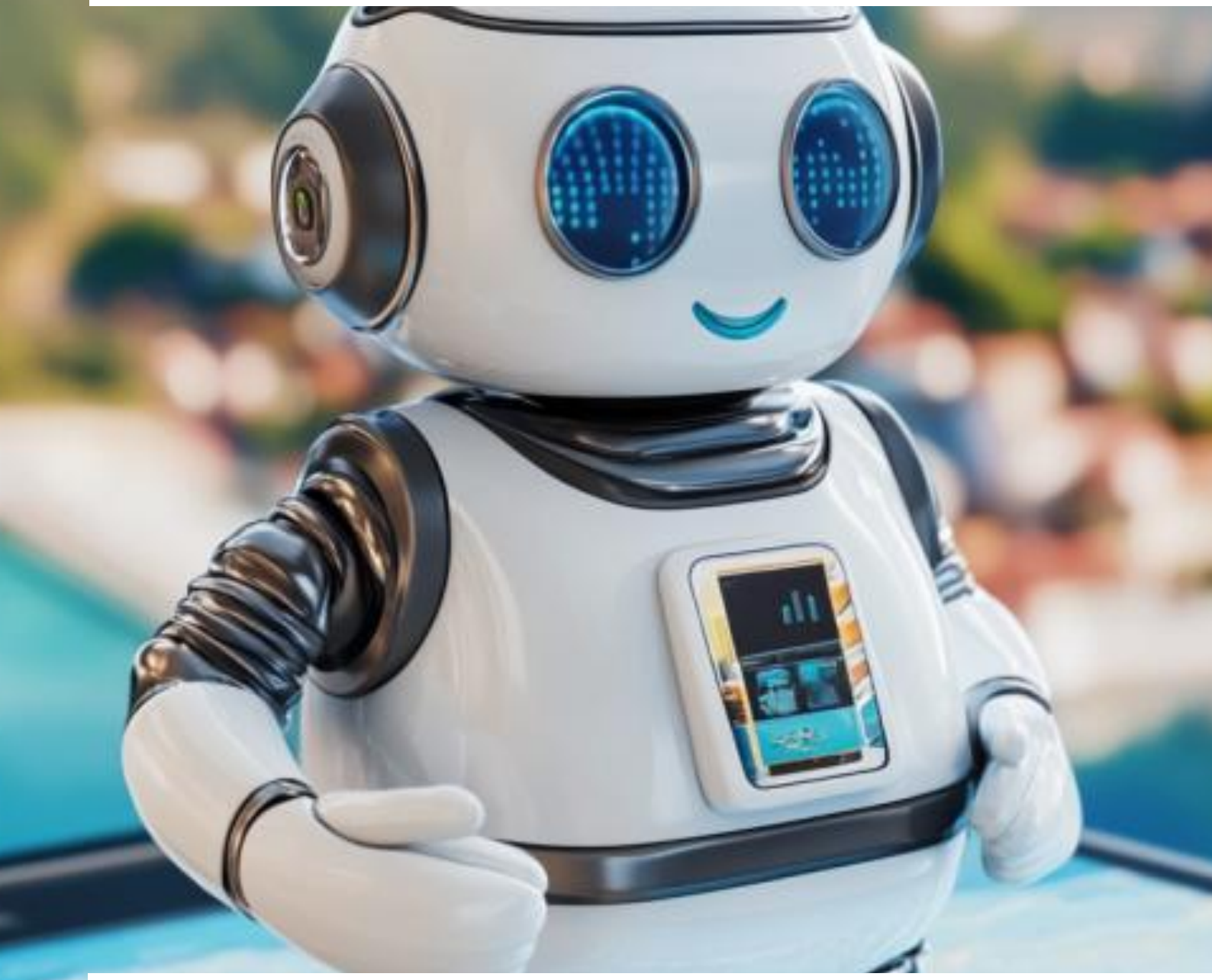
Implementing Generative AI Chatbots

Potentials, Challenges and Guidelines for the Successful Implementation of Generative AI Chatbots into Tourism



The authors' institutions

Hochschule Kempten
University of Applied Sciences

UNIVERSITÄT BAYREUTH

FRANKFURT UNIVERSITY OF APPLIED SCIENCES

RWTH AACHEN UNIVERSITY

Fraunhofer FIT

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Implementing Generative AI Chatbots

Potentials, challenges and implementation guidelines for the successful implementation of Generative AI Chatbots into tourism

Moritz Busch[4, 5]

Diego Collarana[5]

Stefan Decker[4, 5]

Torsten Eymann[2, 5]

Niklas Gutheil[2, 5]

Robert Keller [1]

Niklas Kühl [2, 5]

Christoph Lange-Bever[4, 5]

Valentin Mayer[2, 5]

Milad Morad[4, 5]

Larissa Pöllath[2]

Maximilian Röglinger[2, 5]

Richa Sharma[5]

Nils Urbach[3, 5]

1 Kempten University of Applied Sciences

2 University of Bayreuth

3 Frankfurt University of Applied Sciences

4 RWTH Aachen University

5 Fraunhofer Institute for Applied Information Technology FIT

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Executive Summary

The tourism industry is facing increasing demand for personalized, 24/7 services while simultaneously grappling with a shortage of skilled workers, rising operational costs, and high customer expectations. Digital solutions, particularly in marketing and sales, play a crucial role in increasing online visibility, enhancing customer engagement, and leveraging recommender systems to personalize offerings and improve decision-making. Generative AI Chatbots have emerged as a promising solution to address these challenges by automating processes, enhancing efficiency, and improving customer communication. However, their successful implementation requires a holistic approach that balances technical feasibility, economic sustainability, legal compliance, and social acceptance. At the same time, the role of digitalization extends beyond customer-facing applications; it is becoming increasingly relevant for back-office processes, helping businesses optimize operations and improve overall efficiency in the tourism sector.

This whitepaper, based on qualitative research, examines the opportunities and challenges associated with integrating Generative AI Chatbots into tourism businesses. Fifteen expert interviews with professionals from tourism, AI development, law, and marketing were conducted and analyzed using systematic content analysis to identify key factors influencing chatbot adoption. The findings highlight the potential of generative AI to streamline operations, provide immediate customer support, and optimize cost structures. Chatbots can automate repetitive tasks, reducing employee workload while ensuring uninterrupted service availability. They also enhance customer interaction by offering personalized recommendations, guiding users through booking processes, and answering inquiries with contextual relevance.

Despite these advantages, several challenges hinder widespread adoption. Technical barriers include ensuring chatbot accuracy, managing real-time data integration, and preventing issues such as hallucinations or inconsistent responses, all of which require continuous monitoring and system updates. Economic constraints present another obstacle, as the high initial investment, ongoing maintenance costs, and unclear return on investment make companies hesitant to commit to chatbot implementation. Legal and compliance issues, such as adherence to AI regulations, GDPR requirements, and liability concerns, further complicate deployment. Additionally, social resistance remains a significant factor, with employees fearing job displacement and customers displaying reluctance to engage with AI-driven services due to skepticism about reliability and usability.

For Generative AI Chatbots to be successfully integrated into tourism businesses, a balanced and strategic approach is essential. Technological readiness must be ensured through high-quality training data, enhanced chatbot response accuracy, and seamless system integration. Organizational change management plays a crucial role in addressing employee concerns through training and transparent communication. Legal and ethical compliance must be prioritized by adhering to regulations, clearly labeling AI-generated content, and ensuring consumer protection. Furthermore, economic viability should be carefully assessed through a thorough cost-benefit analysis and scalable implementation strategies.

While the adoption of Generative AI Chatbots comes with challenges, it also holds substantial potential to improve service efficiency, lower operational costs, and enhance customer experiences. By proactively tackling technical, economic, legal, and social obstacles, businesses can fully leverage AI-driven chatbots and strengthen their competitive edge in the rapidly evolving tourism industry.

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About this Whitepaper

This whitepaper was developed over the course of one year, from January 2024 to March 2025. During this period, the authors conducted several training sessions on the use of generative AI for approximately 100 experts in the tourism sector. These sessions generated numerous inquiries and insights regarding the challenges associated with Generative AI Chatbots. In response, the authors conducted an initial literature review, followed by 15 semi-structured interviews with experts from tourism, generative AI, and business development. The objective was to address the specific concerns and requirements identified by training participants.

Method of this study

The authors conducted 15 semi-structured expert interviews – referred to by (I) in the text – with an average duration of 62 minutes. The sample encompasses a diverse range of professionals from the tourism sector and related fields, including travel agencies, hospitality and tourism management. Positions held by the interviewees include CEOs, professors, founders, scientific directors, and marketing consultant. Additionally, expertise was enriched through five full-day workshops with tourism experts and insights gained from previous projects, fostering a well-rounded understanding of the topic.

Acknowledgments

We gratefully acknowledge funding by the German Federal Ministry of Education and Research (BMBF), the Ministry of Science, Research and the Arts (MWK) of Baden-Württemberg, the Bavarian State Ministry of Science and Art (STMWK), and the Hessian Ministry of Higher Education, Research, Science and the Arts (HMWK) for the ABBA project (Grant Numbers 16DHBKI002, 16DHBKI003, 16DHBKI004, 16DHBKI005), and funding by the German Federal Ministry for Economic Affairs and Climate Action (BMWK) for the Mittelstand-Digital Zentrum Tourismus (Grant Number 01MF23005B).

The logos of our institutions on the cover page shall acknowledge the academic environment that shapes our thinking.

In writing this piece, the authors used ChatGPT (Ver. Jan. 30 and Mar. 28, 2025), Grammarly (Ver. 6.8.261), DeepL (Ver. 4.4.2.7961), and Microsoft Word to improve the linguistic presentation of their thoughts. Full responsibility for the contents lies with the authors.

Feedback

We highly appreciate feedback. Please get in contact via wirtschaftsinformatik@uni-bayreuth.de.

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The working papers of Information Systems are intended to present preliminary results. The authors are grateful for critical comments.

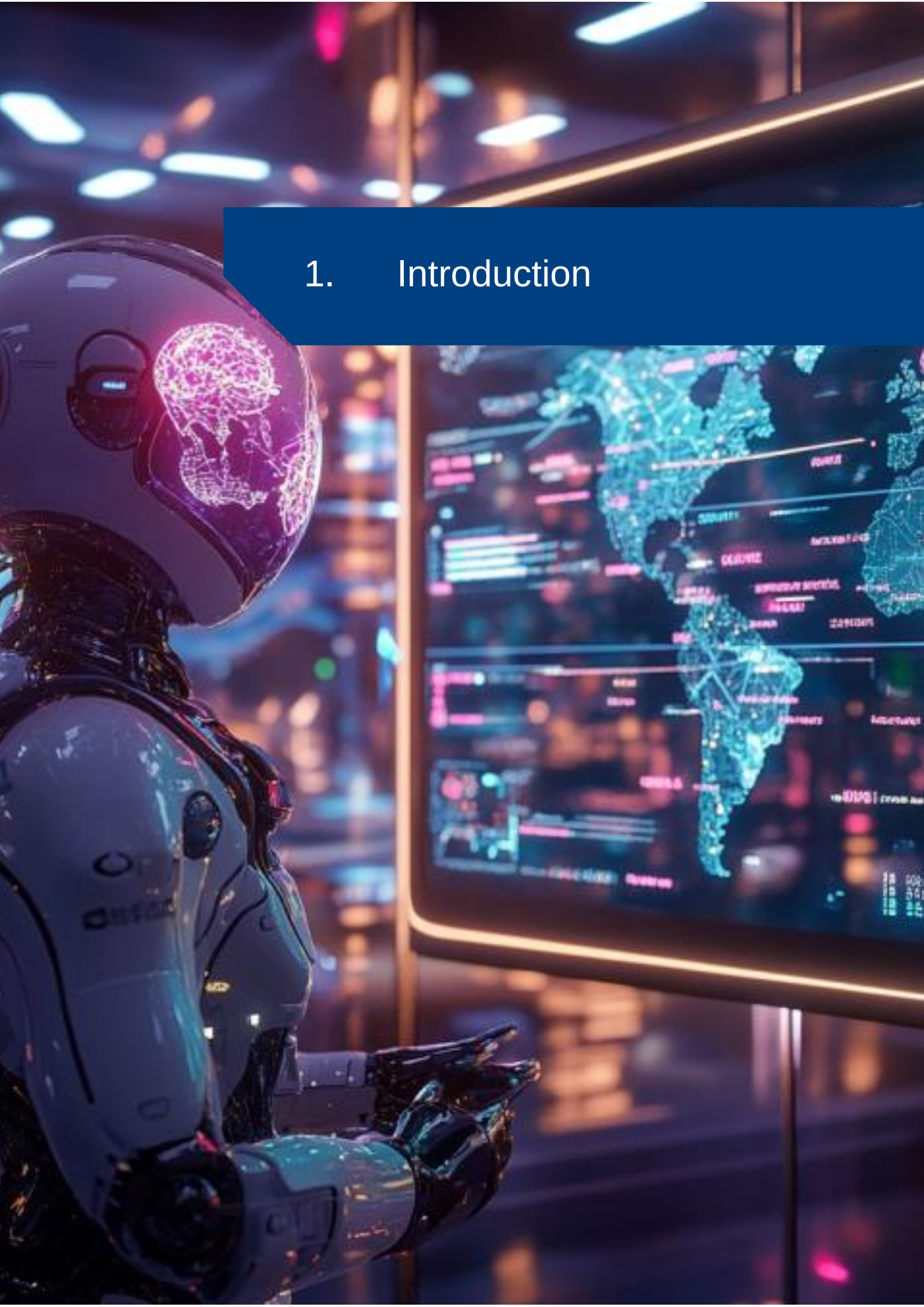
About the ABBA Project

ABBA stands for “AI for Business | Business for AI.” It is a publicly funded joint project to establish a cross-university, modular offer for developing AI competencies of students in management, business administration, economics, information systems, and related fields.

Using artificial intelligence (AI) technologies in business requires specific skills. In addition to technical expertise, the business world requires knowledge to embed AI technologies in business processes, work systems, products and services, design and evaluate business cases, and manage AI-based information systems in the long term. This bridge-building role falls primarily to managers as the central decision-makers in the company. Therefore, the joint project’s target group includes business administration, information systems, and other courses of study relating to socio-economic and socio-technical topics.

The goals of the joint project are developing and providing a modular teaching toolkit for AI, which teaches business students interdisciplinary AI competences in a scientifically sound and practice-oriented manner. The modular toolkit supports teaching for bachelor, master, executive master, and doctoral students at research universities and universities of applied sciences.

To achieve that goal, the joint project unites twelve professorships from three research universities and one university of applied sciences, who share the focus on supporting the development of AI competences: University of Hohenheim, University of Bayreuth, Frankfurt University of Applied Sciences, Karlsruhe Institute of Technology. Fraunhofer FIT, an applied research institute, is an associated partner. Teaching contents and formats are jointly developed, mutually used, and in part made publicly available. Compared to individual creation by each university and professorship, this substantially strengthens the breadth and depth of the offering and the efficiency and quality of teaching. The German Ministry of Education and Research and the State ministries for science in Baden-Württemberg, Bavaria, and Hesse support ABBA financially.



1. Introduction

1. Introduction

The tourism industry is a dynamic yet highly challenging sector where digital solutions play a crucial role especially in marketing and sales. Increasing **online visibility**, **enhancing customer engagement**, and leveraging **recommender systems** have become essential strategies for tourism businesses to remain competitive. Digital technologies enable businesses to optimize their outreach, personalize offerings, and support customer decision-making. However, beyond marketing and sales, the industry also faces significant operational and strategic hurdles. **Labor shortage, cost pressure**, and **rising customer expectations** for tailored services necessitate more efficient and scalable solutions. While digitalization plays a secondary role in direct guest interactions on site, it is increasingly important for **back-office processes**, streamlining operations, and **improving overall efficiency** in the tourism sector.

As tourism businesses seek innovative solutions to address these challenges, chatbots powered by generative artificial intelligence (GenAI) technologies have emerged as a transformative technology with immense potential to revolutionize the industry.

GenAI has undergone a remarkable evolution in recent years, establishing itself as one of the most impactful applications of artificial intelligence across industries. McKinsey estimates that GenAI could generate **$2.6 trillion to $4.4 trillion in economic value** annually, with customer service, marketing, and software development among the primary beneficiaries (Chui et al., 2023). Within the field of GenAI applications, **Generative AI Chatbots** stand out as **particularly promising**.

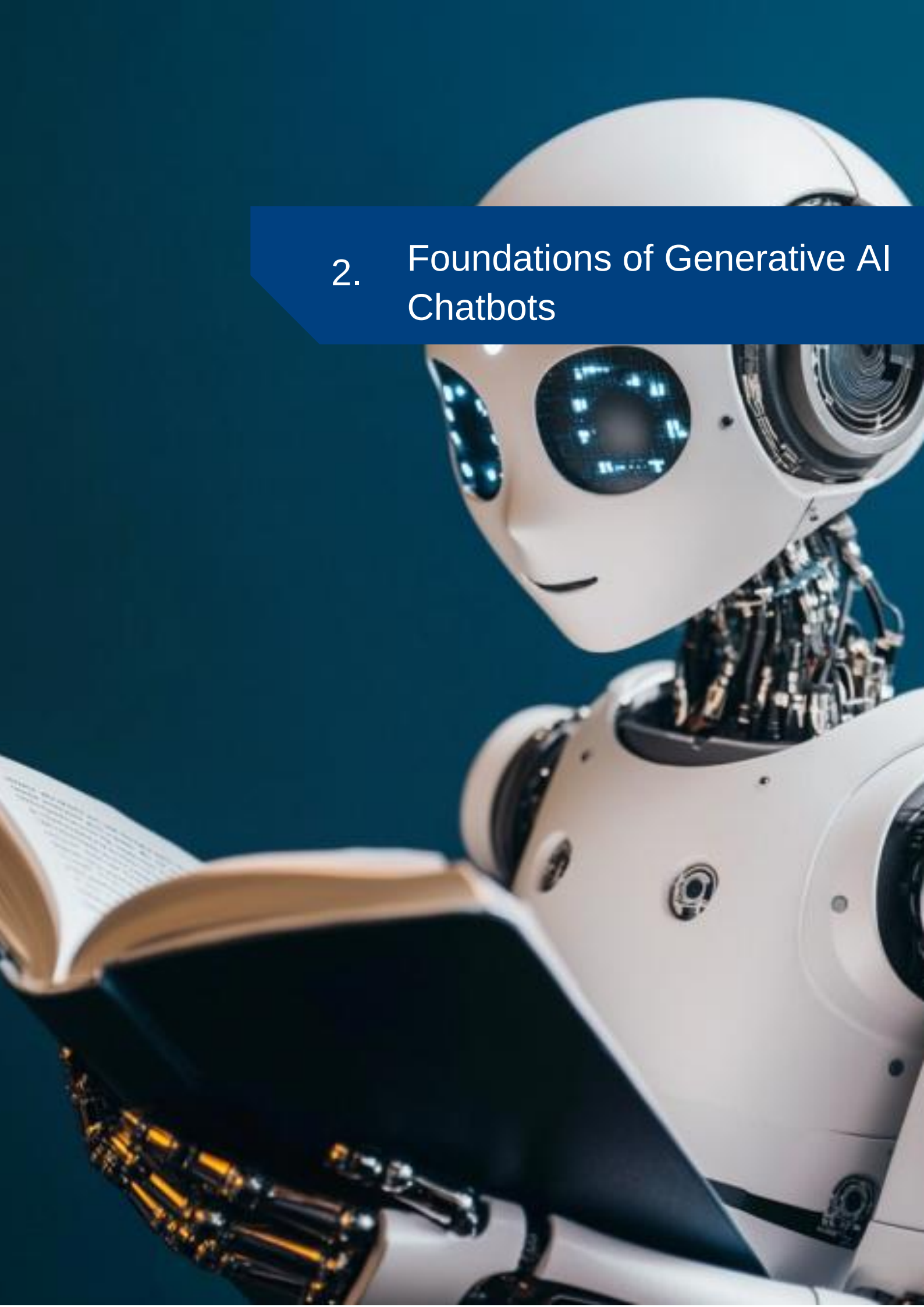
Unlike traditional rule-based systems, Generative AI Chatbots leverage **Large Language Models (LLMs)** to conduct human-like conversations, offering the potential to **generate autonomous, non-predefined responses** by learning from extensive training data (Khennouche et al., 2023). In the tourism sector – where cultural competence, empathetic communication, and personalized service are paramount – Generative AI Chatbots can provide significant value. By responding **individually and permanently**, these chatbots can enhance customer satisfaction and streamline operations.

Recent statistics highlight the growing adoption of GenAI in tourism. By 2024, 53% of travel companies worldwide reported using GenAI to digitally support travelers during the booking process (Statista, 2024b). Other notable applications include recommending activities and destinations (48%), creating engaging content (47%), and supporting customer service teams (45%). Moreover, Generative AI Chatbots help gather traveler feedback, inspire travel planning, and provide real-time assistance during trips (Statista, 2024b). According to a survey by Accenture, 65% of travel companies identified **chatbots** as one of the **most impactful implementations** of GenAI in their operations (Statista, 2024a).

However, implementing Generative AI Chatbots in the tourism industry is **not without challenges**. High **costs** for training and maintaining these systems, coupled with significant **computing requirements**, often exceed the capacities of smaller businesses (MIT Technology Review, 2023). Moreover, Generative AI Chatbots come with the **risk of generating misleading** or inaccurate information referred to as **hallucinations** (Luo et al., 2024). **Data protection** regulations, particularly in the European Union under the AI Act, add another layer of complexity by requiring companies to ensure fairness, transparency, and accountability in their AI applications (Park, 2024).

This Whitepaper explores the **potentials and challenges of implementing Generative AI Chatbots in the tourism industry**, with a focus on actionable recommendations. It provides insights into how these technologies can address industry-specific pain points, enhance customer experiences, and improve operational efficiency.

2. Foundations of Generative AI Chatbots



2. Foundations of Generative AI Chatbots

Artificial Intelligence (AI) and Natural Language Models

AI refers to the ability of machines to perform tasks typically requiring human intelligence, such as learning, problem-solving, and language understanding (Russell and Norvig, 2022). Within AI, advancements in **Natural Language Processing (NLP)** and **machine learning** have enabled computers to analyze, generate, and respond to human language in increasingly sophisticated ways (Kreutzer and Sirrenberg, 2019). Central to these advancements are **LLMs** such as OpenAI's GPT or Google's Bard, which leverage vast amounts of data and powerful computational frameworks to produce coherent, context-aware text.

Unlike earlier NLP systems that relied heavily on predefined rules, LLMs like GPT-4o use transformer architectures capable of learning language patterns and context autonomously (Vaswani et al., 2017). This shift has been instrumental in the rise of **LLMs**, which empowers systems to create new and contextually relevant content rather than merely retrieving or reorganizing existing data (Bubeck et al., 2023).

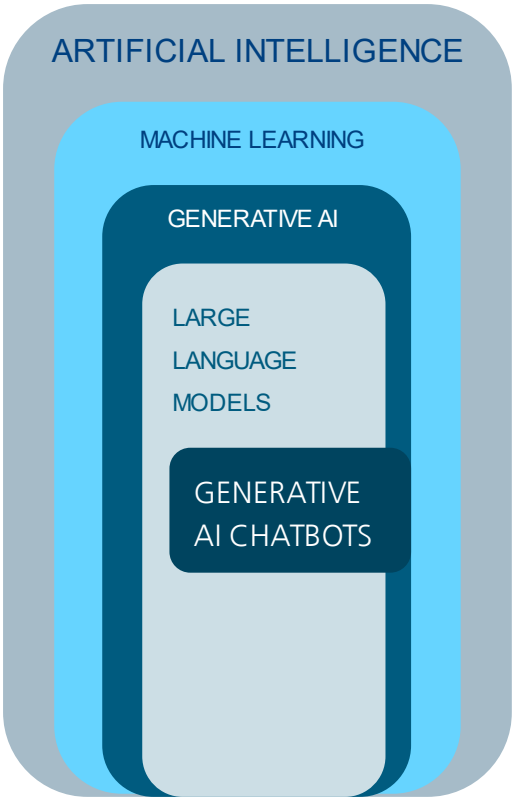


Figure 1: Conceptualization of Generative AI Chatbots, adapted from Gimpel et al. (2024)

From Rule-Based to Generative AI Chatbots

Chatbots have evolved significantly since their inception in the 1960s. **Rule-based chatbots**, such as the pioneering ELIZA, operate on fixed sets of predefined patterns and responses (Weizenbaum, 1966). While suitable for simple tasks such as answering FAQs, their lack of flexibility limits their ability to handle complex or unexpected queries.

In contrast, **Generative AI Chatbots** are powered by LLMs, enabling them to craft responses dynamically. These systems generate answers in real time by synthesizing information from their train-

ing data rather than relying on static rules or templates (Wang, 2024). This adaptability makes Generative AI Chatbots well-suited to handling diverse user inputs, personalizing conversations, and maintaining human-like dialogue over extended interactions.

Key distinctions between the two approaches include:

Feature	Rule-Based Chatbots	Generative AI Chatbots
Architecture	Predefined rules	LLMs and deep learning
Response Generation	Template-based	Dynamic and context-aware
Complexity Handling	Limited	Advanced, capable of nuanced tasks
Personalization	Minimal	High, based on user context

Table 1: Own source (based on Weizenbaum, 1966; Hussain et al., 2019; Wang, 2024; Vaswani et al., 2017)

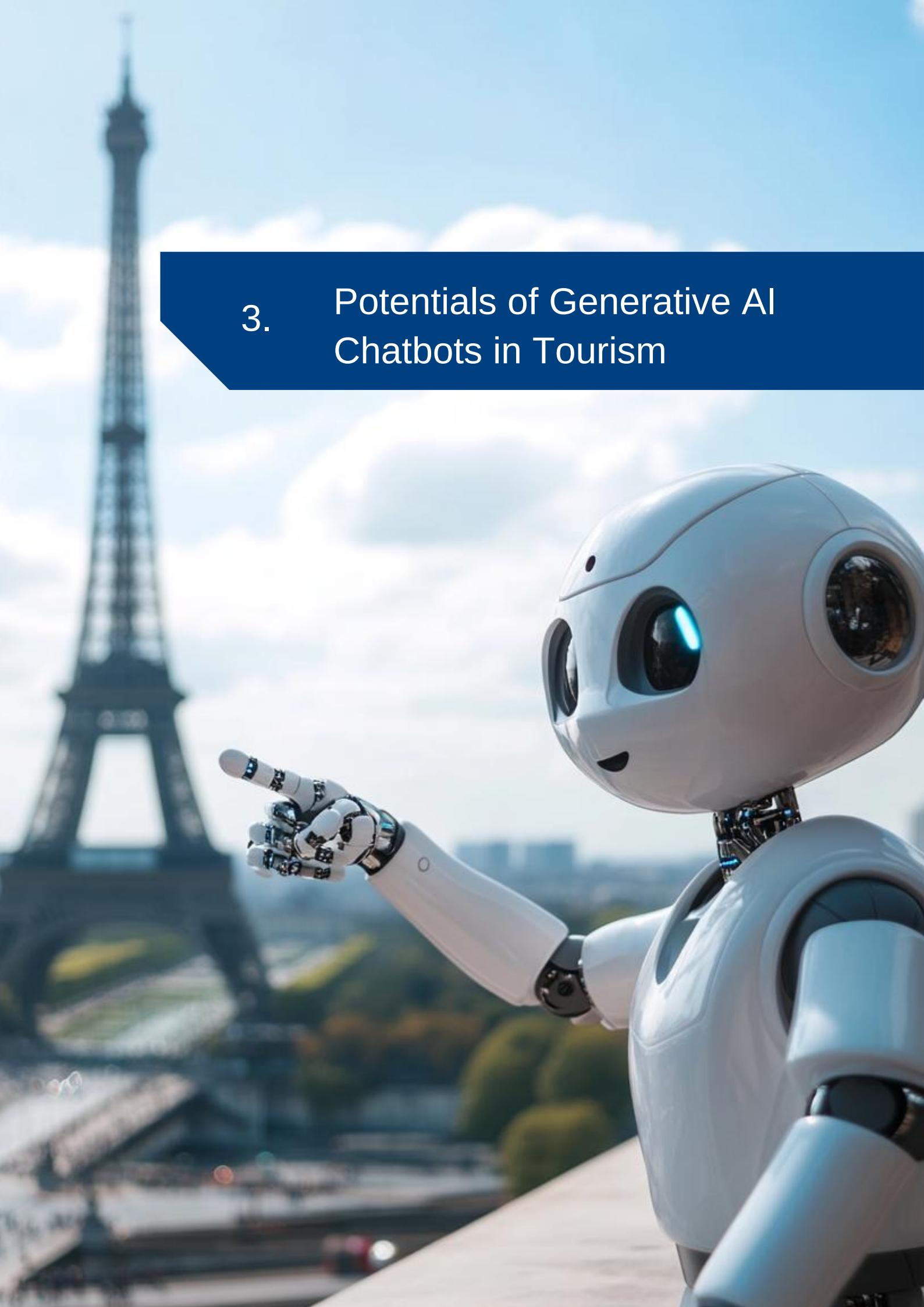
Renewed Relevance in Industries

Chatbots are not a new phenomenon. Since their inception in the 1960s with ELIZA and subsequent iterations such as SmarterChild and early digital assistants, they have been used to facilitate automated interactions. However, their impact was often limited by technological constraints, such as rigid rule-based systems and limited natural language understanding. Today, Generative AI Chatbots are experiencing a resurgence in relevance, driven by several key factors:

1. **Technological Advancements**: Improvements in computational power and the development of transformer models such as GPT have drastically enhanced the capabilities of Generative AI Chatbots (Vaswani et al., 2017). Their ability to simulate human-like interactions has expanded their use beyond basic customer service.
2. **Industry Challenges**: Labor shortages and rising consumer expectations for 24/7 service make automation indispensable. Generative AI Chatbots address these gaps by offering scalable, cost-effective solutions capable of maintaining high-quality interactions.
3. **Shift in Consumer Behavior**: The demand for personalized, instant, and consistent experiences has surged. Generative AI Chatbots can analyze user preferences, provide tailored recommendations, and adapt to individual needs, aligning with modern consumer expectations (Wang, 2024).
4. **Economic Potential**: McKinsey projects that GenAI technologies could generate up to $4.4 trillion annually, with significant contributions from customer service and marketing – two areas where Generative AI Chatbots excel, especially in a marketing-heavy industry such as tourism (Chui et al., 2023).

These factors collectively explain why Generative AI Chatbots are not only technologically impressive but also strategically vital for industries like tourism, where personalized, empathetic, and culturally competent communication is essential.

3. Potentials of Generative AI Chatbots in Tourism



3. Potentials of Generative AI Chatbots in Tourism

The implementation of Generative AI Chatbots in tourism unlocks a wide range of opportunities for companies seeking to enhance their operations and customer engagement. **Economic advantages** stand out as the most significant benefit, accounting for **50%** of the analyzed segments. Within this dimension, increased efficiency emerges as the primary factor with 18 mentions, followed by resource and process optimization (11 mentions) and cost optimization (9 mentions). **Social impacts** are also prominently represented, making up **34.2%** of the segments with 25 mentions. Notably, Generative AI Chatbots contribute to employee relief, cited in 11 segments, by streamlining repetitive tasks and supporting daily workflows. They also open new avenues for interaction, including booking assistance (5 mentions), improved customer communication (5 mentions), and creative support (4 mentions). Additionally, the **technical dimension** accounts for **15.8%** of the assessment, highlighting the importance of result quality (6 mentions) and long-term availability (4 mentions). Together, these opportunities demonstrate the multifaceted value of Generative AI Chatbots in driving innovation and efficiency across the tourism sector.

3.1 Economic Dimension

Generative AI Chatbots offer substantial economic advantages for tourism companies, particularly by optimizing workflows, reducing costs, and enhancing customer interactions. Their potential can be explored through three core aspects: **process automation and task efficiency**, **personalization and customer engagement**, and **cost optimization and return on investment (ROI).**

Process Automation and Efficiency

Generative AI Chatbots are particularly effective at automating repetitive and routine tasks, freeing employees to focus on more strategic responsibilities. Automation reduces inefficiencies by handling recurring queries such as customer questions about spa services or mealtimes. One expert noted the potential for automation to simplify workflows: “That means, for me, it’s a simplification. Most people think it’s going to be more complicated with AI […] it’s not. It’s going to be easier, basically” (I11).

Chatbots also contribute to reducing redundant tasks by managing the initial stages of customer interaction. As one interviewee stated, chatbots can prestructure and presort information, enabling businesses to respond more effectively to customer needs (I8).

Personalization and Customer Engagement

Generative AI Chatbots enhance customer interactions by providing personalized and targeted assistance at scale. This tailored engagement improves customer satisfaction and can lead to increased sales opportunities. By automating simpler customer service interactions, businesses can redirect resources to focus on personalizing high-value experiences, such as personalized greetings or enhanced guest services. For instance, one expert noted that chatbots allow companies to allocate time for activities such as offering each guest a welcome drink, fostering a more personalized and memorable interaction (I12).

Cost Optimization and Return on Investment (ROI)

The cost-saving potential of Generative AI Chatbots lies in their ability to reduce labor-intensive tasks, minimize infrastructure needs, and deliver services efficiently. Automation helps businesses

lower personnel costs, as fewer employees are needed for repetitive tasks. One participant highlighted this benefit, explaining that by saving resources through automation, companies can focus on more strategic areas (I13).

Chatbots are also cost-efficient to operate. For instance, one participant mentioned that their company handled 25,000 requests in a single month for approximately €700 in licensing fees (I2). This demonstrates the scalability and economic feasibility of chatbot implementations, even for smaller tourism companies with limited budgets.

Furthermore, by increasing efficiency and improving service quality, Generative AI Chatbots enhance the competitive position of tourism companies. One interviewee emphasized that the combination of internal efficiency gains and better customer service ultimately leads to a stronger market presence (I11).

3.2 Social Dimension

The integration of Generative AI Chatbots into tourism companies provides significant social benefits, particularly in **alleviating employee workload**, **enhancing customer interactions**, and **supporting creative processes**. These advantages address challenges such as labor shortages and increasing demands for personalized services.

Employee Relief and Task Optimization

A key benefit of Generative AI Chatbots is their ability to relieve employees by automating routine tasks, especially in industries like tourism where labor shortages are prevalent. As one interviewee explained, chatbots enable tourist offices to maintain availability while reducing workload: “With the AI chat, if it works, I can manage to be [permanently available] and can relieve the pressure on my local tourist office” (I14).

Chatbots handle frequently asked questions, freeing employees to focus on more value-added tasks. One expert highlighted, “Chatbots are able to answer 90 to 95 percent of questions directly” through database integration (I7). This time savings helps employees concentrate on strategic tasks without reducing their overall contribution: “The work is only shifted to added value, but is not reduced by it” (I6). Additionally, the reduction of repetitive tasks improves job satisfaction. As one interviewee noted, “What has led to satisfaction was the fact that the work was made easier, so they could see that the AI was useful” (I5).

Chatbots also simplify processes and workflows, creating a more streamlined work environment. One expert emphasized their potential to eliminate manual inefficiencies: “I need artificial intelligence or these helpers to make processes and administration easier for me and ultimately to really empower the people I have” (I4).

Enhanced Customer Interaction

Generative AI Chatbots improve customer communication by automating and personalizing interactions across all phases of the customer journey – before, during, and after a trip. For example, chatbots can automatically send follow-up emails and reminders before a trip: “AI has also helped to ensure that follow-up emails are automatically composed, for example, if a customer has now booked, that they then automatically […] receive brief reminders shortly before the trip” (I5).

Chatbots enhance the quality of communication by tailoring messages to individual customers. Emails can incorporate specific branding, personalized texts, and even agent signatures: “It was possible, for example, to customize the email so that it had the design and logo of your own travel agency” (I5). During trips, chatbots can maintain engagement by checking on customer satisfaction

and providing additional services, such as offering rental car options or weather updates: “Before the trip itself, you still need a rental car […] or it could wish you a nice vacation again just before you leave” (I5).

Creative and Inspirational Support

In addition to operational benefits, Generative AI Chatbots support employees creatively by acting as a source of inspiration. In scenarios where travelers have vague plans, chatbots can guide decision-making. As one interviewee explained, “A chatbot can be helpful in situations where customers are undecided and only have a rough idea of where they want to go” (I7).

Chatbots also assist with creative tasks such as brainstorming ideas or planning events. For example, they can provide initial drafts for event programs: “Let’s create a structure for a six-hour workshop, with breaks at such and such times […]. I just need to add it and often don’t have to make many changes” (I11). This reduces the operational burden while preserving the need for employees’ expertise in refining the results.

Additionally, chatbots can simulate the role of domain-specific experts, aiding complex workflows. For instance, they can act as “a historian” to support the development of exhibition concepts or mediation strategies in the tourism industry (I11). By simplifying pre-structuring tasks, chatbots enable employees to focus on more specialized and meaningful contributions.

While Generative AI Chatbots offer significant potential to transform the tourism industry by enhancing efficiency, enriching customer experiences, and relieving employees, these advantages can only be fully realized if the associated challenges are effectively addressed. From technical limitations and ethical concerns to organizational readiness and regulatory compliance, implementing Generative AI Chatbots requires a careful and strategic approach. The next chapter delves into these challenges, providing insights into the obstacles tourism companies face.

4. Challenges of Generative AI Chatbots in Tourism

4. Challenges of Generative AI Chatbots in Tourism

The challenges of implementing Generative AI Chatbots in tourism range from economic, social and technical to legal. Below is an overview of the most pressing challenges.

4.1 Economic Challenges

The implementation of Generative AI Chatbots in tourism presents several economic challenges that significantly impact financial planning and operational viability. These challenges can be categorized into three primary areas: cost types, cost acceptance and expectations, and budget restrictions.

4.2.1 Cost Types

Technical Infrastructure Costs

A major cost factor in implementing Generative AI Chatbots is the technical infrastructure required to host and maintain the system. Companies opting for independent hosting solutions bear all associated costs, including hardware acquisition, maintenance, and regular updates: “The technology has to be maintained, it has to be updated, so you can't forget these costs either” (I5b).

Additionally, large-scale systems such as Microsoft Copilot can quickly accrue six-figure costs, whereas smaller systems have lower requirements (I7). Integration into existing systems often necessitates significant software engineering for customization and data standardization, which adds further complexity and expense: “What carries more weight are the individual adjustments […] which you just have to do” (I1).

Initial Investment

The introduction of a chatbot requires substantial upfront investment, encompassing acquisition, implementation, and support. One expert noted that the initial phase often feels like a loss-making venture: “In the first step, [the introduction] probably still represents a loss-making business” (I5a). This highlights the importance of strategic planning to justify the long-term benefits of these investments.

Personnel Costs

Despite the potential for automation to reduce personnel costs in the long term, the implementation and ongoing maintenance of Generative AI Chatbots require skilled personnel. Tasks such as content updates, user interaction analysis, and system adjustments demand continuous human involvement: “Staffing for the ongoing maintenance of the AI chat […] what are the responses, how to react to them, reworking content if necessary” (I14).

4.2.2 Cost Acceptance and Expectations

Difficulty in Measuring Financial Benefits

One challenge lies in aligning the costs of chatbots with their financial benefits, which are often indirect. For instance, while infrastructure and tool costs may be high, the savings are realized through improved efficiency in personnel management and optimized workflows: “I have higher tool costs or higher costs for the technical infrastructure, but I actually make the profit in terms of time

with my staff" (I11).

Customer Expectations

Customer expectations further complicate cost acceptance, as many users assume such services should be free: "Today they always expect everything to be free" (I6). This limits companies' ability to pass costs onto customers, often forcing them to compromise on quality or security: "I accept that I would only be 80 percent correct and have a 20 percent security risk […] because my cost savings are so great" (I8).

Cost Variability

The range of available chatbot solutions – from low-cost tools to high-end professional systems – adds another layer of complexity. While basic solutions may be financially appealing, they often carry risks related to quality and compliance. In contrast, professional systems are significantly more expensive but offer better functionality and security: "There are really cheap tools that I can buy […] But with the legal risks that are usually associated with them" (I11).

4.2.3 Budget Restrictions

A significant challenge in the tourism sector is financial constraints, particularly for municipal and regional tourism organizations. Many of these entities rely on public funding and have limited budgets for digital transformation. This makes investments in new technologies, such as Generative AI Chatbots, difficult to justify, even when their long-term benefits are acknowledged.

Limited Financial Resources

The tourism sector often operates with tight budgets, leaving companies with limited flexibility to invest in new technologies. As one interviewee noted, "Budgets in tourism are always tight" (I13). This financial constraint necessitates thorough evaluations of economic efficiency and prioritization of investments.

Long-Term Financial Commitment

Implementing a Generative AI Chatbot is not a one-time expense but a long-term commitment involving ongoing maintenance and updates: "It's a long-term investment […] it also involves running costs and ongoing expenses" (I13). This can deter companies from pursuing chatbot solutions, even when they recognize their potential: "Probably a measure, no matter who offers it, that is too expensive" (I10).

4.2 Social Challenges

Implementing Generative AI Chatbots in tourism introduces a range of social challenges on the organizational as well as customer side, primarily centered on organizational culture, social acceptance, and the impact on work processes. These challenges must be addressed to ensure successful adoption and integration – especially in an industry like tourism.

4.2.1 Organizational Challenges of Tourism Companies

Employee Acceptance and Resistance to Change

A significant hurdle in implementing Generative AI Chatbots is gaining employee acceptance. Many employees perceive new technologies as a threat to established routines and job security. Resistance often stems from a preference for familiar processes: "We humans like to be used to routine

and love our old processes" (I4). This resistance is particularly pronounced among long-standing employees nearing retirement, who show little willingness to adopt new methods (I12).

The acceptance gap, where initial enthusiasm for AI does not translate into regular usage, is another obstacle. One interviewee noted, "Everyone is enthusiastic, but it is used very little," highlighting the challenge of embedding AI into daily routines (I7). Additionally, younger employees tend to embrace AI more readily, while older employees often require additional support and motivation to adopt the technology (I10).

Deeply rooted emotional resistance, fear of obsolescence, and skepticism toward AI systems further complicate acceptance. One expert noted, "The human level is often the biggest hurdle, as technical problems are easier to solve" (I1). Overcoming these challenges requires active persuasion and clear communication of the benefits of Generative AI Chatbots.

Increased Initial Workload

While Generative AI Chatbots can reduce workload in the long term, their initial implementation often leads to additional tasks and responsibilities. Setting up and training the systems requires significant time and effort. As one participant stated, "It's just something that comes on top," referring to the extra work required during the setup phase (I13).

This workload includes developing a catalog of questions, configuring responses, and integrating the chatbot into existing workflows. One interviewee described the process as requiring "a good week or two" for setup, followed by months of continuous adjustments (I4). The decentralized nature of tourism organizations further complicates this process, as local professionals must manage data maintenance alongside their regular duties (I13).

Fear of Job Loss

The perceived threat of job loss is a major barrier to the adoption of Generative AI Chatbots. Employees often fear that AI systems will replace their tasks, leading to redundancy. One participant observed, "The consensus was that many people are afraid of losing their jobs because some tasks will be eliminated as a result" (I10).

These fears are particularly prevalent in customer-facing roles, where employees view their work as inherently social and worry about being replaced by machines: "Talking to people is something positive, and suddenly a machine comes along and says, 'I can do that better than you can'" (I15). Such concerns are not always rational but are often emotionally charged and require sensitive handling.

Adaptation of Skills and Work Processes

The successful use of Generative AI Chatbots depends heavily on employees' ability to adapt their skills. A key challenge is the quality of input provided to the chatbot, known as prompting. Incorrect or insufficient input often leads to unsatisfactory results. As one expert noted, "The better I enter the information, the better the result" (I11). However, many employees lack the necessary training to optimize chatbot interactions, reflecting a broader need for skill development in this area.

The integration of chatbots also requires rethinking work processes and adapting routines. One interviewee emphasized that this shift involves not just technical adjustments but also significant changes in organizational culture: "The work […] will definitely change" (I7). Proper training and support are essential to ensure employees can navigate these transitions effectively.

4.2.2 Social Challenges towards Customers

User Acceptance and Familiarity

Many customers, particularly those unfamiliar with chatbot technology, are hesitant to adopt this mode of interaction. For example, long-time customers often prefer traditional channels like phone calls: “I've always called, so I'll call now” (I12). This resistance is particularly strong among older users, who may ignore chatbot options or feel that the technology falls outside their communication comfort zone (I12).

Customer skepticism is compounded by experiences with earlier, less capable chatbot systems. These older models often forced users into rigid topics and delivered unsatisfactory results, leading to lingering distrust. As one interviewee noted, “Why should I then turn to the chatbot for the second and third time if I have had such experiences?” (I3).

Additionally, chatbot adoption rates remain low, with a small percentage of users engaging with the technology, even when anonymity is offered. Features like requiring personal information before interaction further discourage usage, as noted by an expert: “The usage rate is lower than when it is completely anonymous” (I2).

Managing Expectations

Generative AI Chatbots often face the challenge of mismatched customer expectations. Many users initially overestimate the technology's capabilities, expecting it to completely replace human interaction. Disappointment arises when they realize the limitations of chatbots, as one expert described using the “Kübler-Ross curve”: customers are “super enthusiastic” at first but become disillusioned upon encountering the system’s constraints (I15).

Smaller tourism companies also struggle with customer expectations set by global platforms, which offer highly advanced chatbot solutions. Customers accustomed to these high standards may find smaller companies' offerings lacking, leading to dissatisfaction (I13).

Empathy Gaps

A significant limitation of Generative AI Chatbots is their inability to replicate genuine human empathy. While chatbots can provide “super answers” (I15), they often fail to communicate with the same level of appreciation and emotional intelligence as human staff. This shortfall is especially evident in customer care, where individuals expect respectful, personalized interaction. As one interviewee stated, “It’s not only about what you communicate, but how you communicate” (I15).

Moreover, chatbots primarily reflect the interests of their programmers, rather than acting as advocates for customers. For example, while a human travel agent aims to find “the best possible product” for the customer, chatbots lack the same intrinsic motivation (I9). Improvements in emotional intelligence and the ability to interpret emotional states could significantly enhance chatbot acceptance in the future (I5).

Building Trust and Transparency

Trust is another critical factor influencing chatbot adoption. Customers often feel uncertain about how their data will be handled, leading to concerns about security and transparency. One expert highlighted this issue, stating, “At the end of the day, it’s a matter of trust” (I3).

Building trust requires clear communication about data protection measures and how the chatbot operates. Transparency, coupled with professional presentation and certifications, can help alleviate

these concerns. As noted by one participant, “More transparency and better data protection regulations […] can lead to [customers] being more inclined to use artificial intelligence” (I5).

4.3 Technical Challenges

The implementation of Generative AI Chatbots in tourism involves numerous technical challenges that span functionality, data management, infrastructure, and cybersecurity. Addressing these issues is critical to ensuring the effectiveness and reliability of chatbots while meeting user expectations.

4.3.1 Functionality

Precision and Relevance

The accuracy and relevance of chatbot responses significantly impact user trust and satisfaction. Errors or incomplete answers can lead to dissatisfaction, especially in tourism, where incorrect information about destinations or services can harm the customer experience. For example, while a chatbot may correctly state that ferries to Heligoland operate from Cuxhaven, it may fail to mention alternative departures from Wilhelmshaven (I14).

Ensuring high-quality responses requires regular review and adjustment of information sources. Additionally, chatbots must account for business logic, such as tailoring offers to specific customer preferences: “If you want a deluxe studio now, then I won't offer you the cheapest room as an alternative” (I4).

Training and Development

Generative AI Chatbots require ongoing maintenance and training to remain effective. Contrary to the assumption that chatbots are self-sustaining, they must be regularly updated and optimized, much like human employees (I15). The quality of chatbot performance depends on the accuracy and relevance of the training data provided. Customizing chatbots to specific subject areas in tourism is crucial for addressing diverse user needs (I5).

Hallucinations

Hallucinations – instances where chatbots generate responses based on patterns rather than real knowledge – pose a serious risk in the tourism industry. Incorrect answers, such as fabricated information about destinations, can mislead users and damage trust. To mitigate this risk, businesses must closely monitor chatbot outputs and incorporate human oversight when necessary (I10, I14).

Susceptibility to Manipulation

Generative AI Chatbots can be influenced by biases in training data or deliberate manipulation. This vulnerability can result in distorted or undesirable outputs, particularly concerning sensitive topics such as politics or religion (I9). Companies must implement robust safeguards and regularly audit systems to address these issues.

4.3.2 Usage Barriers

Limited Customizability

Customization is a significant challenge, especially when addressing complex or highly individualized requests. For instance, arranging personalized travel itineraries, such as specific hotel room preferences, often exceeds current chatbot capabilities (I1). High-quality customer data is essential

for chatbots to deliver personalized recommendations, but this level of data granularity is often lacking (I5).

Lack of Understanding Contexts

Chatbots often struggle to interpret the semantic nuances of user queries, leading to irrelevant or inaccurate responses. For example, a chatbot might fail to prioritize specific URLs or misunderstand the intent behind complex queries (I6). Addressing this limitation requires advancements in natural language processing and more sophisticated training.

Response Time

Fast response times are crucial for user satisfaction. Delays of more than 2 seconds can disrupt the user experience, while prolonged delays of 15–20 seconds for complex queries are unacceptable (I6). Optimizing system efficiency and infrastructure is necessary to meet these performance expectations.

Communication Transience

Chat sessions with chatbots are temporary, with information lost once the session ends. This is problematic for long-term decision-making processes, such as booking vacations, which often involve multiple consultations and extended timeframes (I1).

4.3.3 Data Management

Maintenance and Availability

Maintaining up-to-date and accurate data is critical for chatbot functionality. Real-time data is especially important for short-term events such as performances or tours. Outdated or incomplete data can lead to irrelevant recommendations and dissatisfied users (I6, I10).

Ongoing maintenance requires significant organizational effort, including regular updates and data integration. Centralized data platforms can help streamline this process, but data discontinuities between local and national levels remain a significant obstacle (I6).

Data Quality

The effectiveness of Generative AI Chatbots depends on the quality and comprehensiveness of the data used. In tourism, where information is often managed decentrally, inconsistent data quality presents a major challenge. The reluctance of some organizations to share data further complicates efforts to build comprehensive, centralized databases (I6).

Cybersecurity

The integration of chatbots introduces new cybersecurity vulnerabilities, including the risk of cyberattacks. These attacks can result in data breaches or disruptions to services, highlighting the need for robust IT security measures. Companies must implement forward-looking strategies to stay ahead of potential threats, recognizing that cybersecurity is a continuous challenge (I3, I7).

4.3.4 Infrastructure

Sustainability Risks

Generative AI Chatbots require significant energy and resources during training and operation. The environmental impact includes high energy consumption and increased carbon footprints due to data center expansions. These sustainability concerns underscore the need for energy-efficient solutions

and better infrastructure planning (I11, I15).

Integration and Interface Customization

Integrating chatbots into existing systems is a complex task that requires adapting interfaces and ensuring compatibility with existing processes. Initial implementation efforts are often underestimated, leading to delays and complications. Deeper integration into everyday tools, such as email or word processing systems, could improve adoption and ease of use (I11, I13).

4.4 Legal Challenges

The implementation of Generative AI Chatbots in the tourism sector introduces complex legal challenges that affect data protection, compliance with regulatory frameworks, liability issues, and competition law. Successfully addressing these challenges is essential for maintaining legal compliance and minimizing risks.

4.4.1 Consumer and Data Protection

Data Standard Compliance

Compliance with data protection regulations, such as the GDPR, poses significant challenges for companies implementing chatbots. The principle of “Privacy by Design” requires robust technical and organizational measures, which consume additional resources (I15). Companies often rely on external data protection consultants to navigate these requirements and ensure compliance: “We have an external data protection consultant who supports us in this area” (I15).

Particularly problematic is the transfer of personal data outside the EU, which may breach GDPR if adequate protection levels are not guaranteed. As one expert highlighted, “It becomes problematic […] when all this data processing takes place not in Europe but in the US” (I15). Balancing innovation with strict adherence to data protection standards is another concern, as overregulation may hinder service delivery: “Data protection […] must not be the case that it does not enable development” (I3).

Consumer Regulations

Generative AI Chatbots must comply with consumer protection laws, including the newly introduced EU AI Act (2024). The Act mandates transparency, safety, and ethical standards, requiring companies to clearly inform users they are interacting with AI and to implement measures to minimize risks. Companies face penalties for chatbot outages that prevent customer access to promised services, which could lead to violations under German consumer law (I8).

Moreover, consumer protection associations increasingly scrutinize AI systems to ensure compliance with regulations, emphasizing the need for transparent practices and adherence to legal requirements (I8).

4.4.2 Regulatory Requirements

Transparency and Labeling Obligations

Transparency is a cornerstone of regulatory requirements, demanding that companies clearly disclose the use of AI in customer interactions. Notices must be provided in the immediate context of use, such as within chat windows, to ensure users understand they are interacting with a machine (I8). Additionally, companies are encouraged to clarify the limitations of AI-generated content, including its potential inaccuracies: “The results are suggestions […] not everything has to be correct” (I7).

The EU AI Regulation strengthens these obligations, but labeling alone is insufficient. Companies must also indicate the development stage of the chatbot (e.g., alpha or beta) to manage user expectations and mitigate liability risks (I7).

Non-Transparent Data Sources

The lack of transparency regarding training data sources introduces significant legal risks, particularly concerning copyright. Many models are trained on data scraped without proper regard for copyright laws, leading to legal disputes: “There are lawsuits because the companies that trained their models […] scraped data […] without considering the copyrights” (I11).

The global nature of AI exacerbates this issue, as copyright laws vary by country, creating inconsistencies in legal standards. Companies must navigate these complexities and assess the legality of their training data and generated content (I8).

4.4.3 Liability Issues

Responsibility for Chatbot Outputs

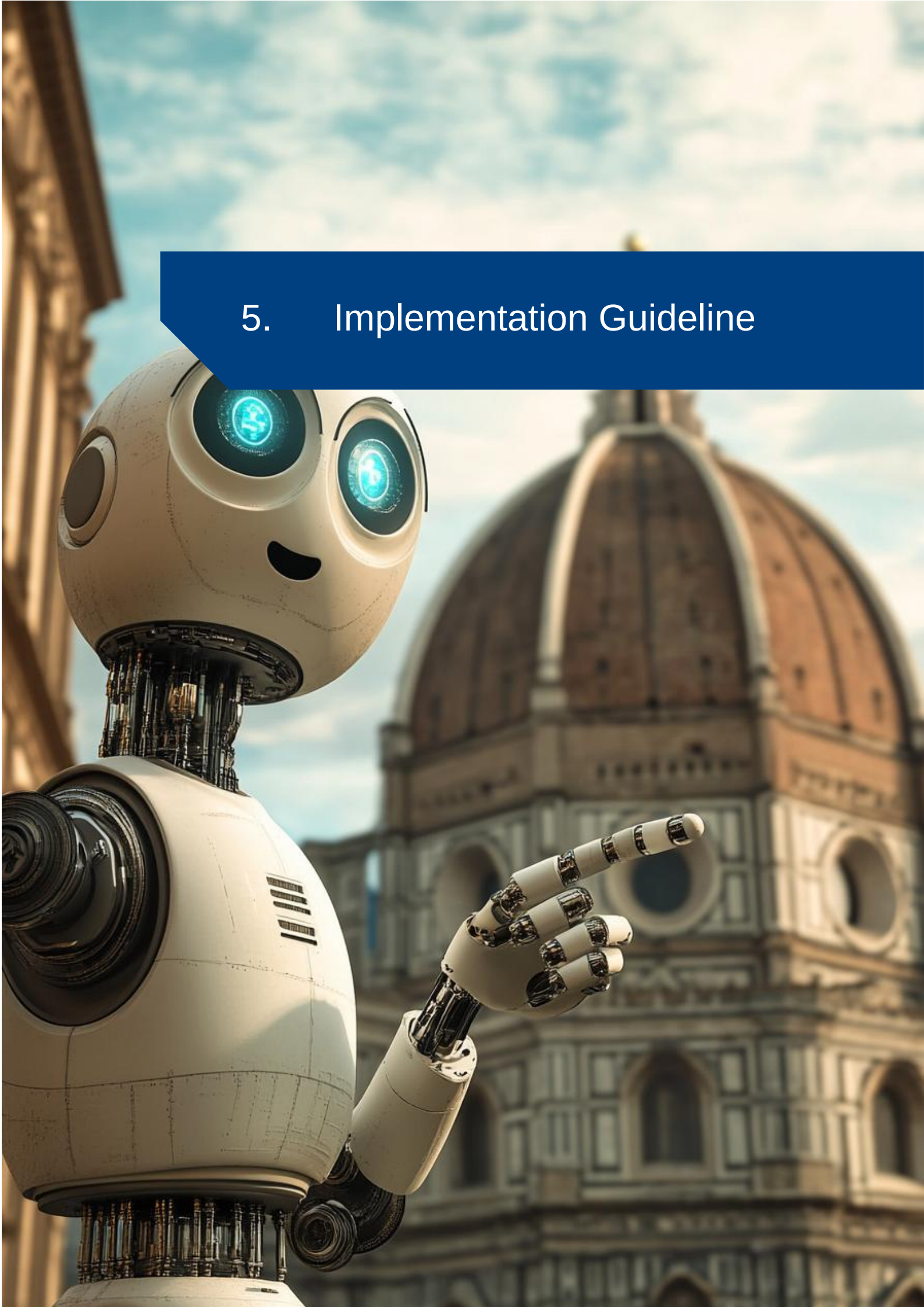
Companies are fully liable for chatbot outputs, as they would be for human employees. Shifting responsibility to the machine is not legally permissible: “Companies are just as liable as if they were acting themselves or with an employee” (I8). This includes liability for contractual agreements facilitated by chatbots, where disclaimers about AI-generated content do not absolve companies of accountability (I8).

The early-stage development of chatbot technology heightens liability risks, particularly due to errors or hallucinations, where chatbots generate inaccurate or misleading information. To mitigate these risks, companies often supplement AI systems with human oversight for greater transparency and trust (I8).

Unfair Competition

Using Generative AI Chatbots as substitutes for human employees may create unfair competition by misrepresenting the nature of customer interactions. For example, portraying chatbots as human employees could distort market conditions, as chatbots are cheaper and offer higher availability than humans (I8). This practice could trigger legal disputes in the highly competitive travel industry, where companies are known to litigate over competitive advantages (I8).

5. Implementation Guideline



5. Implementation Guideline

5.1 Organizational Implementation Recommendations

While Generative AI Chatbots continue to delve deeper into the tourism sector, not every use case solves an actual problem or adds value for customers. We developed guidelines for implementing Generative AI Chatbots to tackle these issues from an organizational perspective. These guidelines are outlined below.

Defining the Scope and Setting the Stage

Strategic planning requires a systematic approach to ensure this technology's long-term benefits and sustainable integration. A clear strategy begins with the question, "What is the consequence of not innovating?" (I3). Entrepreneurs must be aware that not innovating can lead to "possibly going bankrupt because [they are] overtaken from all sides" (I3). In this context, the question of the speed of adaptation arises: "Do I want to be a pioneer with all the pros and cons, or do I wait for a few others to test it out and then follow relatively quickly, or be a later follower?" (I3). The process of strategic planning should be systematic and structured because "otherwise [the company] is always stuck with a patchwork" (I11). This requires the involvement of all parties that are affected (I11). The starting point could be developing a mission statement or guidelines that set the fundamental direction for applying the technology (I11). Building on this, it is advisable to analyze "in which areas [you] really want to use AI" to achieve the greatest benefit (I11). Important components of such a strategy are risk analyses and evaluating potential tools (I11). Strategic planning can also be understood as a cross-cutting task, comparable to sustainability: "The more systematically and structured I approach this with certification and so on, the better it is in the end" (I11). A holistic view of work processes is crucial to effectively leverage AI's benefits. According to one interviewee, it is necessary to "analyze the entire company vertically in all areas of the processes" (I6). Finally, strategic planning is only successful if it is carried out in coordination with employees: "I have to think of a strategy behind it. And I would develop that together with the employees as well" (I11).

Ensuring Regulatory Compliance

Legal protection is essential when implementing Generative AI Chatbots. Companies must ensure that the chatbot and its functions meet the GDPR and AI Act (I3) requirements. Privacy by Design (I15) is an essential guiding principle: compliance with data protection requirements is integrated into every development and design phase from the outset. In the interest of user education, a full-fledged data protection package should be provided, with visible and comprehensible information on how and for what purposes personal data is processed (I15). At the same time, it must be made clear that no legally binding statements may be made (I10). A mechanism similar to a cookie banner can also be part of this process so that users give their consent before interacting with the AI (I12).

Creating Workforce Acceptance

Successful implementation of Generative AI Chatbots in tourism requires fostering acceptance. Encouraging employees to try the technology reduces fear and builds trust. Here, an open corporate culture marked by curiosity and a willingness to experiment is crucial: "It is much, much more important that employees have an openness to new technologies […] simply this openness, willingness to try things out and to actually do them, especially in the beginning" (I13). Communicating AI's benefits is key to achieving employees' openness: "Creating awareness of new technologies […] that you are open to it […] and realize: okay, AI won't replace me, but I need it to improve my work-

flow" (I5b). This especially shows that recognizing time-saving benefits significantly increases willingness to adopt (I2).

However, employees often hesitate to take initiative: "Most of the time […] we first have to convince them of the advantages and benefits of a chatbot" (I12). For companies aiming to convince employees of benefits, demonstrating best practices helps: "You have to use examples of best practice to show that it can really increase efficiency" (I11). Trial and error foster acceptance: "All the programs are so user-friendly […] just try them. I mean, you can't go wrong" (I10). Gradual introduction through imitation also works: "We progressed with the […] team and then actually let it sink in a bit so that the others were like, 'Oh look, how's that going? It's going quite well, maybe we should try it too'" (I2).

Employees often reject new technologies when benefits are unclear (I12), making in-person workshops more effective than digital formats: "Learning together and mutual support are strongly encouraged" (I11). At last, human backup remains essential when chatbots reach their limits (I13). Companies need their workforce's acceptance for this human backup to work.

Balancing Automation with Human Work

It is important to strike the right balance between automation and human interaction. As one expert describes it: "You definitely have to be aware of that. When I say 'you', I mean when you offer this as a company" (I13). This statement makes it clear that companies need to be aware of the implications of these decisions. An important question is to what extent the chatbot can act independently without completely replacing human contact. This includes considerations about "how wide you open the door […] and what you also allow and request" (I13). Another consideration is whether human employees need to be involved in the process for certain products. One expert explains: "That raises the question of whether I ultimately need […] this loop through employees or staff who go in again and look at it again somehow?" (I3). Complete automation could be a realistic goal, especially for standardized products such as simple flight bookings (I3). As the expert explains: "These are products where not much personalization is done, and where probably not much personalization is expected. […] Especially with these standard products, it should be possible to somehow technically cleanly abbreviate this loop through employees in the company" (I3). This shows the complexity of designing the technical requirements in such a way that automation can be effectively implemented without sacrificing quality. Companies have to weigh up exactly "up to which point […] I also want to run this through the tool" (I13).

Evaluating and Further Developing the Chatbot

Once the chatbot runs, it should not be seen as a static tool. It is emphasized that regular evaluations and feedback loops have a decisive influence on the quality of the chatbot (I13). It is important to continuously check whether the chatbot is answering the expected questions correctly, where there is room for improvement, and what new content should be integrated in a timely manner. Regular revision of content and close collaboration with the team promote the continuous growth of the AI (I15, I2). Especially in tourism, maintaining data is an important ongoing task. Since offers change frequently and new destinations or partners are added to the portfolio, reliable data management is crucial to ensure that the chatbot always provides up-to-date information (I13). Internal transparency regarding the results and usage statistics is essential to involve the team in this process and to include all employees. Discussing real user requests or demonstrating specific success stories promotes understanding of the AI and motivates further optimization (I2, I11).

Experimentation mindset

To fully understand the potential and limitations of Generative AI Chatbots, tourism companies

should take a hands-on approach and experiment with these systems. Given the rapid advancements in AI, it is beneficial to test different chatbot applications in low-risk environments, gather feedback, and gradually refine their use. Many AI tools are designed to be user-friendly, allowing companies to explore functionalities without significant technical expertise. By adopting a mindset of experimentation and continuous learning, businesses can gain valuable insights into how chatbots can enhance customer interactions, optimize internal processes, and ultimately strengthen their competitive position in the tourism market.

5.2 Process model for implementation

5.2.1. Proof-of-Concept development phases

Following the experimental mindset, implementing a Generative AI Chatbot often starts with a proof-of-concept (PoC) phase to test and evaluate the technical feasibility, user acceptance, and business impact. The following section describes a process model that is intended to assist tourism companies in implementing a meaningful PoC as a step-by-step guide, thereby providing a clear insight into whether a Generative AI Chatbot is the appropriate instrument.

Step 1: Discovery

The main objective of the discovery phase is to understand the current challenges the company is facing and thereby to identify potential chatbot use cases. The most commonly used activities to start the discovery are stakeholder interviews, pain-point analysis, or user journey mapping. In this step, it is important to be clear about the challenges in order to be able to develop targeted ideas about how a Generative AI Chatbot can sustainably solve them. Furthermore, it is advisable to involve colleagues from different departments to work on solutions in an interdisciplinary and conceptual manner.

Step 2: Scoping

Identifying ideas and use cases is an essential step in the development of a Generative AI Chatbot. However, the next step is to establish a prioritization framework to evaluate each use case value contribution and feasibility. Selecting a feasible idea for the PoC is an important approach to facilitate rapid implementation. The scoping of a PoC is also a crucial stage in the project management process; therefore, it is necessary to be precise about the scope of the project and to consider the development stages that will follow. A roadmap should be created to plan these stages conceptually. This approach facilitates the systematic development of the Generative AI Chatbot, with the end goal of achieving a comprehensive vision, while concurrently dividing the project into smaller development stages, with the first development stage being the PoC.

Step 3: Provider Screening

In order to test the technology quickly and iteratively, it may be more appropriate to use existing chatbot providers than to develop a complete in-house solution. Following the “Buy-option”, it is essential to select a Generative AI Chatbot provider that meets the project's specific requirements. A recommended approach would be to conduct a comprehensive analysis of the current market using a set of criteria for evaluation. These criteria could include the following aspects: 1. the range of generative AI models offered in the solution, 2. the capacity for easily integrating company data into the system, 3. the ease of configuration for non-technical users, 4. the compliance of data management and customer interaction with data protection and AI regulations, 5. the structure of the pricing model. Currently, experience shows that a three-month PoC requires a budget of around 5.000 to 10.000 EUR. As an outcome, a Generative AI Chatbot provider whose platform can adequately meet the technical, financial, and regulatory requirements should be identified. To simplify the initial provider selection process, we conducted a preliminary screening of German chatbot providers based on the criteria above. The following table provides a structured overview of selected Generative AI Chatbot solutions, focusing specifically on ease of use, integration capabilities, supported channels, and GDPR compliance. This initial comparison highlights that the selected providers offer broadly similar key features, making them viable options for further evaluation based on specific project needs.

Provider	Ease of use	Integration of company data	Channels	GDPR compliance
DialogBits	No-Code-Solution Visual workflows	Website Documents ERP / CRM	Website Messenger Social Media	✓
BOTfriends	No-Code-Solution Visual workflows	Website Documents ERP / CRM	Website Messenger Social Media	✓
Kauz.ai	No-Code-Solution Visual workflows	Website Documents ERP / CRM	Website E-Mail	✓
Melibo	No-Code-Solution Visual workflows	Website Documents ERP / CRM	Website Messenger Social Media	✓
Userlike	No-Code-Solution Visual workflows	Website Documents ERP / CRM	Website Messenger Social Media	✓

Table 2: Generative AI Chatbot provider screening

Note: All information in the table is based solely on publicly available content from the providers' websites, researched between January and March 2025. Features may have changed since then.

Step 4: Workflow conceptualization

The configuration of a Generative AI Chatbot requires the conceptual development of the company-relevant workflows that the chatbot is to automate in the future. Therefore, it is necessary to define the main workflows, such as pre-travel inquiries or booking assistance, from the selected use case to develop conversation flows and identify decision points and relevant data sources (e.g., trip schedules, pricing) in a structured manner. This will result in a detailed workflow that clearly defines user intentions, chatbot responses, and employee transition points.

Step 5: Chatbot configuration

In the next step of the process, the Generative AI Chatbot will need to be configured based on the derived workflows. This will involve enhancing the providers’ knowledge base with documents or

website links, setting up the workflows in a no-code environment typically offered by the provider, and, depending on the use case, linking to internal systems. The result will be a functional chatbot prototype that can conduct human-like dialogues and provide answers based on the company's customization.

Step 6: User Testing

The final step involves evaluating the chatbot's performance in real-world scenarios and collecting feedback from employees and customers. There are several approaches to user testing, and a two-phase testing strategy is recommended, with employees testing the chatbot first and then selecting customers. In the preliminary testing phase, the sequence facilitates the evaluation of the chatbot's responsiveness, focusing on aspects such as relevance, completeness, and correctness. Employees can most effectively assess these. Subsequent user testing with a select group of customers should then be conducted to evaluate the user experience and acceptance of the chatbot. Quantitative and qualitative feedback collection methods, such as surveys and interviews, respectively, can be employed to systematically gather user feedback. Feedback should be collected to facilitate the identification of errors and weaknesses in the chatbot, thereby providing a foundation for decision-making during the PoC phase.

Following the steps outlined in the process model for a PoC, a tourism company should be capable of establishing and evaluating a Generative AI Chatbot within three months. The PoC results should be considered to assess the technological feasibility, user acceptance, and business impact. The iterative and experimental approach should facilitate the acquisition of initial well-founded experience and assessments of the use of a Generative AI Chatbot.

"Kootstra Schiffreisen GmbH is conducting a PoC to explore the use of chatbots and assess how our target audience interacts with them, aiming to improve service quality and efficiency. Working closely with the Fraunhofer Institute, whose expertise has been invaluable, we followed a structured approach from scoping and vendor screening to chatbot configuration and user testing. This process has provided valuable insights and a strong foundation for decision-making, and we look forward to the PoC results and the next steps, with appreciation for the excellent collaboration with the Fraunhofer Institute and all involved."

KOOTSTRA Rad- und Schiffsreisen

- Julius Gräler (CEO of Kootstra Schiffsreisen GmbH)

5.2.2 "Make" or "Buy" - that is the question

While collaborating with external vendors can be highly efficient for producing a chatbot, some tourism companies – especially larger organizations with significant IT capabilities – may prefer an in-house approach.

When following a "Buy" strategy, companies typically leverage a ready-made platform or a subscription-based service. The provider handles most technical complexities – model hosting, data pipelines, security patching – leaving the tourism organization to focus on customizing the chatbot's workflows and datasets. This strategy allows the fastest time-to-market by configuring existing solutions. It also lowers the initial technical overhead, simplifies budgeting, and allows predictable costs, e.g., monthly or annual fees. However, innovation and advanced customization to the company's business strategies may be limited.

The "Make" strategy entails internally building and maintaining the Generative AI Chatbot solution. Despite its higher upfront complexity, it can yield long-term flexibility, customization, and proprietary

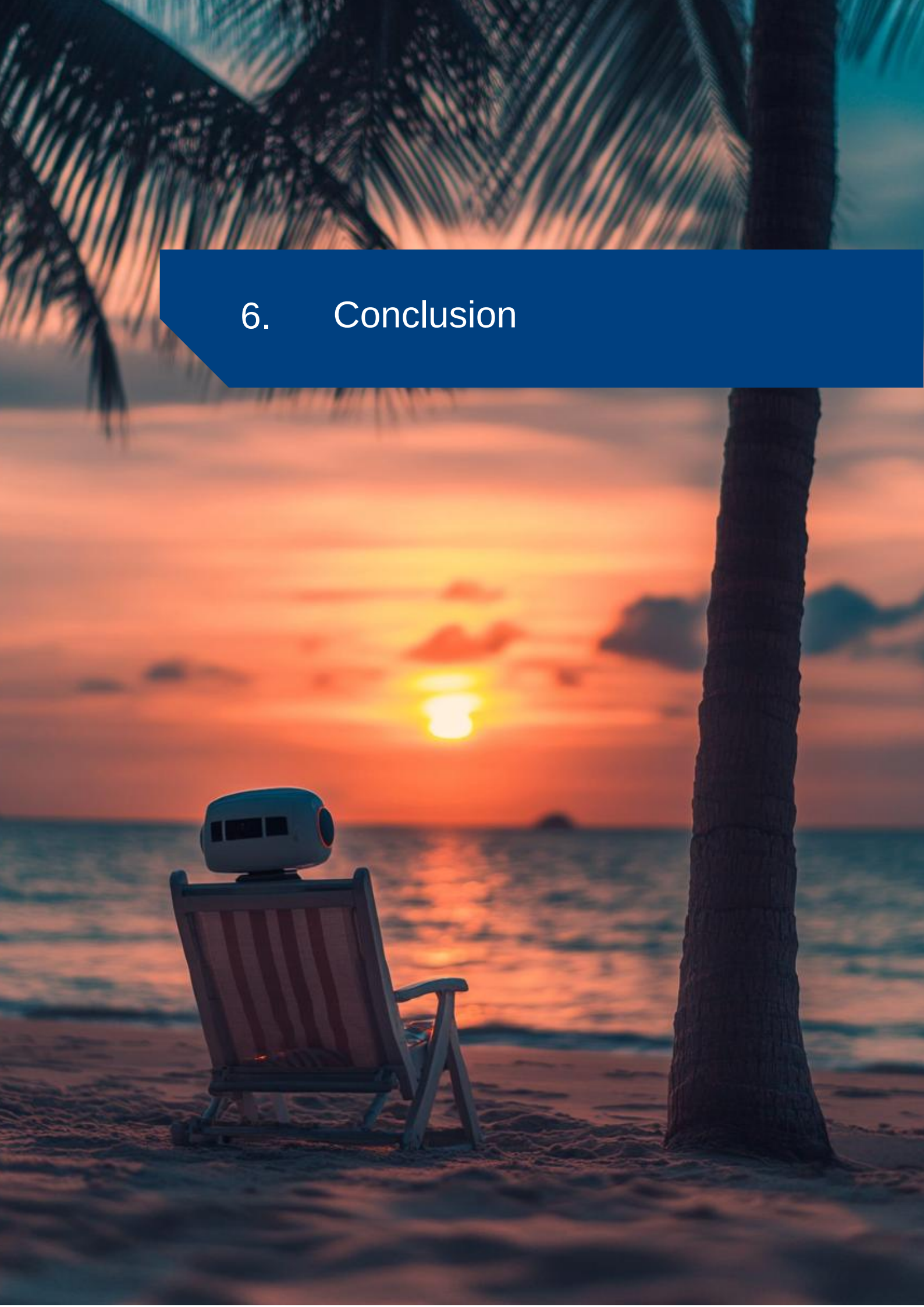
control benefits. Below are key technical factors tourism businesses should consider when evaluating a “Make” strategy.

(1) Infrastructure and model hosting entails planning adequate GPU or cloud resources for LLM adaption, e.g., setting up container orchestration, load balancing, and DevOps pipelines to handle variable user loads and ensure consistent performance.
(2) Model selection and fine-tuning often begin with open-source or enterprise-level pre-trained models, which can be further adapted to the tourism domain by integrating location data, booking APIs, and seasonal insights; prompt engineering techniques help to maintain response accuracy. Selecting a suitable model is determined by several factors. When selecting a model for Generative AI Chatbots, speed, reliability, response quality, and data protection are crucial (I1, I7, I12). The model should process data in compliance with EU regulations, be adaptable to specific needs, and enable natural, human-like interaction to meet user expectations (I8, 10).
(3) Data pipelines and governance to integrate information from multiple sources making it AI ready – CRM systems, booking engines, user-generated content – and ensuring compliance with GDPR and the AI Act through proper anonymization, and data access controls.
(4) Retrieval-augmented generation and knowledge graphs help reduce hallucinations by indexing and embedding relevant corporate or tourism data. This allows the chatbot to provide immediate context from a vector database or knowledge graph, which can capture complex travel relationships (such as multi-city itineraries or event scheduling).
(5) Talent and skill requirements are high, as data scientists, software architects, and compliance experts must collaborate to master NLP model optimization, distributed system design, and lawful data handling throughout the project lifecycle.
(6) Owning intellectual property generates long-term ROI and competitive differentiation. It allows deeper customization, ongoing innovation, and the ability to adopt advanced techniques such as multi-modal models or event-driven architectures, helping the organization stand out in an increasingly competitive tourism market.

Most companies begin with a rapid PoC using a service provider to validate the concept’s viability, then decide whether a more tailored, in-house approach is warranted. A hybrid model is also possible, where initial experimentation happens via a vendor's platform, and key components (e.g., specialized modules for data processing or advanced analytics) are developed internally over time.

Overall, the discussion clearly shows that introducing a Generative AI Chatbot in tourism must be designed to be multi-dimensional. Companies are well advised to start with a systematic strategy that considers technological feasibility, legal safeguards, and organizational and cultural embedding. Sustainability aspects are incorporated here, as is the question of how much energy can be invested to create real added value for customers (I6). Ongoing quality and data maintenance, regular evaluation of user feedback, and an innovation-friendly mindset are also among the key factors for success. If all parties involved can be integrated, the chatbot can become a valuable “employee” in the long term, handling customer requests quickly and competently.

6. Conclusion



6. Conclusion

Generative AI Chatbots represent a promising innovation for the tourism industry, addressing the growing demand for personalized, round-the-clock services while mitigating challenges such as labor shortages, rising operational costs, and the need for enhanced customer experiences. Their ability to automate repetitive tasks, optimize workflows, and provide tailored recommendations makes them a valuable asset for businesses seeking to improve efficiency and maintain a competitive edge in an increasingly digital market. However, the successful deployment of these AI-driven systems requires careful navigation of a range of challenges across technical, legal, economic, and social dimensions.

From a **technical perspective**, ensuring data accuracy, managing integration with existing systems, and addressing AI limitations such as hallucinations or response latency remain significant hurdles. Without well-structured and up-to-date data, chatbots risk providing misleading or incomplete information, potentially eroding user trust. Similarly, cybersecurity risks and the vulnerability of AI models to manipulation necessitate robust protective measures to ensure system reliability and compliance with industry standards.

The **legal landscape** also poses complexities, as evolving regulations – such as the EU AI Act – impose strict requirements regarding transparency, data protection, liability, and consumer rights. Companies must ensure that chatbots clearly disclose their AI nature, handle data in accordance with the GDPR, and provide legally sound responses to avoid reputational or financial risks. Navigating these regulatory frameworks requires not only legal expertise but also a proactive approach to aligning chatbot functionalities with compliance standards.

Economically, the high initial investment, ongoing maintenance costs, and the challenge of measuring ROI present barriers to widespread adoption. Many tourism businesses, especially small and medium-sized enterprises, face financial constraints that limit their ability to invest in sophisticated AI solutions. Budget limitations, coupled with uncertain economic returns, make it crucial to develop cost-effective and scalable implementations that deliver tangible benefits in terms of efficiency gains and customer satisfaction.

On the **social front**, both employee and customer acceptance play a decisive role in determining the success of Generative AI Chatbots. Resistance to change, fear of job displacement, and a lack of AI literacy among employees can hinder adoption, making targeted training and change management essential. Meanwhile, customers accustomed to human interaction may struggle to trust chatbots, particularly if they fail to deliver accurate, empathetic, or contextually relevant responses. Clear expectation management, seamless escalation to human agents, and continuous chatbot improvement are key to fostering user confidence and engagement.

Despite these challenges, businesses that strategically integrate Generative AI Chatbots – taking a holistic approach that balances technological advancements with organizational adaptation – can gain a significant competitive advantage. By leveraging AI for process optimization while maintaining a strong focus on regulatory compliance, cost efficiency, and user experience, tourism companies can enhance their service offerings and position themselves for long-term success. The key lies in a structured and well-planned implementation that not only addresses current barriers but also ensures the adaptability and scalability of chatbot solutions in an evolving digital landscape.

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