Integrating AI Technologies into Hotel Businesses: Opportunities and Challenges

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Abstract. Today, artificial intelligence has become an area of opportunity in the business space. One of such spaces is the sphere of hotel business. This article will look at the capabilities of Artificial Intelligence (AI), the flexibility of its use, the variability and limitations of use, as well as how deeply AI has an impact in these industries.

CEOs are increasingly implementing artificial intelligence, into their workflows to simplify and automate data processing, improve operational efficiency and create more opportunities for future innovation. The list of applications of artificial intelligence is extremely wide: from the automation of data processing to the convenient booking of rooms.

In addition, AI also facilitates communication between international people. This article examines survey-based research and statistics, the challenges and complexities that companies may face when using AI. To ensure responsible and effective implementation, of artificial intelligence, organizations must overcome these challenges. With the growth of AI technologies and the expansion of customization and accessibility, the future of AI integration promises to be dynamic.

Keywords: Artificial Intelligence, Hotel business, Automation, Data, Integration.

Literature Review

The development of technology has led to the use of state-of-the-art systems in the hospitality industry, such as artificial intelligence (AI) and robot-based applications and services. Recently, the issue of the introduction of such technologies and their impact on the operating costs of the hotel, as well as on the quality of customer service [9], has been actively discussed. Given the importance of these new technologies, this article examines the trend associated with the introduction of artificial intelligence and robotics in the hospitality industry (Khan et al., 2017).

Artificial intelligence (AI) is revolutionizing traditional business models in the hotel and tourism industry, offering new opportunities to improve efficiency, increase the level of personalization of services for customers and introduce innovations in the field of service delivery. [10] Despite the many positive aspects that AI users have, it is also worth noting a large number of obstacles and problems. Another problem is data privacy in addition, it is important to keep in mind that investing and maintaining this infrastructure requires a lot of money, which can be difficult for many companies, especially for small organizations working in the tourism and hospitality sector (Yadav et al., 2024).

Introduction

The hotel industry is undergoing an active transformation. Current tourists no longer just need to stay

in a hotel with comfortable rooms — they want to get a full-fledged, individual, useless, like an old iPhone, and memorable sightseeing experience. To get it, you need an ideological space, which, of course, raises the question of not only automating hotels, but also predicting insane or mega-orthodox customer needs.

Artificial intelligence has already entered our daily lives: using AI for booking, simplifies and adapts the service for more convenient use by customers, quickly finds answers to any questions, and finds optimal prices for certain services. The use of such technologies greatly promotes business and simplifies non-obvious things in the IT field. In this article, we'll take a closer look at how artificial intelligence is changing hotels and what it means for their future.

Main body

The hotel scene is changing a lot these days. Comfortable hotel rooms are no longer enough for tourists looking for a unique travel experience. They are looking for something memorable and unusual in the general overview of the city and the sights. In order to meet the expectations of their guests, hotels must take into account many aspects: from an individual approach to each guest to service automation. Artificial intelligence is currently a part of our lives.

Thanks to AI, we can not only easily receive detailed answers to any questions, but also quickly and seamlessly book hotel rooms after finding out the price there. In addition, using AI makes it easier to run a business. In this article, we will try to examine in detail the impact of artificial intelligence on the hotel business, as well as analyze the unobvious cons and pros. In a recent study by Accenture magazine, it was announced that artificial intelligence could double economic growth by 2035. A study conducted by PwC also confirmed the results of Accenture, adding that AI has a huge impact on different industries. [16]

However, looking at it from the other side, the abuse of artificial intelligence is fraught with big problems: the first and obvious problem is the loss of people's jobs due to their replacement with artificial intelligence. For example, according to the OECD (Organization for Economic Cooperation and Development), in 21 countries, automation risks wasting 14% of jobs. [3] McKinsey also says that by 2030, up to 800 million jobs could be lost due to the use of AI. However, he mentioned that artificial intelligence can create new employment opportunities. According to the annual survey, about 400 guests were interviewed. [7]

The main topic was the opinion of the guests about artificial intelligence in hotels. The results were as follows:

➢ 70% of the guests replied that chatbots are useful for solving simple questions, but prefer to contact real people on complex issues. - The main reason why guests love chatbots is to get Wi-Fi passwords, then schedule calls and check the hotel schedule.

➢ 58% believe that AI improves hotel reservations and accommodation.

➢ 65% of travelers want hotel technology to be more advanced than at home. In the hotel business, it is necessary to find a balance between the use of automated care and the individual approach of real workers. [2]

Although most guests approved of the use of artificial intelligence in basic attitude functions, many guests like how chatbots handle basic tasks such as checking service times or setting an alarm. Hotel owners who can use artificial intelligence tools to be more efficient will stand out, while those who don't may struggle to keep up.

Artificial intelligence is a new field in the study of computer and information sciences, which includes optimal and fast problem solving, data analysis, self-learning and memorization of new functions, recognition of voice queries and the ability to read information from photographs. In business areas, AI helps to systematize and robotize processes, process information from any language, and also has a machine learning function.

In the hotel business, AI performs not only the above processes, but also becomes a big leap in digital

transformation. In this process, many traditional business methods begin to give way to high-tech counterparts that perform actions faster and more conveniently.

Artificial intelligence is now most often used to improve work efficiency: customer service, automation of work, access to feedback at any time, etc. To date, many hotels have already implemented AI into their workflow, making it easier for customers to book rooms, answer guests' questions, and give some recommendations or advice.

Now it is simply necessary to study and understand the advantages of AI in the hotel business, because modern trends and technologies do not stand still, developing and bringing benefits to the business. For example, thanks to a modern algorithm, AI can easily perform repetitive actions, which helps a person focus on more complex and strategically important matters. Do not forget about the importance of data personalization, having feedback from guests will help to identify the shortcomings of the hotel faster and quickly correct them, while applying effective marketing strategies. Different types of bots and chat assistants can help in collecting different data, moreover, in real time without much effort. Online monitoring of guests' wishes, optimization of data on prices for goods/services, inventory, approximate forecasting of consumer demand, etc. This way, hotel business owners can track income and risk information, as well as remain competitive, and be able to provide high-quality services with the possibility of further improvement. [8]

The hospitality industry is exceptionally receptive to the quality of service and customer needs. This field of activity involves prompt response, an individualized approach and a clear organization of work. Artificial intelligence (AI) is particularly effective in the hospitality industry for the following reasons:

First, it generates a significant amount of information, including data on guest behavior, bookings, reviews, seasonal fluctuations, and competitor prices.

Secondly, a significant part of the processes is repetitive, such as responding to customer requests, cleaning rooms, and managing pricing.

Thirdly, intense competition makes it necessary to continuously improve the service and optimize costs.

Fourth, customer expectations are steadily increasing, particularly regarding digital convenience and the flexibility of the services provided. [4]

Today's digital-focused consumer is used to platforms like Netflix, Amazon, and TikTok. Accordingly, he expects from the hotel: simplified and fast booking using mobile devices; immediate answers to any questions; personalized service that eliminates repetitions and standard templates; contactless check-in procedure and interaction with staff. The introduction of AI is the only effective way to meet these requirements without significantly increasing staff and, consequently, increasing costs.

1. Service customization: from versatility to customer needs

Artificial intelligence (AI) has significant potential in the field of processing and analyzing large amounts of data in real time. This ability allows you to create personalized services tailored to the individual preferences of each customer.

For example, if a customer previously stayed at a hotel, chose a room with a sea view, visited a spa center and preferred vegetarian food, then upon re-booking, the AI will automatically offer him a similar room, include a spa package and provide an updated menu without meat dishes. All this happens without the administrator's involvement.

Personalization tools include chatbots and voice assistants that work around the clock, communicate in different languages and take into account the client's communication style. Recommendation systems use behavioral analysis based on browsing history, bookings, and reviews. Smart rooms equipped with Internet of Things (IoT) devices allow you to individually adjust lighting, temperature, music and TV channels. [1]

As practice shows, the individualization of service has a positive effect on customer satisfaction, increases the likelihood of repeat visits and reduces the number of complaints. Research shows that customers prefer brands that demonstrate an individual approach.

2. Optimization of internal operations and automation of processes

Artificial intelligence (AI) allows you to automate many routine tasks that were previously performed manually. This is especially true in the context of the shortage of qualified personnel that hotels around the world are facing today.

Automation of staff schedule planning is possible when the AI generates shifts, taking into account hotel workload, sick days, vacations and demand forecast. Cleaning and maintenance control is also automated, when the system notifies about the status of rooms, equipment failures and distributes tasks among employees. The AI tracks stock balances, predicts needs, and forms orders for suppliers.

The adoption of artificial intelligence to maximize cleaning at a big chain hotel, for example, has cut room downtime between check-out and check-in by 30%. The mechanism tells the maid of the guest's departure automatically and she gets the route on the tablet. Consequently, there are time savings, lower personnel expenses, better service quality, and higher general operational efficiency. Smart pricing and income maximization [6]

Revenue management in the hotel sector is being dramatically transformed by artificial intelligence (AI). Dynamic, adaptive algorithms are replacing traditional techniques of manual pricing fixing. Dynamic pricing works as follows: the system analyzes a vast array of data, including seasonal fluctuations, weather conditions, demand levels, competitor actions, historical trends, local events, and currency rate changes. Prices change in real time to reflect present demand and room availability.AI can also create unique offers, find the best timing for promotions, and calculate the ideal discount size. For instance, a hotel next to a prominent exposition center might greatly boost its earnings by reacting promptly to the rise in demand generated by an approaching event. The AI forecasts a rise in demand in 2-3 weeks and automatically changes rates to maximize profitability without affecting occupancy.

The AI also examines how well different sales channels, like online travel agencies, the hotel website, and corporate clients, function to allocate the room stock to the most lucrative sectors. Statista claims that the implementation of AI-based dynamic pricing mechanisms lets hotels raise RevPAR (revenue per available room) by an average of 10-15% Automating communications helps to improve the quality of customer service [5], Artificial intelligence significantly accelerates and simplifies the connection between clients and the hotel.

Key means of contact: Chatbots on the hotel website: answer inquiries, give booking information, and suggest extra services. Chatbots in Telegram and WhatsApp: offer communication before arrival, during stay and after check-out. In-room voice assistants let visitors place orders for food or ask for late check-out. For instance, a visitor may text the hotel's WhatsApp asking, "Please provide two towels and coffee in the room," and his request would be met right away, eliminating the need for phone calls and protracted waiting. The service becomes increasingly appealing to consumers, particularly for foreign visitors, given the quick reaction time, simplicity of engagement, and lack of language barriers. [11]

Security promise:

Ensuring the security of both private consumer data and their physical integrity depends on artificial intelligence, a key technology. Entry face identification: Residential properties are accessible exclusively to authorized people The systems track anomalies and alert the security service. Detection of questionable transactions and unlawful access, prevention of fraudulent activity. The hotel runs a facial recognition automatic door opening system. While the system records the time and identity of every person entering, guests come in without needing keys, hence guaranteeing convenience and security. Guests place safety first, particularly for business travelers and families with children.

Cultural and linguistic adaptability AI removes language and cultural variances. Even without a team of people who know various languages, hotel complexes may serve customers from all over the world. Artificial intelligence capabilities:

Translating rules, menus, instructions, and text messages. Voice command recognition and translation. The website and app interface's adaptation to the language and cultural traits of the user. For instance, a Japanese tourist lands in Paris. A voice assistant in Japanese serves him in his room, he gets a message in his home language, and the app shows the restaurant menu with an exact translation. This is particularly true for big international chains and hotels situated in tourist areas. Building trust is helped by clear and easily available facts. [12]

Robotics and the Internet of Things: When integrated with robots and Internet of Things technologies, artificial intelligence is becoming even more powerful.

Robots acting as couriers bring goods and other objects to rooms. Registration using terminals or a mobile app is automated. System of climate and lighting management that fits the guest's tastes. Monitoring of the technical state of equipment: refrigerators, air conditioners, locks, etc. The robot serves breakfast to the room, alerts via the mobile app, and then deletes it. Especially in situations of epidemiological safety, the customer does not engage with the personnel. Such technologies not only leave an impression but also help to save running expenses and increase task accuracy. [10]

Customer behavior predicting and data analysis AI lets hotels know what guests want and can help them forecast their behavior even before they ask. Functional: Predicting reservation cancellations. valuation of the likelihood of a return visit. Segmentation of the audience depending on behavior and preferences. Study of app and website user activity.[15] Should the system find that the consumer often cancels bookings, they are given money at check-in or a restricted discount period is established. This study increases consumer loyalty, lowers losses, and helps to maximize marketing plans.

Methodology and data

This research explores how using AI impacts on hotel business. According to the survey data analyses of several hotel employees randomly collected in Uzbekistan in 2025. The research focuses on relevant variables such as biggest challenges, the most beneficial functions of using AI, adaptation in technological systems, employees' willingness to use AI, providing to get any feedback opportunity to collaborate with other potential spheres, and other factors, and analyzing their relationship with starting using AI. The results reveal that all these factors have some influence during the leading hotel business.

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	collab, num_room, train_AI_sys, feedback, adop_AI, rating, sup_AI_adop, position [b]	.	Enter

a. Dependent Variable: observation
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,439^a	,193	-,115	9,296

a. Predictors: (Constant), collab, num_room, train_AI_sys, feedback, adop_AI, rating, sup_AI_adop, position

The model summary shows an R-Squared value of 0.193, meaning that the predictors used in the model explain 19,3% of the variation in using AI in the hotel business. The model relies on variables such as feedback from guests, training AI system, adaptation of AI and opportunity to collaboration.

However, it's important to note that 80,7% of the variation is still not accounted for, highlighting the limitations of the current model. While an R-Squared of 0.193 indicates that a reasonable portion of the variation has been captured, it also suggests that other variables might be necessary to fully understand the factors influencing using of AI.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	432,945	8	54,118	,626	,747[b]
	Residual	1814,555	21	86,407		
	Total	2247,500	29			

a. Dependent Variable: observation

b. Predictors: (Constant), collab, num_room, train_AI_sys, feedback, adop_AI, rating, sup_AI_adop, position

The theoretical concept describes the importance of using AI in the hotel business with the given dependent variables and independent ones.

The bellow is a representation of the model:

$Y = ß + α$ **collab** $+ α1$num_room $+ α2$train_AI_sys $+ α3$feedback$+ α4$ adop_AI $+ α5$ rating $+ α6$ sup_AI_adop $+ α7$ position $+ ε$

Where,

➢ **Y** - dependent variable;

➢ **ß** - constant (intercept);

➢ **α1, α2, α3, … αn** --- coefficient

➢ **ε** - error term (it is used to improve consistency (functionality) of the regression model)

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	11,894	13,818		,861	,399
	rating	,070	2,128	,007	,033	,974
	num_room	4,494	2,985	,348	1,506	,147
	position	1,775	1,467	,319	1,210	,240
	adop_AI	,574	1,838	,065	,312	,758
	sup_AI_adop	-,214	1,527	-,032	-,140	,890
	train_AI_sys	-,977	2,216	-,092	-,441	,664
	feedback	-1,583	3,794	-,091	-,417	,681
	collab	-4,331	2,504	-,403	-1,730	,098

a. Dependent Variable: observation

At this table we can see that only Collaboration with other spheres (collab) is statistically significant at 1% level, it means the acceptance of HA (alternative hypothesis) in positive relationship. Due to this fact we can observe that Collaboration has great potential in future, so it may be beneficial for our business.

As for other points, they reflect what is more important for the internal business system: functionality, convenience, service improvement, etc.

Conclusion

In conclusion, using AI in hotel businesses can be the great way of improving these companies. It helps to simplify a lot of primitive actions and make it automatically. Moreover a lot of information can be synchronized with the integration of AI. But as it was mentioned before, AI can only facilitate the work, but it cannot be the full solution of problems. It is the tool which was created to combine many function in one thing, which is really helpful in right hands, but has its own disadvantages. AI cannot replace human resource fully, it cannot take into account all nuances, including emotions and human feelings.

1. Hotel rating
30 ответов

- 1-2 stars
- 3 stars
- 4 stars
- 5 stars

23,3%
36,7%
33,3%
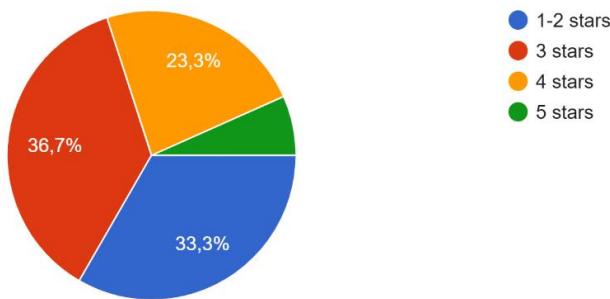
2. Your Position
30 ответов

- Owner
- General Manager
- IT/Technology Manager
- Operations Manager
- Employee
- Guest

26,7%
16,7%
16,7%
23,3%
10%
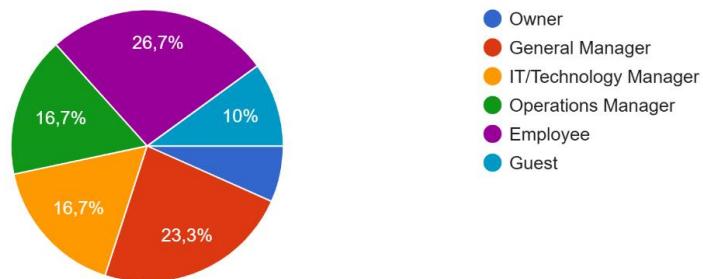
3. Number of Rooms
30 ответов

- 1–50
- 51–150
- 151–200

53,3%
40%
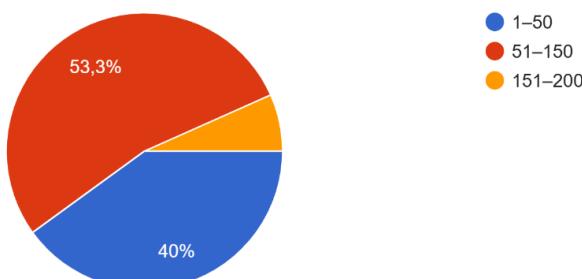
4. Has this hotel adopted any AI technologies?
30 ответов

- Yes, currently using
- Planning to implement within 12 months
- Exploring possibilities
- Not interested at this time

46,7%
10%
13,3%
30%
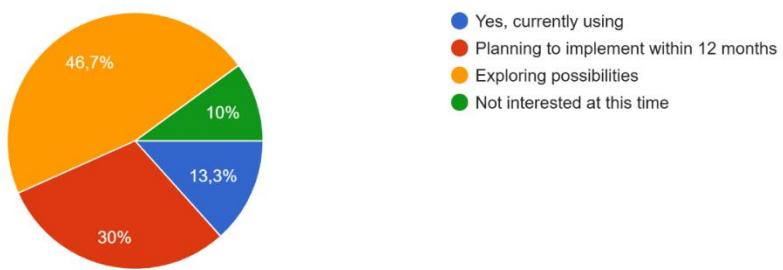
5. Which hotel functions do you believe AI can impact the most?
30 ответов

Function	Value
Guest communication & service	9 (30 %)
Room pricing & revenue management	17 (56,7 %)
Housekeeping operations	17 (56,7 %)
Marketing & customer targeting	20 (66,7 %)
Check-in/out processes	16 (53,3 %)
Maintenance & energy efficiency	14 (46,7 %)
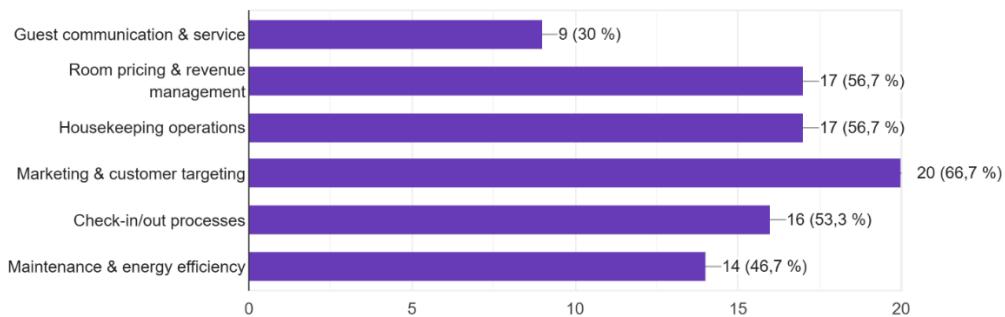
6. What are the biggest challenges you can face in adopting AI?
30 ответов

Challenge	Value
High upfront costs	8 (26,7 %)
Limited technical knowledge or training	21 (70 %)
Integration with current hotel systems	12 (40 %)
Privacy and data protection concerns	14 (46,7 %)
Staff resistance to technology	15 (50 %)
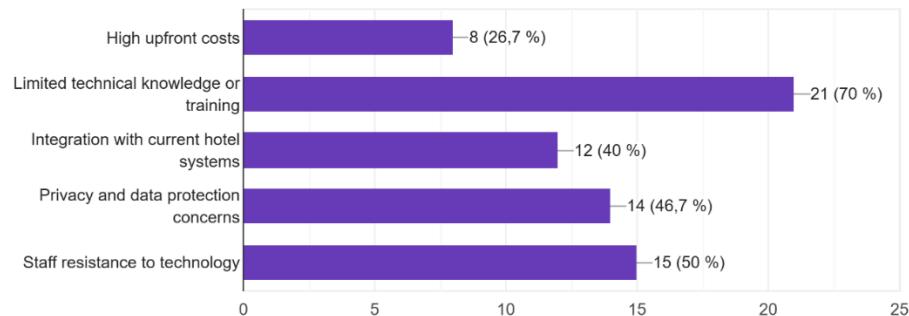
7. What kind of support or resources would help the hotel with AI adoption?
30 ответов

- Staff training and workshops
- Government/industry incentives or subsidies
- Partnerships with AI solution providers
- Case studies and success stories
- Industry best practice guides

16,7%
20%
13,3%
13,3%
36,7%
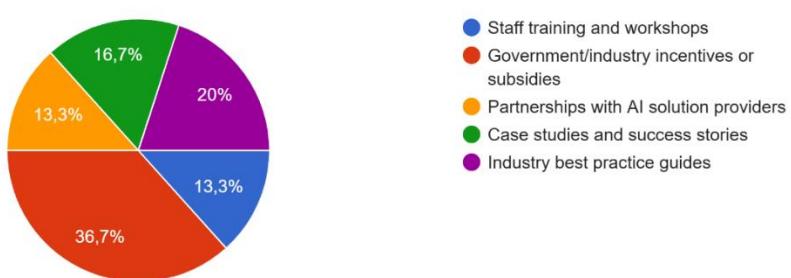
8. What types of training (if any) should been provided to staff regarding AI systems?

30 ответов

- System usage training (how to operate new tools)
- Data privacy and compliance training
- Customer service alignment with AI

46,7%
26,7%
26,7%
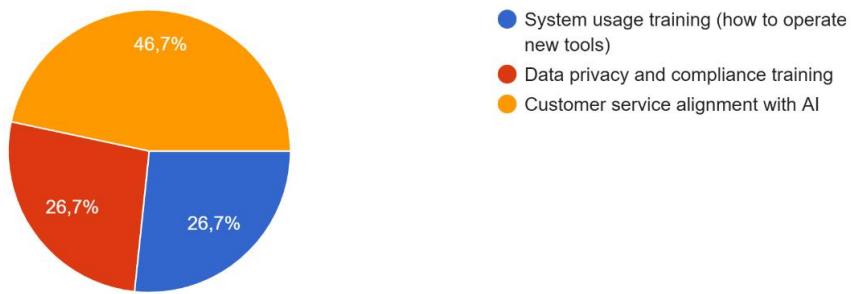
9. Should guests be provided feedback regarding AI-powered features?

30 ответов

- Yes
- No

40%
60%
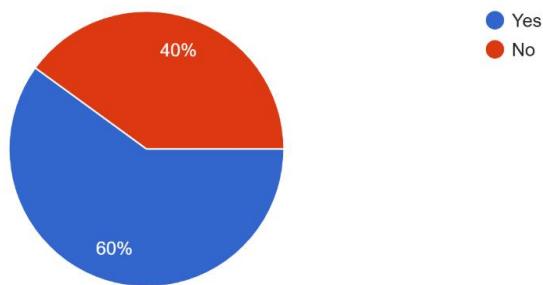
10. Would is it open to collaborating with universities, startups, or AI providers to pilot new solutions?

30 ответов

- Yes, absolutely
- Maybe, depending on project
- No, not interested

33,3%
26,7%
40%
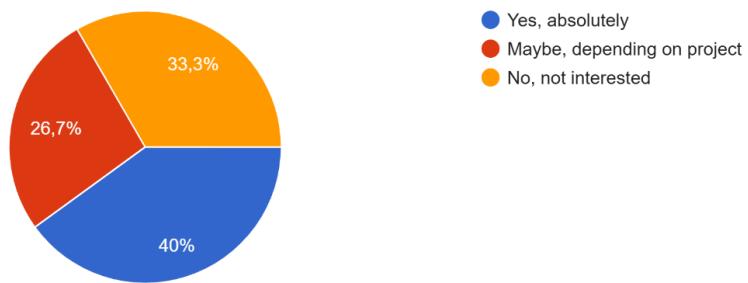
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