RESEARCH ARTICLE

# Acceptance of artificial intelligence as organizational leadership: A survey

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**Abstract** • In times of digital transformation and in an increasingly fast-paced corporate landscape, there is an increasing debate among company executives as to whether and how artificial intelligence (AI) can take over management tasks or even replace managers as such. This article provides an initial contribution to this discussion by examining the potential user base's acceptance levels of and expectations for the adoption of AI technology in organizational leadership roles. For this purpose, employees and managers (N = 74) were surveyed in an online questionnaire that presented three hypothetical scenarios in which AI performs certain managerial tasks, featuring different levels of interaction with potential users. An ANOVA analysis showed that the highest acceptance levels among the scenarios were achieved for AI managers that operate as (digital) cognitive assistants, thus giving support to executives in team supervision and providing a data-driven feedback culture.

***Akzeptanz einer Künstlichen Intelligenz als organisatorische Führungskraft**: Eine Fragebogenstudie*

**Zusammenfassung** • *In Zeiten der digitalen Transformation und in einer zunehmend schnelllebigen Unternehmenslandschaft wird unter Führungskräften zunehmend diskutiert, ob und wie Künstliche Intelligenz (KI) Führungsaufgaben übernehmen oder gar Führungskräfte als solche ersetzen kann. Die vorliegende Arbeit leistet einen ersten Beitrag zu dieser Diskussion, indem sie die Akzeptanz und die Erwartungen der potenziellen Nutzerbasis an den Einsatz von KI-Technologie in organisatorischen Führungsaufgaben untersucht. Zu diesem Zweck wurden Mitarbeiter und Führungskräfte (N = 74) mittels eines Onlinefragebogens befragt. Dieser stellt drei hypothetische Szenarien vor, in denen KI bestimmte Führungsaufgaben übernimmt, wobei die Szenarien unterschiedliche Ebenen der Interaktion mit potenziellen Nutzern aufweisen. Eine ANOVA-Analyse zeigte, dass die höchsten Akzeptanzwerte unter den Szenarien für KI-Manager erzielt wurden, die als (digitale) kognitive Assistenten agieren und so Führungskräfte bei der Teambetreuung unterstützen sowie eine datengetriebene Feedbackkultur bieten.*

**Keywords** • *artificial intelligence, leadership, future of work, acceptance*

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## Introduction

There seems to be a consensus, even among managers themselves, that artificial intelligence (AI) is no longer a hypothetical scenario in organizational leadership (Rittershaus 2020; Sahota and Ashley 2019). According to a McKinsey survey, 25 % of CEO workload could potentially be automated (Manyika et al. 2017), no matter whether it is a high skill or low skill task. Yet, the algorithm that became a board member (BBC 2014) still causes astonishment as human qualities beyond AI capabilities, such as intuition, critical thinking, moral judgment, creativity, and emotional intelligence, are regarded as important for sound management (Sahota and Ashley 2019). The successful integration of AI managers into organizational leadership will eventually depend on whether employees and human managers will accept instructions from an algorithm (ibid.). Beyond those societal concerns about AI, it will be crucial to know: what are the application-specific concerns and which actual expectations are placed on the design to create a subsequent successful implementation of AI as a leader? This article makes an initial contribution to this research question by examining the potential user's acceptance of the adoption of AI technology in organizational leadership.

## Theory

First, we define AI and present the latest studies about AI and leadership. At the end of the section we derive the research question and hypotheses for this article.

## Terminology of AI

Since there is no generally valid definition for human intelligence, there is no such definition for AI either. In research, a distinction is often made between 'weak AI' and 'strong AI'. Weak AI, sometimes also called narrow AI, relies on human interference to perform a specific and clearly defined task (IBM 2020), for example, to play chess. In this case, the weak AI had to be trained by a large data set of documented chess maneuvers, so that the algorithm can simulate the mind of a chess professional. On the contrary, strong AI, sometimes called broad AI, aims to develop a human-like consciousness that can perform various tasks that apply to many context-sensitive situations (Vorhies 2016). Just like humans, such AI would have a self-awareness that could not only solve but also teach itself to solve problems and make plans for the future (IBM 2020). However, the latter is controversial and not yet technically feasible (Buxmann and Schmidt 2019). As for this article, the focus will remain on the pragmatical weak AI within the defined context of organizational leadership tasks.

## AI and organizational leadership

According to a 2019 Gartner survey, 37 % of the world's companies have implemented AI in one or another form, which represents a 270 % increase over the previous four years (Costello 2019). The main reason is supposedly the advanced level of technology. Especially faster-growing companies want to increase the use of AI, and in particular for leadership tasks (Microsoft 2019). The time that human managers will gain through AI support, will be invested in motivating and inspiring their employees, identifying new market opportunities, and setting the right goals. Moreover, a Bain outlook predicts most teams will be self-managed by 2027, making many traditional management positions obsolete (Allen et al. 2017). On the employees' side, 40 % of 515 survey participants indicated that they would like an AI to assist their superiors whereas 30 % even trust the AI to replace them (Bitkom e.v. 2019). When it comes to replacing coworkers, however, only 17 % would want AI colleagues.

By discussing specific use cases, current application standards will be briefly introduced in the following. The AI that became a board member, as mentioned in the introduction, and referred to as VITAL, is an algorithm that has been introduced by Deep Knowledge Ventures, a Hong-Kong based venture capital (BBC 2014), focused on pharmaceuticals and medicine projects. The company hoped that the algorithm would be able to make investment recommendations regarding life science firms (Wile 2014). VITAL did so well that it earned a seat on the executive board with observer status (Burridge 2017). Klick, a company from Canada, has automatized most of its management and administrative processes to such an extent that it does not rely on a human resources department any longer (Moulds 2018). The algorithm streamlines the process of managing individuals and their daily activities, therefore providing full transparency and accountability. Since the AI has been reading data for more than 15 years, it has the potential to predict portfolio success. In another use case, the startup B12 builds websites with the help of an AI called Orchestra (Kessler 2017). As soon as clients place an order, Orchestra coordinates the project's whole workflow by generating chat groups, identifying both available and suitable team members, and assigning the work accordingly in the right order. The human workers are relieved of coordination and regular management tasks, thus, they can dedicate themselves to the technical side of the business.

But the topic of AI as managers must be treated with care because it also contains risk for potential discrimination when trained on biased data. The case of Amazon illustrates just how decisive this can be: due to a deficient training set, the AI recommended only male applicants for recruitment (Hamilton 2018). Risks and ethical concerns should therefore not be neglected. What is remarkable about all these application examples is that the function of the AI is usually in the foreground and little or no mention is made of the effects on the workforce and the journey to implementation. Instead, performance improvements and efficiency gains are usually communicated. Thus, the goal of this article is to take a first step and ask about employees' expectations and acceptance levels of AI in the area of organizational leadership.

## Acceptance and expectations of AI leaders

While 86 % of managers indicate that they would like to be supported by AI, especially for routine tasks (Kolbjørnsrud et al. 2016), other data show that only 8 % of firms engage in core practices that support the adoption of AI in the organization (Fountaine et al. 2019). Thus, there seems to be a gap between recognizing the potential of AI and implementing it. Reasons mentioned include, among others, the lack of trust towards the algorithm (McAfee and Brynjolfsson 2012).

Suitable for investigating expectations and acceptance of AI is the definition provided by Chismar and Wiley-Patton (2003) who define acceptance as the intention to adopt the application. Applied to the context of AI implementations, acceptance refers to the intention of employees and executives to adopt AI in leadership positions. From this, the main research question is derived as follows: *Which form of AI manager evokes the highest acceptance among employees and executives?*

User acceptance literature offers many models with different approaches on why and how people adopt information systems (IS) (Venkatesh et al. 2003). A seminal model in IS acceptance theory is the Technology Acceptance Model (TAM) proposed by Davis (1985), which conceptualizes the relationship between system design features and user acceptance. The popularity of the TAM stems from its understandability and simplicity (King and He 2006), making it well suited for this work. It contains definitions of two primary predictors:

- Perceived usefulness (PU): "The extent to which an individual believes that using a particular system would improve his or her job performance" (Davis 1985, p. 82).

- Perceived ease of use (PEU): "The extent to which an individual believes that the use of a particular system would system can be used without physical or mental effort" (ibid.).

The use of the TAM requires some type of external input, i.e., a system or scenario to which it can be related, a requirement that generally makes it difficult to assess system use in advance (Mathieson 1991).

In the light of the present research question, various scenarios would be conceivable based on the AI typology, e.g. assign tasks, or set goals (Weinkauf and Hoegl 2002). As mentioned before, cognitive assistants are today's most commonly used AI types in the corporate context, so they should be emphasized in the course of this research. Nevertheless, aspects of potential upcoming scenarios, such as autonomous AI manager variations, should also be included to anticipate future adoption considerations.



For our survey, we developed three scenarios with three kinds of AI managers d based on existing real world examples to best capture application areas relevant to research: (a) digital cognitive assistance in staff recruitment, (b) digital cognitive assistance in supervision, and (c) physical autonomous system in strategy. It is expected that potential users react differently to the scenarios, as they differ in their level of interaction, given the leadership task the AI is performing. Other than that, because of the various AI manager scenarios presented, different levels of know-how would be required of the user. Literature shows that companies are more likely to see the benefits of AI deployment if it is more known, understood, and appreciated (Adell 2010). The greater the gap between the previous and new state in the organization, the longer it takes individuals to get used to it (Chau 1996). Now, while AI managers as such are still unknown to most organizations, it is arguable that a physically and autonomously operating AI manager, in the shape of a robot, appears less familiar than other digital assistants already in use to some extent. As far as leadership tasks are concerned, individuals are constantly reminded that especially tasks that can be easily automated may be taken over by AI (Kolbjørnsrud et al. 2016; Odgers Berndtson 2019). In this sense, tasks like going through a large number of applications to find a suitable candidate would be considered more appropriate for AI than, for example, recording employee performance parameters to provide feedback. The following two hypotheses were developed accordingly:

Hypothesis 1: Mean differences in perceived ease of use between different scenarios are expected: digital cognitive assistants in staff recruitment have the highest, digital cognitive assistants in supervision have the second-highest, and physical autonomous systems in strategy the lowest perceived ease of use.

Hypothesis 2: Mean differences in perceived usefulness between different scenarios are expected: digital cognitive assistants in staff recruitment have the highest, digital cognitive assistants in supervision have the second-highest, and physical autonomous systems in strategy the lowest perceived usefulness.

## Method

Both hypotheses were operationalized in a questionnaire that was used to collect data on the acceptance and expectations of the participants regarding AI as a manager. The online questionnaire was created in German on the website of 'SoSciSurvey' and was built based on literature-based insights, already established instruments and the authors' own considerations. McDonald's omega coefficient will be used for all further reliability assessments in relation to the following statistical tests in this section. In addition, the used scenarios will be presented in this section.

### Sample

The questionnaire was distributed via various communication channels (LinkedIN, Xing, university mailing list, etc.).[1] The only requirement for participation in the survey was the ability to work. The sample was N = 74, including 34 women, 39 men and one participant who indicated a diverse gender. The mean age of the participants was 37.96 years (sd = 12.65). The majority of the participants were employed (72.97 %) whereas others were either civil servants (9.46 %), working students (8.11 %), or not working (6.76 %). 62.16 % of all respondents had academic degrees and 21.62 % were holding the German general qualification for higher education (Abitur). The most represented industry was the finance and insurance industry, accounting together for 29.73 %, followed by the IT industry with 17.56 %, and the educational sector with 12.16 %. The distribution of responsibilities in the sample is shown in figure 1.

### The questionnaire

This survey's focus was on individuals' expectations and acceptance of AI in a leadership context. The major challenge here, however, was that due to the lack of research in this area, it was not possible to draw on already established, psychometrically tested questionnaires. Nevertheless, to ensure adequate data quality, the approach taken was to use reliable questionnaires wherever possible. It is also worth mentioning that a brief definition of AI was given on the first page of the questionnaire to avoid misunderstandings.

In this article, we consider acceptance scores that result from applying the TAM1 and focusing on three different AI manager systems (see Hypotheses 1 and 2). After each scenario was described in detail, including visuals, acceptability was assessed using six items for each of the two TAM beliefs, derived from a translation of Davis' (1985 pp. 285–286) original questionnaire. The original seven-point Likert scale was retained unchanged. Reliability data are found in many applications of the TAM, in part because there are multiple versions of the model.

A total of 70 items were used for this online questionnaire. The average time for completion was 20 minutes.

1 Participants were informed in detail about the study and the protection of their data prior to the survey. A declaration of consent is available from each participant.

### Scenarios

The following three scenarios were used in this survey as a stimulus for questioning participants about AI managers. To formulate them, real use cases from the corporate landscape, like the ones mentioned earlier (VITAL, Klick, and B12), were used as inspiration.

1. Digital cognitive assistance in staff recruitment (inspired by Klick): AI is a special software in human resources to make objective decisions about staff recruitment. Besides, the AI can process all personal data obtained from the internet aggregated along with the application documents.
2. Digital cognitive assistance in supervision (inspired by B12): AI is a smart screen that supports the manager in recording and evaluating employee performance parameters to provide individual and true performance-based feedback.
3. A physical autonomous system in strategy (inspired by VITAL): AI in the form of a robot that supports the manager in strategic activities and delegates tasks accordingly. It also has voting rights and participates in strategic meetings.

In formulating the texts, particular care was taken to use objective rather than advertising language in order not to produce bias.

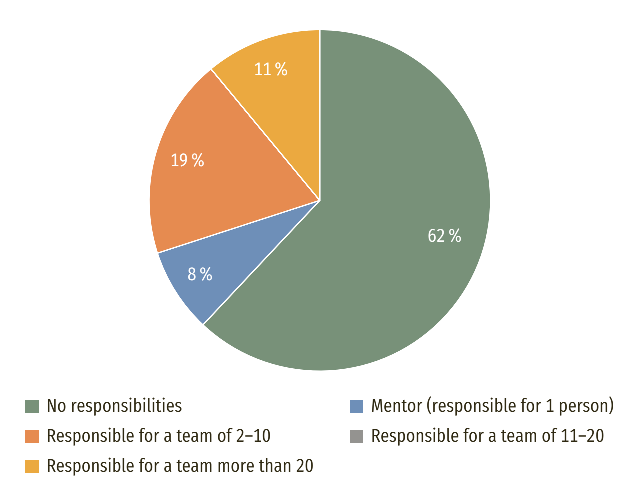


**Fig. 1:** Distribution of responsibilities in the sample.
*Source: authors' own illustration*

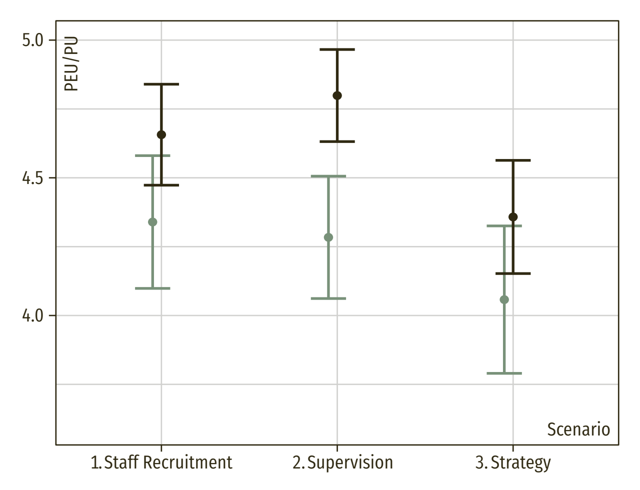


**Fig. 2:** Mean plots for perceived usefulness (PU; green/lower) and perceived ease of use (PEU; black/higher) for the three scenarios.
*Source: authors' own illustration*

## Results

The results of the quantitative analysis are presented in the first part of this section. To get an overview of the relationships between the researched constructs involved in this study, correlations were calculated. All pre-conditions of the following calculations were checked and fulfilled.

### Outcome variables: acceptance in terms of scenarios

At first, referring to hypotheses 1 and 2, a repeated analysis of variance (ANOVA) was performed to find differences in means among the three different scenarios regarding TAM acceptance. Note that the sample size varied among scenarios (n = 72 for scenario 1, n = 69 for scenario 2, and n = 66 for scenario 3) as not all respondents answered all questions. A separate ANOVA was calculated for perceived ease of use (PEU) and perceived usefulness (PU), respectively. There were significant differences between the scenarios in PEU (F-value = 6.58, $p = .002$) but not in PU (F-value = 1.42, $p = .245$). Therefore, hypothesis 2 is disproved at this point because no significant difference in PU was found among the scenarios. As for hypothesis 1, however, a pairwise comparison via post-hoc t-tests (statistical tests after an ANOVA which show which scenarios differ significantly from each other) was conducted to see which exact scenarios deviate from each other. A significant difference was found between scenarios 2 and 3 ($p = .0012$) but none between scenarios 1 and 2 ($p = .2589$) and scenarios 1 and 3 ($p = .1431$).

Consistent with hypothesis 1, scenario 2 has a higher mean value for PEU than scenario 3, which is even statistically significant, but scenario 1, although this was not significant, falls below scenario 2. Therefore, hypothesis 1 will be only partly rejected while PU was not found significant, even though the differences in mean values agree with hypothesis 2. Both TAM beliefs are supposed to make a joint prediction of acceptance or the intention to use AI managers. By adding up the individual scores for PEU and PU, one can see that scenario 2 had the overall highest acceptance among respondents, followed by scenario 1 and scenario 3. Aggregated for all scenarios, it was noticeable that PEU (M = 4.61, SD = 1.35) was rated higher on average than PU (M = 4.23, SD = 1.62), indicating that the overall ease of use of the scenarios presented here was more appreciated than the usefulness they could bring. This is visualized in the following figure 2.



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## Discussion

As expected, mean differences in TAM scores were found between all three scenarios introduced in the context of the framework. But contrary to the hypotheses, AI managers that support leaders with the supervision of their teams in the shape of digital cognitive assistants (scenario 2) scored overall highest acceptance values. Across all scenarios, ease of use scored higher than usefulness. There were differences in the results between the analysis of individual AI manager scenarios, the aggregated form, and analysis outside the TAM framework. This implies that potential users perceive a specific application as easier to use.

The fact that scenario 2-type AI managers have reached the highest acceptance levels despite some concerns about being heavily monitored shows the need of potential users for objective and data-driven supervision and feedback in organizations. Adopting this kind of cognitive assistants successfully will require decision-makers to foster the conviction of technological competence and the general openness to technology of the user base. With recruitment software, which in most cases would probably run in the background, or AI applications in senior management positions there would be less interaction with the majority of employees. Especially with a workforce that is on average older, one should well evaluate the existing affinity for technology before implementing interactive AI managers. The takeaway lesson for decision-makers is that involving topics not related to job tasks, such as salary and working conditions (Buitendach and Rothmann 2009), can contribute to acceptance of AI in organizational leadership and should not be neglected. This could be especially advantageous because decision-makers might have more control over these external mechanisms than over intrinsic aspects (e.g. identification with the work).

Our survey recognized several tendencies that may not have become significant because of the relatively small sample size. These potential influences need to be researched more in-depth in future works. It could also be challenged whether the scenarios, which were used as hypothetical reference systems, were adequately chosen for this research. In this sense, it would also be conceivable to change the number of scenarios or introduce them more profoundly. Given that they are purely hypothetical, this could make them more tangible, allowing for a more extensive analysis. Most IS research that used TAM frameworks was based on real use cases (Baharum et al. 2017). Even though reliability values were overall satisfactory, the question arises of how well the constructs have been measured by the questionnaire used here.



## Conclusion

This work has made an initial contribution to helping decision-makers determine which factors influence which forms of potential AI managers and how. It was found that the most important influence factors on AI acceptance are a certain level of proficiency in technology and the concrete layouts of AI managers, such as the level of interaction, while strong differences between the different hypothetical use cases were found. These preliminary results now need to be confirmed in a broad study.

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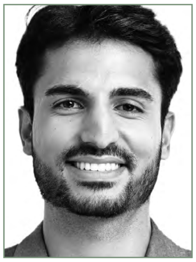

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