856
We use project scheduling software (it helps in planning, tracking, analysis of projects) to improve our work on a project.			0.859	0.922
We use Resource Scheduling software (it helps allocate resources like equipment rooms, staff, and other resources) to improve our work on a project.			0.724	0.835
KMO = 0.821; Bartlett's Test of Sphericity: Approximate Chi-Square = 3161.185, $p < 0.01$				
Using AI enhances employee effectiveness.	Employee engagement	0.846	0.861	0.928
Employees are engaged in the quality of their work.			0.827	0.909
Employees complete their work with passion.			0.819	0.905
Employees are engaged in achieving successful business results.			0.648	0.825
Employees are aware of the importance of innovation for our company, and they help to develop the enterprise.			0.747	0.864
Employees are enthusiastic in their work.			0.738	0.859
Employees are engaged in business ideas and solutions.			0.802	0.896
Employees believe in the successful development and operation of our enterprise.			0.659	0.837
KMO = 0.918; Bartlett's Test of Sphericity: Approximate Chi-Square = 3217.999, $p < 0.01$				

Table 6. Model fit and quality indicators.

Quality Indicators	The Criterion of Quality Indicators	Calculated Values of Model Indicators
APC	$p < 0.05$	0.106, $p < 0.05$
ARS	$p < 0.05$	0.239, $p < 0.05$
AARS	$p < 0.05$	0.228, $p < 0.05$
AVIF	AVIF < 5.0	1.010
AFVIF	AFVIF < 5.0	1.042
GoF	GoF ≥ 0.1 (low) GoF ≥ 0.25 (medium) GoF ≥ 0.36 (high)	0.374
SPR	SPR ≥ 0.7	0.850
RSCR	RSCR ≥ 0.9	1.000
SSR	SSR ≥ 0.7	1.000
NLBCD	NLBCD ≥ 0.7	0.850

Table 6 reveals statistically significant values for APC, ARS, and AARS, all with p -values below 0.05, indicating strong model predictors. The AVIF and AFVIF values are under 5.0, demonstrating low collinearity concerns. SPR, RSCR, SSR, and NLBCD exceed their minimum thresholds, ensuring model validity. The GoF (goodness-of-fit) indicator results show that the model is highly appropriate. Table 7 shows the quality indicators of the structural model.

Table 7. Indicators of the quality of the structural model.

Constructs	CR	AVE	R ²	Adj. R ²	Q ²	VIF
AI-supported entrepreneurial culture	0.916	0.652	-	-	-	1.081
AI-enhanced leadership	0.854	0.597	-	-	-	1.084
Adopting AI to reduce employee workload	0.889	0.664	-	-	-	1.024
Incorporating AI tools into work processes	0.967	0.853	-	-	-	1.012
Employee engagement	0.959	0.771	0.764	0.751	0.897	1.014

For all five constructs, the CR exceeds 0.7, and the AVE values surpass 0.5, with CR values consistently outstripping AVE values. This configuration underscores the achievement of convergent validity across all constructs. An R² value of 0.764 indicates that the model explains approximately 76.4% of the variance in the dependent variable using the independent variables, which is considered a relatively high value. This suggests that the model fits the data well and possesses substantial predictive power. A Q² value greater than 0 indicates that the model possesses predictive relevance. Predictive relevance is a key indicator that the model provides useful insights that can be applied for practical or research purposes. For practical applicability, Q² values greater than 0 are generally considered [66]. The VIF values, which fell between 1.012 and 1.084 and are well below the threshold of 5.0, indicate the absence of collinearity issues in the structural model's outcomes. Table 8 presents standardized path coefficients for male and female entrepreneurs.

Table 8 shows the results of the SEM and the structural coefficients of the compounds of the basic structural model. Table 8 reveals that all constructs positively affect employee engagement for both male and female entrepreneurs. Based on the provided results from Table 8, the path coefficients for both male and female entrepreneurs show how different constructs affect employee engagement. For AI-supported entrepreneurial culture ($\gamma = 0.131, p < 0.05$) and incorporating AI tools into work processes ($\gamma = 0.184, p < 0.05$), the path coefficients are slightly higher for male entrepreneurs, indicating a stronger effect on employee engagement compared with female entrepreneurs. However, when it comes to adopting AI to reduce employee workload ($\gamma = 0.173, p < 0.05$) and AI-enhanced leadership ($\gamma = 0.157, p < 0.05$), the effects are stronger for female entrepreneurs, as indicated by higher path coefficients. Additionally, the positive link direction is observed in all cases. Furthermore, Cohen's coefficient values show that the influence of the predictive latent variables is of high strength in all cases. Thus, we accepted hypothesis H5.1: There is a statistically significant difference in the path coefficients in the use of AI to enhance employee engagement between male and female entrepreneurs.

Table 8. Standardized path coefficients of male and female entrepreneurs.

Links between Constructs	Male Entrepreneurs			Female Entrepreneurs		
	Path Coefficient (γ)	Effect Size (f^2)	Standard Error	Path Coefficient (γ)	Effect Size (f^2)	Standard Error
AI-supported entrepreneurial culture → Employee engagement	0.131 $p < 0.05$	0.364	0.038	0.127, $p < 0.05$	0.354	0.045
AI-enhanced leadership → Employee engagement	0.149, $p < 0.05$	0.375	0.038	0.157, $p < 0.05$	0.361	0.045
Adopting AI to reduce employee workload → Employee engagement	0.151, $p < 0.05$	0.362	0.038	0.173, $p < 0.05$	0.379	0.041
Incorporating AI tools into work processes → Employee engagement	0.184, $p < 0.05$	0.370	0.039	0.168, $p < 0.05$	0.386	0.045

5. Discussion

The integration of AI into entrepreneurship represents a transformative shift in business operations, strategies, and scaling, particularly when viewed through the lens of gender. The democratization of access to AI tools has the potential to reduce traditional disparities between male and female entrepreneurs, fostering a more inclusive and equitable business environment [10,17]. This aligns with prior studies that highlight AI's role in leveling the playing field, enabling entrepreneurs of all genders to enhance operational efficiency and engage more effectively with employees [1,4,38,39]. Our findings confirm that both male and female entrepreneurs recognize the importance of clear company policies and timely communication, which are crucial for effective AI integration. However, male entrepreneurs tend to view their business culture as more adaptable to technological changes, which may facilitate higher employee engagement with AI tools [11,19]. This observation is consistent with research suggesting that proactive leadership in technology adoption can significantly influence organizational culture and employee responsiveness [70]. Interestingly, our results revealed gender differences in the perception and implementation of AI, with male entrepreneurs displaying a higher path coefficient in AI-supported entrepreneurial culture's impact on employee engagement. This may reflect broader societal norms and expectations about gender roles in technology and innovation [28,71,72]. Such disparities underscore the need for a gender-neutral approach in adopting AI, ensuring that both male and female entrepreneurs can leverage these technologies to compete effectively and create a collaborative, innovative workplace environment. To enhance the impact of AI within entrepreneurial cultures, it is essential for leaders to foster an inclusive atmosphere that supports technological advancement and innovation. Providing adequate training and resources, ensuring open communication, and actively involving employees in AI integration can help maximize the benefits of AI across genders. Furthermore, regular monitoring and adaptation of AI strategies based on employee feedback can improve outcomes and foster a culture of continuous improvement and inclusivity [29,30,60]. The results presented in Table 2 reveal that both female and male entrepreneurs generally agree on having a clear vision for their departments. However, there are notable differences in other areas. Male entrepreneurs report a strong understanding of business problems and the ability to direct AI initiatives effectively, emphasizing the importance of providing employees with the necessary training for handling AI applications. Female entrepreneurs, on the

other hand, highlight the significance of fostering open communication and immediate problem resolution, which are complemented by proactive AI solution designs to anticipate and meet future business needs of functional managers, suppliers, and customers. Table 8 shows that AI-enhanced leadership significantly impacts employee engagement, with a higher path coefficient observed for female entrepreneurs. Research [26,32,71] suggests that female entrepreneurs often exhibit more transformational leadership qualities, such as empathy, inclusiveness, and a collaborative approach. These qualities are essential for effective communication and relationship building, which are pivotal in engaging employees, particularly when implementing new technologies like AI. Based on these findings, several recommendations can be made to maximize the benefits of AI-enhanced leadership for improving employee engagement across genders as follows: (1) personalized development: entrepreneurs should use AI data analysis to develop personalized mentoring and coaching programs that align with individual employee needs and goals; (2) flexible work environments: AI can help create flexible work conditions that cater to employee preferences, such as adjustable working hours or remote work options, thereby boosting satisfaction and engagement; (3) leadership feedback: AI tools can offer insights into leadership practices, enabling entrepreneurs to enhance their understanding and empathy toward employees, which can lead to improved motivation and engagement; (4) performance recognition: employing AI to analyze and recognize employee achievements promptly can strengthen appreciation and contribute to higher engagement; and (5) data-driven decision-making: utilizing AI for strategic decision-making can enhance project efficiency and success, positively impacting employee engagement. By integrating these AI-driven strategies into their leadership practices, entrepreneurs can foster an encouraging and supportive work environment that enhances employee engagement and leverages the unique strengths of both male and female leadership styles. The findings in Table 3 reveal that both female and male entrepreneurs predominantly agree that AI technology implemented in their enterprises can efficiently handle orders and tasks, consequently alleviating employee workload. Additionally, there is consensus that AI aids in information search and analysis, leading to a reduction in employee burden. Moreover, respondents from both groups acknowledge that AI streamlines task completion, saves work time, and enhances communication with users/customers, thereby easing the workload of employees. Female entrepreneurs, on average, demonstrate higher agreement with utilizing AI to mitigate employee workload compared with their male counterparts. Table 8 further indicates that the impact of AI adoption on reducing employee workload shows a stronger path coefficient among female entrepreneurs than male entrepreneurs. This could be attributed to various factors such as the inclusive and empathetic leadership styles often exhibited by female entrepreneurs, which prioritize employee well-being and workload management [23,24]. Enterprises led by female entrepreneurs may cultivate a culture that values work–life balance, employee satisfaction, and technological support, thus enhancing employee engagement [26,32,73]. This culture, emphasizing a reduction in employee workload through AI, could contribute to higher employee engagement [4]. Female entrepreneurs may adopt a comprehensive approach to AI integration, ensuring that these technologies genuinely alleviate employee burdens rather than solely automate tasks. This might involve extensive training, support, and feedback mechanisms to ensure successful adoption [26,32,34,68,73]. To adapt AI to reduce employee workload, we propose the following recommendations for entrepreneurs, regardless of gender. Entrepreneurs should use AI to automate routine and time-consuming tasks such as data processing, email management, and administrative duties. This can free up employees' time for more strategic and creative tasks, enhancing their engagement. Entrepreneurs should use AI to analyze communication within the enterprise and identify potential issues or bottlenecks (AI can suggest improvements or automate certain aspects of communication to make it more efficient and less burdensome) as well as develop AI systems that can recognize employee engagement and success and automatically suggest rewards or acknowledgments. This can increase employee engagement. Also, entrepreneurs should implement AI tools for monitoring the well-being of employees,

which can proactively identify signs of overload or stress and use AI to analyze the performance and preferences of employees to tailor their work tasks and projects. Ensuring employees are engaged in tasks that match their skills and interests reduces the feeling of overload. By employing these strategies, entrepreneurs can leverage the power of AI to improve the work environment, reduce employee workload, and increase their engagement. Entrepreneurs should involve employees in decisions related to AI adoption and application. This could include surveys, focus groups, or inclusion in pilot projects. Employee involvement can lead to higher acceptance and engagement with AI technologies. Finally, entrepreneurs should regularly evaluate the impact of AI on employee workload and engagement; they should be prepared to adjust strategies based on feedback and outcomes to ensure that AI adoption remains aligned with employee well-being and organizational goals; and they should leverage AI to automate routine tasks and free up employees for more creative and meaningful work. This not only reduces workload but also enhances employee engagement.

The adoption of AI technologies across both genders indicates a strong commitment to digital transformation strategies among entrepreneurs, as shown in Table 4. However, nuances exist in their application: male entrepreneurs are slightly more inclined toward using project scheduling and resource management tools, while female entrepreneurs favor tools like Robotic Process Automation. This gender-based divergence in AI tool utilization underscores the potential of digital technologies to not only streamline operations but also to address gender disparities in entrepreneurship. Significantly, the adoption of these technologies offers a pathway to democratizing entrepreneurship by providing equal access to essential resources and networks, thereby enhancing female entrepreneurs' competitiveness in traditionally male-dominated markets [74,75]. Digital platforms also facilitate flexible work arrangements, which can mitigate some societal barriers women face, thus promoting a more inclusive and dynamic business environment. However, Table 8 reveals the higher effectiveness of AI tools in enhancing employee engagement among male entrepreneurs. To address this and foster an equitable work environment, it is crucial for entrepreneurs to develop AI integration strategies that are sensitive to the diverse needs of all employees. This includes forming gender-inclusive teams, improving communications about AI benefits, and employing AI analytics to deepen insights into business operations. Additionally, integrating AI solutions like chatbots and virtual assistants can free up employees to tackle more complex challenges, thereby boosting engagement.

5.1. Theoretical Contributions

1. Unveiling gender-specific dynamics in AI use: Our study explored how male and female entrepreneurs in Slovenia differ in their perception and implementation of AI technologies. This contribution significantly expands the literature on the impact of gender on the adoption and use of technology in entrepreneurship.
2. Development and testing of a model: Our study developed and empirically tested a model that connects various aspects of AI-supported entrepreneurial culture, AI-enhanced leadership, adopting AI to reduce employee workload, and incorporating AI tools into work processes with employee engagement. This model offers a new framework for understanding the complex interactions between AI and entrepreneurship.
3. Focus on the Slovenian entrepreneurial context: With an emphasis on Slovenia, which has been a relatively unexplored environment in the context of AI in entrepreneurship, our study contributes to a better understanding of global trends and their local application.

5.2. Practical Contributions

1. Improvement of entrepreneurial practices: The findings of our study provide practical insights into how enterprises can better leverage the potential of AI to improve leadership practices, reduce employees' workload, and increase their engagement. This includes the following: (1) Tailored AI training programs: given the gender differences

in AI adoption and utilization observed, enterprises should develop gender-sensitive training programs. For example, since female entrepreneurs may prioritize AI for market research and customer experience, training initiatives should focus on enhancing these skills among female entrepreneurs, offering tools and case studies that align with their strategic preferences. (2) Gender-inclusive AI tool development: enterprises should involve both male and female entrepreneurs in the development phase of AI tools. This involvement can ensure that the tools are designed to meet the varied needs and preferences of all users, ultimately leading to broader acceptance and more effective use across the business. (3) Strategic decision-making support: enterprises should develop AI-driven analytic tools that specifically aid in strategic decision-making, ensuring they are accessible and adaptable to both male and female entrepreneurs. Such tools can help in identifying trends, forecasting, and providing insights that cater to the distinct strategic inclinations observed among genders. (4) Enhancing employee engagement through AI: enterprises should implement AI systems that actively monitor employee engagement and workload, tailored to the different management styles of male and female entrepreneurs. This can help in adjusting work processes in real time to enhance productivity and work engagement. (5) Community building and networking through AI: enterprises should facilitate AI-enabled platforms that foster networking and mentorship among entrepreneurs. These platforms can be designed to encourage interaction across genders, promoting knowledge exchange and collaboration that respects and utilizes the unique strengths of each group.

2. Support for policymakers: Our research offers a basis for the development of targeted policies and programs that promote gender equality in entrepreneurship and technology, focusing on utilizing AI to achieve these goals.
3. Advice for entrepreneurs: This study provides advice for male and female entrepreneurs on how AI technologies can be successfully integrated into their business models and work processes to improve employee engagement and foster innovation.

5.3. Limitations and Future Possibilities

The limitations of this study primarily revolve around its geographical scope, focusing solely on Slovenian enterprises. The present study, while providing valuable insights into the gender nuances of AI's impact on employee engagement within the Slovenian entrepreneurial context, inherently carries limitations in its geographic scope. Acknowledging this limitation, we advocate for future research to adopt a more global perspective, encompassing a diverse range of countries and regions. Such research should aim to explore the multifaceted relationship between AI and gender in entrepreneurship across various cultural and economic landscapes. It is imperative to consider how different societal norms, business practices, and levels of AI maturity could affect the integration of AI technologies in businesses and their subsequent impact on employee engagement and gender dynamics. Moreover, comparative studies between countries could unveil how regional variations in AI adoption influence the empowerment or marginalization of different genders within the entrepreneurial ecosystem. This could involve investigating factors such as access to AI technologies, the availability of skills training, and the presence of supportive policies for gender equality in the tech sector. Future research recommendations include expanding this study to include a wider geographical range, incorporating longitudinal data to examine changes over time, and integrating qualitative research methods to gain deeper insights into the subjective experiences of entrepreneurs with AI. Furthermore, investigating the role of AI in different industry sectors could provide a more nuanced understanding of its impact on gender dynamics within entrepreneurship.

One of the novel aspects of our study was the comparative analysis of path coefficients between male and female entrepreneurs within the Slovenian entrepreneurship context. This methodological choice was driven by our goal to uncover gender-specific dynamics in the adoption and impact of AI technologies on entrepreneurship, a signif-

icant yet underexplored area of research. By exploring these differences, we aimed to contribute to the nuanced understanding of how gender influences technological engagement in entrepreneurship. We directly compared the path coefficients for male and female entrepreneurs to highlight potential patterns and generate hypotheses for future investigations. This limitation underscores the importance of further research that could employ additional statistical methodology. Future studies could build on our initial findings by analyzing a multigroup structural equation model to statistically test differences between the path coefficients of male and female entrepreneurs.

The integration of AI into entrepreneurship marks a significant shift toward creating equitable opportunities for entrepreneurs of all genders. By harnessing AI to bridge historical gaps, the business world is evolving into a more inclusive arena where the success of male and female entrepreneurs is determined by their skills and contributions rather than gender [16,38]. This evolution not only fosters gender equality but also stimulates innovation and competitiveness on a global scale. Embracing AI equips entrepreneurs with the tools to devise strategies that bolster engagement, productivity, innovation, and harmony within the workplace, steering businesses toward lasting success in an increasingly inclusive economic environment [1,4,5,39].

6. Conclusions

In the digital transformation era, AI is revolutionizing not just the realms of data analytics or robotic automation but also redefining enterprises' approaches to managing workplace dynamics and employee interactions. One of the more intriguing outcomes of AI's integration into the workplace is its potential to "blur" and challenge traditional gender norms, especially in entrepreneurship. However, as AI assumes a central role in businesses, questions arise about gender disparities or unities in its application. Human biases often come into play during decision-making processes. AI systems can facilitate objective decision-making in various leadership aspects, such as promotions, assignments of employee tasks, and evaluations of employees. By relying on quantifiable metrics and data-driven insights rather than subjective judgments, AI minimizes bias based on gender or any other factors. This fosters a sense of fairness among employees, reduces disparities, and leads to employee engagement. When employees believe that their company values diversity and gives everyone an equal chance to succeed, they are more likely to be engaged and committed to their roles. High employee morale often leads to increased productivity and work engagement. Our study's findings indicate no statistically significant differences between male and female entrepreneurs in Slovenian enterprises across the following key constructs: AI-supported entrepreneurial culture, AI-enhanced leadership, adopting AI to reduce employee workload, incorporating AI tools into work processes, and employee engagement. Understanding such trends helps businesses to adapt and foster a more inclusive and engaged work environment. Our study holds significant implications, suggesting that integrating AI into the work environment can reduce gender disparities in decision-making and leadership within Slovenian enterprises. The absence of significant gender differences in these areas implies that AI-driven approaches can create a more level playing field where gender-related factors influence leadership and technology practices less. Our research findings underscore AI's potential to promote fairness and objectivity in various aspects of business management. Our study significantly advances the understanding of gender's complex roles in utilizing AI within the entrepreneurial environment. It reveals how AI is a transformative force in reducing traditional gender gaps in entrepreneurship, providing a fresh perspective on how technology's integration reshapes business operations and strategies. By analyzing how male and female entrepreneurs differently experience and embrace AI technologies, our research underscores AI's capacity to cultivate a business environment that is more inclusive, equitable, and competitive business landscape. This study adds to the academic discourse on AI and entrepreneurship. It provides actionable insights for practitioners aiming to harness AI's full potential while promoting gender equality within the entrepreneurial sector.

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