DIGIT

UNIWERSYTET EKONOMICZNY W POZNANIU

DIGIT report:

Expectations and concerns of marketing students regarding working with Artificial Intelligence.

July 2026

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STRATEGIC PARTNERSHIPS

Project „People and algorithms in organizations: competencies to work in the digital environment" (BNI/PST/2023/1/00082).

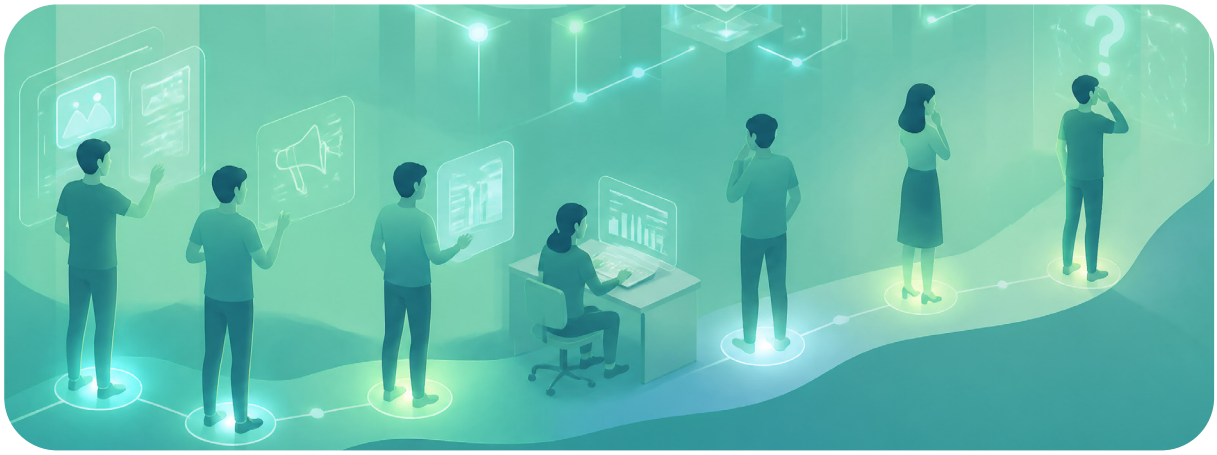
This report examines marketing students' expectations, concerns and readiness to work with Artificial Intelligence. It explores how students use AI, how they perceive its role in marketing and how they assess their AI-related competencies. The findings identify distinct AI collaboration profiles and reveal key skill gaps, particularly in responsible AI and advanced applications. On this basis, the report offers insights to inform AI-focused marketing education and to prepare graduates for an AI-enabled workplace.

Taken together, the findings portray marketing students as confident operational users of AI whose readiness thins markedly as tasks shift towards strategic, managerial and ethical decision-making, a gap most pronounced, paradoxically, among the very students most eager to adopt these tools. These patterns proved largely consistent across European and American respondents, which points to a shared imperative: to embed responsible AI and strategic judgement throughout marketing education and professional development, treating them as core elements from the outset.

Introduction

Artificial Intelligence (AI) is rapidly transforming the marketing profession by reshaping how organizations analyze customer data, create content, support decision-making, and manage customer relationships. As AI technologies become increasingly embedded in marketing practice, future professionals must develop not only technical proficiency in using AI tools but also the ability to collaborate effectively with AI in a responsible, ethical, and strategically informed manner. Understanding how today's marketing students perceive AI is therefore essential for designing educational programs that prepare graduates for the evolving demands of the digital economy.

This report presents the results of a study examining the expectations, concerns, and readiness of marketing students regarding working with Artificial Intelligence. The research investigates how students from Europe and the United States define and use AI, how they perceive its role as either an operational tool or a collaborative partner, and how they evaluate key dimensions of responsible AI, including agency, transparency, and fairness. In addition, the study assesses students' self-reported AI-related competencies, identifies the skills they intend to develop, and explores differences in readiness for AI collaboration across distinct student profiles.



The findings reveal that marketing students generally view AI as a valuable source of support for learning, content creation, research, and marketing decision-making. However, their confidence is concentrated in practical applications of generative AI, while more advanced areas, including AI governance, ethical decision-making, risk management, and autonomous AI systems, remain underdeveloped. The analysis also demonstrates that students are not a homogeneous group but differ substantially in their openness to collaborating with AI, suggesting that educational interventions should be tailored to different levels of AI readiness.

By providing evidence-based insights into students' attitudes, competencies, and development priorities, this report contributes to the growing discussion on AI-enabled marketing education. The results offer practical guidance for universities, educators, and employers seeking to design curricula and professional development initiatives that equip future marketers with the knowledge, skills, and responsible mindset required to thrive in AI-supported marketing environments.

Part 1. Attitudes toward Human-AI Collaboration

This section starts with presenting how marketing students use AI. Then, we examine which orientation toward human-AI collaboration best characterises marketing students. Third, we assess whether students frame AI primarily as an operational servant or as a collaborative partner. Fourht, it examines students' perceptions of responsible AI, with particular attention to agency, fairness, transparency and accountability. Finally, it describes students' self-assessed AI-related competences and the competences they intend to develop. The statistical analyses are used selectively to support interpretation rather than to generate an exhaustive statistical inventory.

1. How do students understand and use AI

Students most frequently defined AI through its practical functionality rather than through technical principles. AI was primarily described as a system that answers questions, supports information retrieval and assists users in everyday tasks. More technical definitions referring to machine learning or large language models appeared less frequently. Topic prevalence did not differ significantly across student profiles ($\chi^2 = 9.90$, $p = .625$).

Table 1. Definitions of AI

Topic	Representative keywords
AI as question-answering and information support	answer, questions, information, people
AI as computer system simulating human knowledge	computer, human, knowledge, learns
LLM/data-based model understanding	model, language, data
AI as human-like task-performing technology	human, perform, technology
Machine learning and generative algorithms	learning, machine learning, generative

Students primarily described AI as a learning assistant. The dominant applications included explaining concepts, preparing written assignments, brainstorming ideas, conducting research and summarising information. Although AI Strategists and AI Trailblazers more frequently referred to research-oriented applications, differences between profiles were not statistically significant ($\chi^2 = 17.33$, $p = .138$).

Table 2. Usage of AI

Topic	Representative keywords
Learning support and explanations	study, understand, explain
Writing and brainstorming	writing, ideas, grammar
Research and data analysis	research, assignments, data
Information search and summarisation	information, summarize
Homework and everyday study	homework, school

Students most often referred to specific generative AI tools rather than underlying technologies. ChatGPT, Gemini, Copilot and Canva dominated the responses, whereas AI Trailblazers more frequently described AI through marketing applications such as customer analytics and content creation. Differences between profiles were not statistically significant ($\chi^2 = 14.63$, $p = .262$).

Table 3. Technologies used

Topic	Representative keywords
Marketing applications	content, customer, analytics
ChatGPT, Gemini, Copilot, Canva	chatgpt, gemini, copilot
Alternative LLMs	claude, grok
Conversational AI	chat, gpt
Limited technology use	sales, technologies

The qualitative findings show that marketing students consistently describe AI in practical rather than abstract terms. They primarily associated AI with information support, content creation, learning assistance, research, data analysis and decision support. Importantly, topic modelling revealed only limited differences between the student profiles identified through the quantitative analyses. This suggests that the profiles differ less in how they verbally describe AI and more in the extent to which they are willing to collaborate with AI and integrate it into future marketing decision-making.

2. Human-AI Collaboration Orientations

We consider how students position AI in relation to knowledge integration based on different degrees of openness toward AI-supported collaboration. A unidisciplinary orientation indicates that AI is expected to deepen work within a single domain. A multidisciplinary orientation indicates that AI is expected to bring in perspectives from different business areas. An interdisciplinary orientation goes further and captures the willingness to integrate such perspectives into broader, collaborative problem-solving.

Table 4. Descriptive statistics for Human-AI Collaboration Orientations.

Orientation	Mean
Unidisciplinary Orientation	4.82
Multidisciplinary Orientation	5.34
Interdisciplinary Orientation	4.95

The results show that students are not equally oriented toward all forms of AI collaboration. The differences between the three orientations were statistically significant: Multidisciplinary Orientation was significantly higher than both Unidisciplinary Orientation and Interdisciplinary Orientation.

Students are most strongly characterized by Multidisciplinary Orientation. They tend to see AI as a system that can bring additional business perspectives into marketing thinking, rather than merely deepening a single domain or fully integrating knowledge across domains. Students are most comfortable with AI as a source of additional perspectives rather than as a tool restricted to a single field or as a fully integrated cross-disciplinary collaborator. The dominant pattern is therefore not narrow task support, but neither is it full interdisciplinary integration. Students appear to value AI especially when it broadens their view of marketing problems by adding insights from adjacent domains. This result is important because it suggests that students' readiness for AI collaboration is already broader than simple automation, but still requires pedagogical support if AI is to be used in genuinely integrative decision-making.

The comparison between European and US students did not reveal regional differences in collaboration orientations. US students reported slightly higher scores on all three orientations, but these differences were small. This suggests that the overall pattern of multidisciplinary dominance is shared across both regional groups.

3. AI as a collaborative partner or as an operational servant

Regarding working with AI, the role assigned to AI in decision-making (AI as a servant and AI as a partner) is central because it differentiates an efficiency-oriented view of AI from a more collaborative view. If AI is perceived mainly as a servant, its value lies in automating tasks and reducing effort. If it is perceived as a partner, it becomes part of the decision process and is expected to contribute insights, support judgement and participate in longer-term problem-solving.

Table 5. Descriptive statistics for perceived AI roles and related attitudes.

Construct	Mean	SD
AI as a Servant	4.86	1.38
AI as a Partner	4.48	1.39

Students perceived AI more strongly as a servant than as a partner. The result suggests that students are open to AI but still define its role more in operational and supportive terms than in fully collaborative terms. In other words, their expectations of AI are not sceptical, but they remain closer to the idea of AI as a capable assistant than to AI as a decision-making counterpart.

4. How do students perceive responsible AI?

Agency, Fairness, Transparency and Accountability[1] are important dimensions of attitudes toward AI. Students need to perceive AI as controllable, understandable, impartial and embedded in accountability arrangements. Perception of AI's Agency, Fairness and Transparency was very similar. Their means are moderate and closely aligned. Students do not strongly reject AI as uncontrollable, unfair or opaque, but they also do not express very high confidence in these dimensions. This pattern suggests a cautious form of acceptance. Students are willing to work with AI, but their perceptions of control, explainability and impartiality remain only moderate. From a responsible AI perspective, this indicates that educational interventions should not only teach students how to use AI efficiently, but also how to evaluate its fairness, understand its outputs and preserve human agency in AI-supported marketing decisions.

Table 6. Descriptive statistics for responsible AI perceptions.

Dimension	Mean	SD
Agency	4.36	1.37
Fairness	4.33	1.55
Transparency	4.32	1.23

The regional comparison showed no meaningful differences for Fairness, Transparency, and Agency. This suggests that perceptions of responsible AI are broadly similar among students in Europe and the United States. The absence of strong regional differences is relevant because it indicates that concerns about control, transparency and responsibility may represent a shared educational challenge rather than a region-specific issue.

[1] Additionaly, the construct of accountability was measured but was excluded from data analysis due to low internal consistency.

Part 2. Readiness to work with AI

We assessed AI-related marketing competencies developed by Ławrynowicz et al. (2025). Their framework organises thirteen competencies needed to work with AI into five distinct domains: Data and Research, Strategy, Branding, Customer Experience, and Managerial. These competencies include areas such as data collection for AI, AI-based customer insights, integrating AI in product development, content generation with AI, AI-powered communication, and digital safety and security, among others.

We assessed them from two complementary perspectives. First, respondents evaluated their current level of competence in each domain using a five-level self-assessment scale ranging from basic to proficient. Second, respondents selected the three competence domains they intended to develop most intensively during the following year. Together, these two measurements provide insight into students' current preparedness and their future learning priorities.

Overall, the results indicate that students demonstrate the strongest readiness in competencies directly related to the practical use of generative AI, particularly within the Branding and Data and Research domains. Students reported the highest levels of competence in AI-supported content generation, customer insight analysis, and data preparation for AI applications. These competencies were also among the most frequently selected priorities for future development, suggesting that students recognize their importance for contemporary marketing practice and intend to further strengthen these capabilities. This pattern reflects the widespread adoption of generative AI tools for content creation, market analysis, and decision support.

Table 7. Competences for working with AI

AI-related competencies		Current competence (Mean)	Selected for future development (%)
Category	**Competence**		
Branding	**Content generation with AI:** Producing written, visual, or multimedia content with AI tailored to specific audiences and formats	3.19	42.96
Data and Research	**AI-based customer insights:** Enhancing insights into customer expectations, needs, emotions, and behaviors through AI-supported analysis	2.73	34.71
Data and Research	**Data collection for AI:** Gathering and preparing relevant data on customers, markets, and marketing activities for AI applications	2.71	40.53
Branding	**AI-based communication:** Optimizing and automating brand communication by integrating AI tools for audience targeting and personalization	2.60	24.76
Customer experience	**AI-based customer relationship management:** Building and maintaining strong customer relations with AI support	2.48	17.23
Managerial	**Teamwork with AI:** Managing teams, projects, and decision-making to ensure ethical and effective use of AI in marketing campaigns	2.48	18.93
Strategy	**Managing AI-based value:** Facilitating value creation, delivery, and capture through AI-enabled systems while clearly articulating this value to stakeholders	2.48	20.39
Strategy	**Developing AI-based product/service:** Designing products or services that are based on or incorporate AI technologies	2.47	28.88
Managerial	**Digital safety and security in the context of AI:** Assessing potential risks of AI implementation in marketing and establishing safeguards to protect individuals and data	2.43	16.50
Customer experience	**Sales intelligence:** Influencing performance by leveraging AI to identify prospects, tailor offerings, and support negotiations	2.43	14.56
Managerial	**Responsibility for AI generated content and decisions:** Evaluating the ethical implications of AI-assisted actions and decisions and assuming accountability for their outcomes	2.40	12.14
Customer experience	**User experience:** Streamlining service delivery and product interactions through AI technologies that address both standardized and personalized needs	2.30	14.08
Managerial	**Working with agents:** Developing and implementing autonomous applications, service robots, or virtual agents capable of executing marketing-related tasks	2.07	14.32

Competencies within the Strategy domain occupied a middle position. Students expressed moderate confidence in using AI to support value creation and product or service development, while also identifying AI-enabled product design as an important area for future learning. This suggests that students increasingly recognize AI's strategic potential but still perceive these applications as more demanding than operational uses of AI.

Similarly, the Customer Experience domain received moderate evaluations. Students reported reasonable confidence in applying AI to customer relationship management and sales intelligence, whereas AI-enabled user experience design was assessed less favorably. These findings indicate that respondents appreciate AI's role in supporting customer interactions but are less familiar with its application in designing and optimizing end-to-end customer experiences.

The weakest results emerged in the Managerial domain, which encompasses competencies related to AI governance, ethical responsibility, digital safety, project management, and autonomous AI agents. Students reported the lowest confidence in developing autonomous AI applications and only moderate confidence in managing AI-related risks, accountability, and ethical decision-making. Moreover, these competencies were selected relatively infrequently as future learning priorities. This suggests that students currently associate AI primarily with operational marketing activities rather than with managerial oversight and responsible governance of AI systems.

The competence analysis reveals a clear practical orientation toward AI applications in marketing. Students reported the highest competence in producing written, visual, and multimedia content with AI, followed by AI-supported customer insight generation and data preparation for AI applications. These same domains were also among the most frequently selected priorities for further development, suggesting that students intend to strengthen capabilities they already perceive as highly relevant for contemporary marketing practice. In contrast, the lowest levels of self-assessed competence were observed for developing autonomous AI applications, streamlining AI-enabled service delivery, and evaluating the ethical implications of AI-assisted decisions. These domains were also relatively infrequently selected as future development priorities. This pattern indicates that students currently associate AI primarily with operational marketing activities such as content creation, analytics, and communication, whereas more advanced organizational, technical, and governance-related applications receive considerably less attention.

Taken together, the results reveal a competence profile that is strongly oriented toward applied, task-focused uses of AI rather than strategic and managerial capabilities. Students appear well prepared to use AI as a productivity-enhancing tool, but considerably less prepared to manage AI implementation, evaluate its ethical implications, or oversee AI-enabled organizational processes. These findings highlight an important opportunity for marketing education to complement technical AI skills with broader competencies in AI strategy, governance, and responsible AI management.

Part 3. Students AI profiles

This section develops a taxonomy of marketing student orientations toward collaboration with AI. The purpose is not to describe the average student, but to identify whether distinct configurations of collaboration readiness exist beneath the aggregate tendencies reported in Chapter 1. The profiles were derived exclusively from responses to questions representing dimensions of collaboration with AI: Unidisciplinary, Multidisciplinary, and Interdisciplinary Orientation.

1. Student profiles based on AI collaboration orientation

AI-reluctant students constitute 7.3% of the sample. AI-reluctant students show the lowest scores on all three dimensions. Their responses indicate limited willingness to use AI either as a focused task-support mechanism or as a source of knowledge from other business domains. The profile represents general distance from AI-enabled collaboration rather than caution confined to a single form of use.

Table 8. Profile descriptives for the classification dimensions.

Profile	n	% of sample	Unidisciplinary (mean)	Multidisciplinary (mean)	Interdisciplinary (mean)
AI-reluctant	30	7.3	2.22	2.06	2.08
Cautious	108	26.2	4.17	4.64	4.14
Moderately receptive	176	42.7	5.09	5.65	5.17
Highly receptive	98	23.8	5.85	6.58	6.30

Cautious students constitute 26.2% of the sample. Cautious students report below-average but not uniformly negative collaboration orientations. They appear open to selective applications of AI while remaining hesitant about continuous knowledge integration and intensive human–AI teamwork. This cluster is therefore best interpreted as selectively receptive rather than resistant.

Moderately receptive students constitute 42.7% of the sample. Moderately receptive students form the largest cluster. They report consistently positive orientations across the three dimensions but do not reach the uniformly high scores of the most receptive group. Their profile suggests practical willingness to use AI for efficiency and broader input, provided that integration remains proportionate to the task.

Highly receptive students constitute 23.8% of the sample. Highly receptive students display the strongest scores across all three dimensions. Their particularly elevated Multidisciplinary and Interdisciplinary Orientation indicates readiness to use AI not only for narrow task support but also for combining knowledge across functions, reconsidering marketing problems from alternative perspectives, and embedding AI-generated input into teamwork.

The four clusters were compared on perceived AI roles, expected responsible-AI perceptions, perceived agency, and anticipated AI-related trends.

Table 9. Profile differences on descriptive variables (means).

Variable	AI-reluctant	Cautious	Moderately receptive	Highly receptive
AI as a Servant	2.31	4.47	5.08	5.67
AI as a Partner	1.67	3.96	4.61	5.68
Fairness	2.47	4.01	4.43	5.08
Transparency	2.67	3.94	4.49	4.93
Agency	2.51	3.98	4.63	4.84
Trends	4.92	4.88	5.18	5.10

All descriptive variables differed significantly across clusters. The means generally increased from the AI-reluctant to the Highly receptive cluster. This ordered pattern indicates that collaboration orientation is closely associated with perceived usefulness of AI, a partner-like interpretation of AI, and willingness to act proactively in an AI-enabled environment.

The cluster distribution was compared between Europe and the United States. The association was not statistically significant. This indicates that the K-means clusters are not simply regional categories and instead capture orientations that occur in both geographic groups.

2. AI-related competences across profiles

Self-assessed AI competences were examined to determine whether the collaboration profiles were associated with perceived ability to apply AI in marketing practice. The results reveal a broad competence gradient: the Highly receptive cluster generally reported the strongest competences, whereas the AI-reluctant cluster reported the weakest. However, effect sizes varied considerably, indicating that the profiles are more strongly differentiated in some applied domains than in others.

Table 10. Self-assessed AI-related competences across K-means clusters (means).

AI-related competencies		AI-reluctant	Cautious	Moderately receptive	Highly receptive
Category	Competence				
Data and Research	Data collection for AI	2.50	2.50	2.68	3.08
	AI-based customer insights	2.37	2.40	2.69	3.26
Strategy	AI-based product/service design	2.30	2.30	2.43	2.80
	AI-enabled value creation and communication	2.27	2.20	2.40	2.99
Branding	Content generation with AI	2.47	2.95	3.20	3.64
	AI-based communication	2.20	2.37	2.56	3.05
Customer experience	AI-based customer relationship management	2.00	2.13	2.42	3.12
	Sales intelligence	2.10	2.09	2.40	2.95
	User experience	2.03	2.06	2.26	2.73
Managerial	Working with agents	1.90	1.94	2.03	2.32
	Responsibility for AI generated content and decisions	2.50	2.12	2.37	2.71
	Teamwork with AI	2.20	2.19	2.36	3.10
	Digital safety and security in the context of AI	2.17	2.16	2.43	2.84

12 of the thirteen competence domains differed significantly across profiles. The strongest differences concerned Customer relationship management with AI, Ethical and effective AI project management, Customer insight analysis, AI-supported prospecting and negotiations, AI-supported content production. The pattern suggests that broad receptivity toward AI collaboration is accompanied not only by favorable attitudes but also by greater perceived readiness to deploy AI in customer-facing, analytical, and managerial activities.

Future competence-development priorities were analyzed separately because they indicate what students intend to learn rather than what they believe they can already do. The percentages below represent the share of each cluster selecting a competence among its three development priorities.

Table 11. Future competence-development priorities across K-means clusters.

AI-related competencies		AI-reluctant %	Cautious %	Moderately receptive %	Highly receptive %
Category	Competence				
Data and Research	Data collection for AI	43.3	31.5	42.6	45.9
	AI-based customer insights	26.7	37.0	35.2	33.7
Strategy	AI-based product/service design	20.0	20.4	30.1	38.8
	AI-enabled value creation and communication	13.3	21.3	23.3	16.3
Branding	Content generation with AI	36.7	45.4	38.1	51.0
	AI-based communication	16.7	22.2	26.7	26.5
Customer experience	AI-based customer relationship management	16.7	23.1	13.1	18.4
	Sales intelligence	6.7	19.4	14.8	11.2
	User experience	10.0	17.6	13.1	13.3
Managerial	Working with agents	3.3	15.7	17.6	10.2
	Responsibility for AI generated content and decisions	36.7	10.2	12.5	6.1
	Teamwork with AI	20.0	23.1	15.9	19.4
	Digital safety and security in the context of AI	50.0	13.0	17.0	9.2

Most development priorities were shared across clusters. Significant differences appeared for AI-based product/service design, Ethical evaluation of AI-assisted decisions, AI risk assessment and safeguards. Even where differences were significant, intended learning priorities are less strongly segmented than current collaboration orientations and self-assessed competence levels.

The results, therefore, caution against treating students as a homogeneous population of AI users. Educational interventions should distinguish between students who remain distant from AI collaboration, those who need confidence and safeguards for selective use, those ready for practical integration, and those prepared for broad interdisciplinary human–AI collaboration.

The competence profile observed in this study is broadly consistent with the role marketing graduates are expected to play in AI-enabled organizations. They are not expected to become AI developers, but to combine marketing expertise with sufficient AI literacy to collaborate effectively with technical specialists. Future marketers should understand how AI systems are developed, what data they rely on, where their limitations originate, and how to critically evaluate AI-generated outputs. Such knowledge enables them to translate business needs into AI requirements, communicate effectively with technical teams, and contribute responsibly to AI implementation. The relatively weaker managerial and governance-related competencies identified in this study are the evidence that marketing education should better prepare students to serve as informed interdisciplinary partners who can bridge business objectives and technical implementation while maintaining appropriate human oversight and accountability.

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Synthesis: Conclusions for marketing education and employers

The presented results form a coherent picture. Marketing students enter the labour market as proficient but narrowly profiled users of AI. They characteristically reach for generative tools in specific, operational tasks. This readiness, by contrast, declines as applications come to involve strategic, managerial and ethical decision-making. The conclusions developed below draw out a number of practical implications for universities and employers.

AI enthusiasts exhibit a competency gap precisely where risk accumulates. For almost all competencies the gradient is intuitive: the more open a student is, the greater their commitment to acquiring new knowledge and skills. There are, however, two competencies for which this intuitive observation does not hold. Digital security is selected as a development priority by 50% of AI-reluctant students, yet by only 9.2% of the most open. For accountability for AI-assisted decisions, the corresponding figures are 36.7% among the reluctant and 6.1% among the most open. In other words, those who will implement AI most intensively in practice are the least interested in security and accountability, whereas the sceptics display the reverse pattern. The data thus resist the narrative that greater exposure to tools yields greater maturity in their use. From the perspective of micro-foundations, this constitutes the seed of organisational risk: not that employees are unable to use AI, but that its most proficient users do not regard oversight as falling within their remit.

Students are inclined to employ AI as a creative instrument for broadening perspectives but are reluctant to have it act as the agent that synthesises these diverse perspectives into a

coherent whole. Multidisciplinary orientation (5.34) is markedly higher than interdisciplinary orientation (4.95), signalling assent to additive collaboration with AI rather than to integrative collaboration. The same tendency is evident in the perceived roles of AI (servant: 4.86 > partner: 4.48): the delegation of tasks appears to take precedence over dialogue with the tool. Students define AI through the prism of functionality, referring to specific applications (ChatGPT, Gemini, Copilot, Canva) rather than to the underlying technologies. The highest competency self-scores were recorded in content generation (3.19), customer insights analysis (2.73), and data preparation (2.71) - that is, in areas directly associated with generative AI. Curricula and organisational development processes should extend beyond teaching the effective use of tools to cultivate competencies for genuine human–AI collaboration, in which AI complements rather than replaces human knowledge. This is facilitated by students' natural openness to a cross-functional perspective: multidisciplinary orientation was the strongest among respondents (5.34), indicating that students value AI especially when it contributes insights from related business areas. This signals to educational institutions that integrating traditional marketing knowledge and skills with analytics, data science and business strategy represents a productive direction. Organisations, in turn, can encourage AI-assisted collaboration across departments to enable the flow of interdisciplinary knowledge. As already indicated, students are clearly more likely to position AI as a servant (4.86) than as a partner (4.48). This is an important distinction. The value of AI as a servant lies in automation and the reduction of effort, whereas AI as a partner contributes insights, supports evaluation and participates in problem-solving, long-term processes and strategy formation. Universities should teach students to conduct a collaborative dialogue with AI including questioning its suggestions, verifying them and developing them further, rather than merely delegating tasks. Employers, for their part, should design workflows in which AI-automated activity remains supported by human judgement and oversight, particularly where automation extends not to isolated tasks but to sequences of them.

Practical AI skills can be acquired more readily than the capacity to employ AI in designing strategies and processes. Competencies relating to ethical considerations and accountability are likewise perceived as more demanding to acquire. This corresponds to respondents' lowest self-assessment scores: the creation of autonomous AI applications (2.07), the design of user experiences (2.30), accountability for AI-assisted decisions (2.40) and digital security (2.43). At the same time, the areas of lowest self-assessed competence were the least frequently select-

ed as development priorities (digital security, 16.5%; accountability for decisions, 12.1%). Students not only feel less competent in these areas but also do not intend to develop them, which threatens to perpetuate the gap. It is worth noting that the average age of the sample is 28 years and includes individuals who have completed master's and postgraduate studies. The competency profile nevertheless remains narrow and operational. Were maturity and professional experience to translate automatically into a broader, strategic vision of AI, one would expect this to be evident in such a sample; however, it is not reflected in the results. This suggests that the readiness to experiment with new tools in strategic and managerial activities does not develop spontaneously with age but requires deliberate intervention. Universities that incorporate AI skills into their programmes should move beyond prompt engineering and content generation. Content addressing risk assessment, organisational governance and the implementation of AI within organisational processes is likewise required. Employers should invest in training that develops both technical proficiency and the managerial supervision of AI.

Students vary considerably in their willingness to work with AI. The cluster analysis revealed four profiles: AI-reluctant (7.3%), cautious (26.2%), moderately open (42.7%) and highly open (23.8%). These groups differ not only in their attitudes but also in their self-assessed competencies. Universities should differentiate AI learning pathways, providing foundational support and confidence-building for uncertain students while offering advanced challenges to the most open. Notably, the most AI-reluctant students relatively frequently identified digital security and accountability for decisions as development priorities; their distance therefore reflects a need for safeguards rather than a lack of interest. Employers should similarly account for differing levels of readiness when designing employee onboarding and planning career paths. Students do not dismiss AI as uncontrollable or opaque, yet neither do they display confidence as to whether such descriptors apply. Perceptions of agency (4.36), fairness (4.33), and transparency (4.32) were only moderate and closely converged. This pattern of cautious acceptance implies that responsible AI should not be treated as a discrete ethics module but woven throughout educational programmes. Students should also come to understand the legal dimensions of using AI and of making AI-assisted decisions. Employers should reinforce these competencies through organisational policies and transparent processes that clearly delineate the responsibilities of the specific human and non-human actors involved.

The challenges surrounding responsible and strategic AI are supra-regional in nature. Comparisons between European and American students revealed no significant differences in collaboration orientation, perceptions of AI responsibility or the distribution of user profiles. This indicates that the identified competence gaps constitute a shared challenge. This affords a genuine opportunity to design joint, transnational educational programmes and micro-credentials that can be adapted across countries without the need to construct separate solutions for each context. For employers operating transnationally, this entails the capacity to harmonise AI competency standards across geographically dispersed teams.

Methodological annex

1. Sample characteristic

The sample consisted of 412 students enrolled in marketing and business-related programmes in the United States (n = 209, 50.7%) and Europe (n = 203, 49.3%). Female respondents constituted 55.3% of the sample, male respondents 43.4%, while 1.2% preferred not to disclose their gender.

Participants average age was 28.17 years, although the sample included both traditional university students and older respondents enrolled in postgraduate education. Almost two-thirds of respondents studied marketing-related programmes, including Bachelor programmes in marketing, communication or sales (39.8%) and Master programmes in marketing, communication or sales (25.7%). A further 22.1% studied related to other business disciplines, and 12.4% represented other study programmes with strong marketing courses.

Students reported that the majority of their weekly activities were still devoted to academic rather than business marketing projects. At the same time, they assessed their own competence in using generative AI and AI-supported data analysis relatively positively, with the most frequently selected response corresponding to 7 on a 10-point self-assessment scale for both domains. This indicates that the sample consisted primarily of respondents who were already familiar with AI tools and therefore capable of providing informed opinions about human–AI collaboration in marketing.

2. Measurement model

The questionnaire was designed to provide a comprehensive assessment of how students perceive, understand and intend to collaborate with artificial intelligence in marketing-related contexts. It adopts a human-centered perspective by combining attitudes toward collaboration with AI, perceptions of AI's role in decision-making, beliefs concerning responsible AI, and AI-related competences. Together, these dimensions capture both the psychological readiness to collaborate with AI and the practical capabilities that may shape future marketing practice. The conceptual structure of the instrument builds on the study of Leszczyński et al. (2026).

Internal consistency was assessed for all reflective multi-item constructs using Cronbach's alpha. Overall, the measurement model demonstrated satisfactory psychometric quality. Most constructs achieved good or excellent internal consistency, indicating that the items consistently captured the intended theoretical concepts and provided a reliable basis for further analyses.

Students' open-ended responses (presented in part 1) were analysed with exploratory topic modelling approach. Because the responses were generally short, topic extraction was performed separately for each of the four open-ended questions using a term-based topic modelling procedure suitable for short survey texts. The resulting topics were subsequently interpreted and labelled according to their dominant semantic content.

3. Clustering method

A person-centered approach was used to classify students into internally similar groups. K-means clustering was applied to the nine standardized collaboration-orientation items. Standardization ensured that each item contributed comparably to the distance calculation. The number of clusters was fixed at four to produce a parsimonious taxonomy that could be compared with the four-profile structure developed in the earlier managerial study of Leszczyński et al. (2026).

Project Overview

DIGIT (People and algorithms in organizations: competencies for working in the digital environment) is the NAWA Strategic Partnership project focused on understanding and developing the competencies needed to work with AI and manage AI-enabled work in marketing environments.

The primary objective is to identify and develop the competencies to work with AI in marketing contexts, manage AI-enabled work processes, and adapt to Marketing 5.0 environments.

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Acknowledgment

NAWA project Number BNJ/PST/2023/1/00082

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Cite the report:

Gaczek P., Koperska A., Leszczyński, G. (2026, July). DIGIT report: Expectations and concerns of marketing students regarding working with Artificial Intelligence, https://doi.org/10.17605/OSF.IO/R6MEY