Artificial Intelligence on Impact Assessment: a preliminary study of perception and use

1. Introduction

IA a legal tool in force in Brazil since 1986, when Resolution CONAMA 1/86 was proclaimed. There are other laws for IA, like Resolution CONAMA 237/97. CETESB is the agency responsible for IA review in São Paulo state since 2009, when it took this role from State Environment Secretariat. As any other tool, IA has been evolving with new data, information, laws and tools.

A significant new tool is Artificial Intelligence – AI. It is not new at all, once it has been used in environmental tasks, like monitoring and data analysis (Cortés et al, 2000), but ince November 2022, with ChatGPT launch, it was the first time that an AI tool got available for public. AI tools development has increased a lot, in a way that it may be considered a disruptive technology. AI promises perform tasks in a cheaper, faster or better way (Gurstein, 1985; Khan and Nawaz Chaudhry, 2023).

AI is now widespread and changing everyday tasks. In Impact Assessment - IA, the increasing application of AI, specifically chatbots, has led to IAIA beginning the task of developing best practice principles for the use of AI (Bond et al., 2024). Authors have begun to refer about the potential uses and future of AI in IA (Himeur et al, 2022, Khan and Nawaz Chaudhry, 2023, Sandfort et al., 2024).

Considering AI adoption on routine, this paper brings a preliminary qualitative study of how IA practitioners are using AI tools, what they think about its use and what are their plans to begin to use it.

2. Methods

To find out how AI tools are being used by IA practitioners, a questionnaire was developed in Google Forms. Firstly, there are questions about profile. After this, there are specific questions about general perceptions of AI tools. Next section is a 3-way conditional: if practitioner already uses AI on IA; if still does not; or if has used but left. Depending on this, the Form directs for other specifics questions. Lastly, there is a textbox for comments.

The questionnaire, in general, has a closed-ended multiple choice questions approach. When needed, there are yes/no questions, open-ended questions with checkboxes and textboxes.

For general perceptions, most questions use a Likert Scale, rated from 1 to 5 (from the least to the most). In other sections, there are multiple choice questions with single best answer or checkbox for selection of multiple options.

The questionnaire was sent by e-mail for practitioners, chosen to cover different stakeholders, roles (reviewers, coordinators, directors, researchers) and backgrounds, to get a representative sample. Most of it is made up of experienced professionals from medium to large-sized companies, which could bring better understanding of AI in IA.

3. Results and discussion

Responses

We have sent the questionnaire for 67 practitioners, with received 42 answers, so response rate is 63%. Although the sample is not large, the response rate may be considered high, once response rate for online questionnaires is about 44% (Wu et al, 2022).
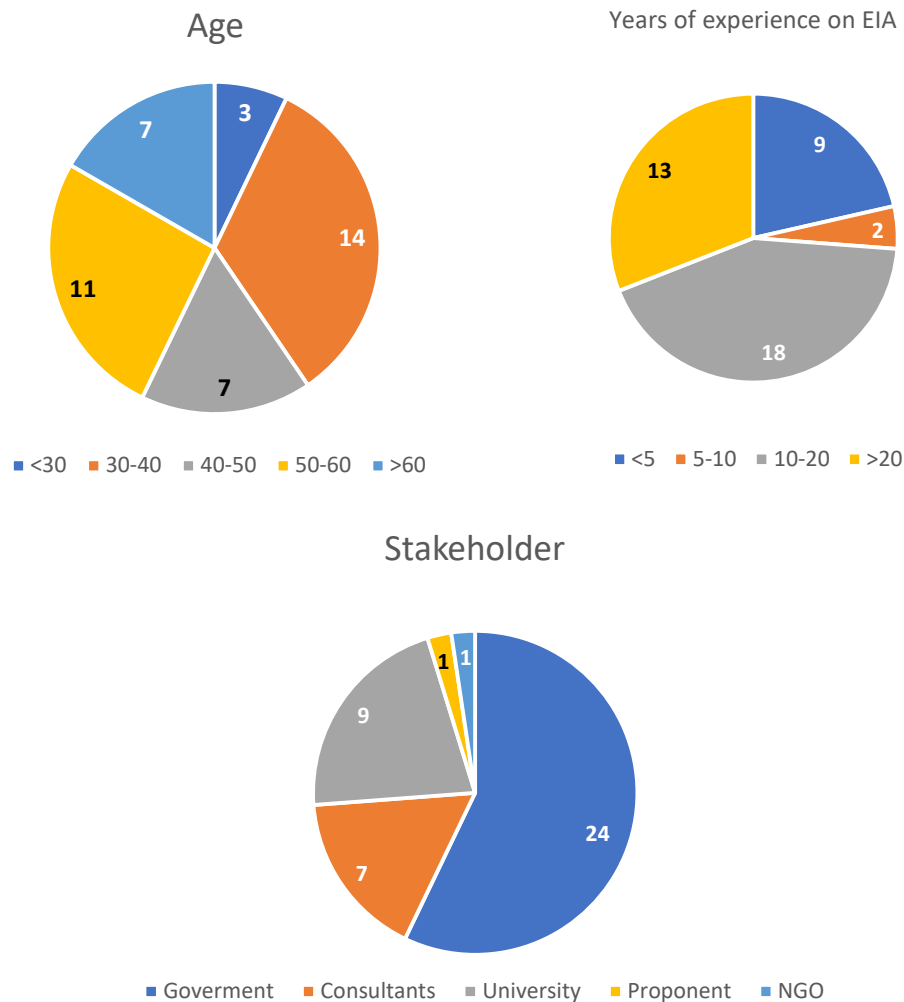
Profile

Figure 1. Profile of respondent practitioners

Age range is diverse, most of respondents between 30 to 50 years. The sample has a large experience on IA activities, most with more than 10 years. They also have high educational levels, being 38 of 42 (90%) with at least some post-graduation degree. Considering the highly experienced and educated respondents, from diverse backgrounds, the sample may be representative of IA practitioners, once it is a preliminary study.

AI familiarity and knowledge

To assess the respondent's perception and knowledge of AI tools, the questionnaire included seven questions in Likert Scale, from 1 to 5, from the least to the most. From 42 respondents, 30 said that have already used at least one type of AI tools, for non-professional purposes. Table 1 summarizes results from the Likert scale questions:

Table 1. Summarized familiarity and knowledge with AI tools.

Question	Average rating	Modal rating
1.Familiarity level with AI tools	2.60	2
2.May AI tools help and impact positively on IA tasks?	3.76	4
3.May AI tools help and effectively change IA practice?	3.48	3
4.Do AI tools pose risks to activities and everyday tasks?	3.12	3
5.Do AI tools will impact on job opportunities in IA?	2.90	3
6.Is your job in risk due AI tools use?	1.69	1
7.Are you favorable to AI tools use in IA activities?	3.74	4

Respondents are trying to embrace AI tools, considering that most of them have already used or at least tried a non-professional use. Tools cited include ChatGPT (more popular), Co-pilot, Gemini, Bardy, Jasper, Jenni, Scispace, DeepSeek and image creators. They are also confident about AI capabilities, considering higher ratings for questions 2, 3 and 7, which rate confidence about AI helping on IA, and a lower rating for question 6, showing that practitioners think AI may be a helpful tool, not just a replacer of professionals for machines.

In the other way, respondents have a below average level of familiarity about AI tools (question 1) and have some fears about risks (question 4). Question 5 shows that most of respondents are few confident about AI impact on job opportunities, once rating is below average (2.90) and modal rating 3 (intermediate level) had 24 answers of 42, the highest number of answers in any modal of questionnaire, showing that was a trick question.

AI on IA activities

The questionnaire had questions about the use of AI tools, for any purpose. Table 2 shows how the 42 respondents are using AI (or have never done so).

Table 2. Number of AI users, by purpose.

Are using AI?	Purpose	Amount
No	-	12
Yes	Just personal	15*
	Just professional	1
	Personal and professional	14

* includes 2 respondents that have stopped using for professional purposes

At first, it shows a large difference: 30 in general respondents said that use AI, but from them, 15 use AI for only for personal purpose and the other 15 (14+1, from bottom lines) said that use them for professional purposes too. It is a large difference. Some comments on the last question, a textbox for free writing, may help on understanding this. In free translation, a comment said "by now, I have low familiarity with AI for using it in a safe and efficient way at work". Other comment: "for me it is not clear how can I use AI in my job". Another comment, summarized, says that the reviewers' jobs are important to avoid AI creating distorted analyses.

Although there were just 12 comments on all responses, 7 of them with positive sentiment and none totally negative (checked manually!). The comments above show that some professionals may wish to implement AI on their routine tasks, but are still not confident about safety, efficiency or even applicability of AI. There are many possible answers for this. AI is still a novelty for many and it is not regulated at all. As all new

technologies, AI will need a time to be adopted and mature. AI likely was adopted up to now only by innovators and some early adopters. There is a long path ahead for AI.

From the 15 respondents that are currently using AI at work, 9 said that it made their tasks easier or faster; 11 wish to increase AI use and the other 4 are not sure about it; nobody answered "no" for increasing use. Considering these numbers, it is possible to say that AI tools benefits on IA are not a consensus among practitioners, but even those that do not consider AI made work easier may be open-minded for using future improved tools, once no one answered that do not wish to increase AI.
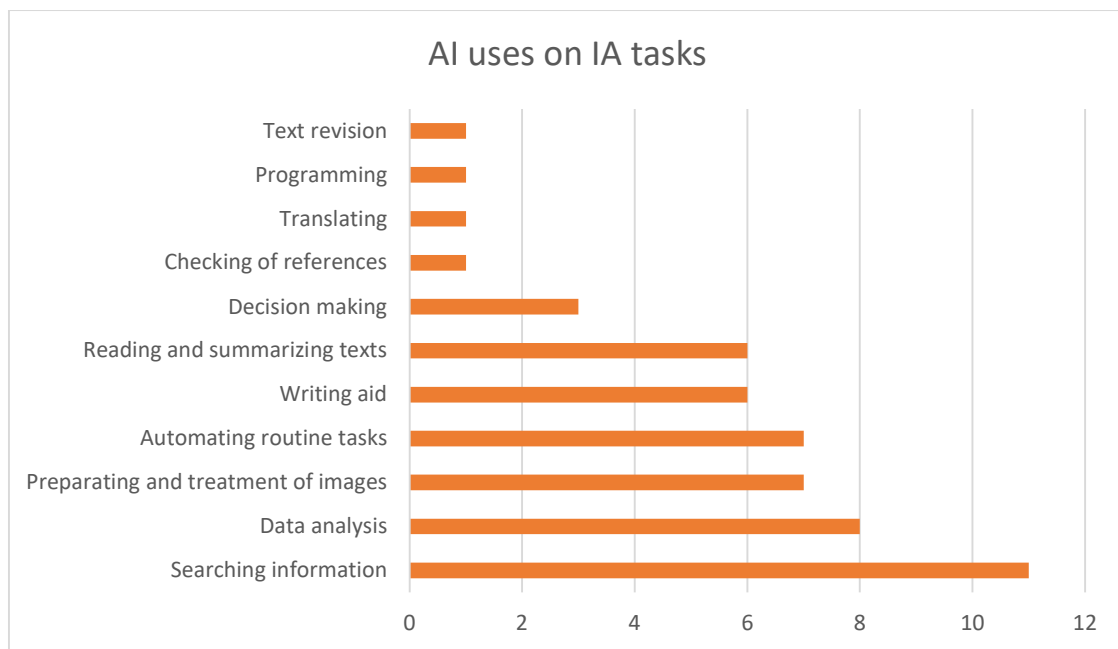

Figure 2. Uses of AI on IA activities

The tools used on IA were the same cited for non-professional uses, with additional answers: Random Forest, SVM and Scispace. The 15 respondents answered for which tasks they are using AI, checking all that applied. The most common was "searching information", likely replacing regular search engines like Google. Images treatment, data analysis, automating and writing aid were also important uses. These are very common uses for AI.

Two respondents said that no longer use AI on IA activities. They are counted for the "just personal uses". Due low number of answers for this situation, few conclusions can be taken. Anyway, the reason cited for stopping use was "inaccurate results". The previous uses were "writing aid" and "searching information". As a new technology, AI still has many gaps on accuracy and these reasons may apart professionals from using it. Even though, the two respondents said that wish to resume use of AI. Considering that some practitioners may be just waiting for AI improvements, it is very likely that the main reason for leaving use was the current lower tool accuracy.

From the 25 respondents that still do not use AI (12) or just use it for personal reasons (13), when asked if they wish to begin to use it at work, 2 answered "no", 9 "yes" and 14 "not sure". These numbers are like other findings in this study, showing uncertainties on AI use, some professionals avoiding implementing it, even with the wish so. In the technology curve lifecycle, the "yes" respondents are likely the early majority adopter and the "not sure" are the late majority. They may be professionals that wish to adopt AI on their tasks but are seeking improvements on safety and accuracy.
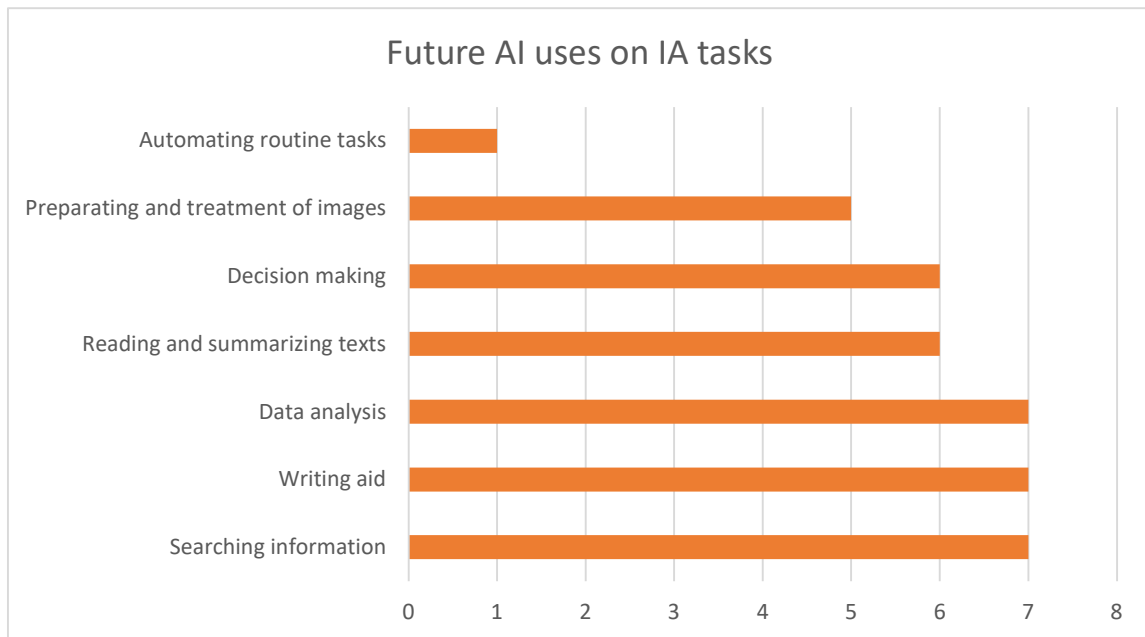
Future AI uses on IA tasks

Task	Value
Automating routine tasks	1
Preparing and treatment of images	5
Decision making	6
Reading and summarizing texts	6
Data analysis	7
Writing aid	7
Searching information	7

Figure 3. Cited uses of AI on IA activities for respondents wishing to being to use AI.

The tasks these respondents wish to implement AI are like those who are already using AI. Those who are still to implement AI use in routine wish it as an aid to make tasks easier or faster.

Lastly, considering general comments for the last question, respondents are confident about the potential of AI, although a little skeptical by now, due existing gaps and uncertainties.

4. Conclusions

As in other activities, AI has begun to be applied in IA tasks. The sample of respondents is representative for this study and shows preliminary results of AI perception and use. Early adopters have already adopted it and some wish to increase AI use, but it has not brought significant changes in IA practice up to now, as just some have adopted it, mostly in a limited way.

It was possible to check that many are willing to start to implement AI in their IA practice but probably have fears about AI and do not wish to be "first ones". Only half that said to have used AI also admitted that use in their IA activities. They likely will be part of late majority to adopt AI as a regular technology. Comments made in textbox mention main reasons as inaccuracy and safety concerns, similar to concerns found by Khan and Nawaz Chaudhry (2023). But in this study, respondents had a more positive view of AI.

It was not possible to confirm, once the questionnaire was not made for it, but comments made and AI tools cited (most are free), suggest that AI use in IA is still an individual decision and not a corporate policy. Regulation and development may help on it, bringing AI into routine.

Considering CETESB routine, the use of AI may be evaluated to find possible improvements in company projects and in IA tasks to be faster and more efficient. For this and general use in IA, it will be necessary consistent flow tiers for correct validation of results by reviewers and adequate use.

It is important to say that IA is a legally consolidated tool in Brazil and has clear rules. As AI is still novelty for many with lack of regulation, besides Brazilian Congress attempts to do so, these may be a barrier to a wider AI incorporating in the IA routine.

5. Disclosure/disclaimer

The authors have no conflict of interests. They are favorable to AI and think it may help to improve IA practice. But this paper was written in old school way, as they believe that critical thinking is essential in IA and research.

References

Bond, A; Cilliers, D; Retief, F; Alberts, R; Roos, C.; Moolman, J. 2024. Using an Artificial intelligence chatbot to critically review the scientific literature on the use of Artificial intelligence in Environmental Impact Assessment, Impact Assessment and Project Appraisal, 42:2, 189-199

Cortés U, Sànchez-Marrè M, Ceccaroni L, R-Roda I, Poch M. 2000. Artificial intelligence and environmental decision support systems. Appl Intell. 13(1):77–91.

Gurstein M. 1985. Social impacts of selected artificial intelligence applications: the Canadian context. Futures. 17 (6):652–71.

Himeur, Y., Rimal, B., Tiwary, A., & Amira, A. (2022). Using artificial intelligence and data fusion for environmental monitoring: A review and future perspectives. Information Fusion, 86- 87, 44-75.

Khan M, Nawaz Chaudhry M. 2023. Artificial intelligence and the future of impact assessment. SSRN Electron J. Available at SSRN 4519498.

Sandfort, R., Uhlhorn, B., Geissler, G., Lyhne, I., & Jiricka-Pürrer, A. (2024). AI will change EA practice – but are we ready for it? A call for discussion based on developments in collecting and processing biodiversity data. Impact Assessment and Project Appraisal, 42(2), 200–208.

Wu, M-J; Zhao, K.; Fils-Aime, F. 2022. Response rates of online surveys in published research: A meta-analysis. Computers in Human Behavior Reports, v. 7, 100206