Conference Paper Title*

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***Abstract*—Adoption of AI systems has been widely used across multiple industry domains at an alerting rate without the focus on it's ethical concerns. To address those concerns, there are an increase number of AI ethics frameworks that have been suggested recently that focus on the algorithmic level rather on the systems level. Nonetheless, some of the system level approaches developed mostly cover a single level governance pattern of the system components in the entire software design lifecycle. However, the need to go beyond the single level system design AI ethics frameworks to allow not only a better responsible-AI-by-design, but also a trustworthy process patterns that abstract and link the underlying layers of responsible AI on each and every level. This paper illustrates a principal-to-practice guide of the multi-level governance within organizations across the globe for AI ethics frameworks. We outline three main areas of gap in organizations for AI ethics frameworks. Consecutively, we propose a multi-level governance pattern for responsible AI systems within organizations which is participatory, iterative, flexible and operationalizable that target those three main gap areas. Finally, to assist practitioners to apply the multi-level governance AI in organizations and the impact that it has on the industry level, we will translate into effective and responsible AI practices.**

***Index Terms*—AI, AI ethics, trustworthy AI, AIMLOps, AIOps, software engineering, software architecture, pattern, best practice**

I. Introduction

Aritificial Intelligence (AI) reshaped our lives, helped people make better predictions and take more informed and wise decisions. However, these high tech are still in there infancy, and there remains much promise for AI to promote innovation and address global challenges that people face.

Consecutively, ethical concerns and anxieties are fuelling around AI [1]. There are lots of enquiries on the trustworthiness and adoption of AI systems, including concerns about exacerbating inequality, digital divide, climate change and market concentration. Additionally, there are concerns that the use of AI may compromise human rights and values such as privacy. To address these concerns and ensure the responsible development and use of AI, a collaborative effort involving multiple stakeholders and international cooperation issued guidelines and ethical principles. Despite the creation of ethical guidelines for AI development inside organization, it can be challenging for developers to apply these principles in practical situations. These principles are often abstract and may not provide clear direction for specific implementation [2]. Therefore, more specific and actionable guidelines are needed to assist developers in implementing ethical considerations in their AI systems. It is important to bridge the gap between ethical principles and the algorithms used in AI systems to ensure responsible development. However, The architecture of an AI ecosystem consists of three layers: AI software supply chain, AI system, and operation infrastructure. It is challenging to show the contribution of each.

One work that was proposed is Responsible AI Pattern Catalogue [3], which takes a pattern-oriented approach to promoting responsible AI in practice. Instead of solely focusing on ethical principles or AI algorithms, this catalogue focuses on design patterns that practitioners can apply to ensure that their AI systems are responsible throughout the software development process. The catalogue is organized into three categories: 1) governance patterns to establish multi-level governance, 2) process patterns to establish trustworthy development processes, and 3) product patterns to integrate responsible design into AI systems. In addition, it focuses on all aspect of the ecosystem (Industry-level, Organization-level and Team-level) without the planning of the design and the developement tools to support the navigation and utilisation of the Responsible AI pattern catalogue.

In this paper, we take a different approach by focusing on the organization-level patterns at the system level rather than just the ethical principles or AI algorithms. This approach aims to integrate responsible design in organizations into final AI products by looking at the bigger picture and the design patterns that shape the system as a whole. This is done with the intention of bridging the gap between the organizational-level and team-level and facilitating navigation. We start off by looking at the main three levels of an organization with the addition to the team-level and examine the current available methods [5]–[9]. Then we make the links on where those methods meets and create the best practices using the multi-level governance patterns at the organization level. The overarching research question that has guided

this study is:

What is the multi-level governance pattern proposed for responsible AI systems within organizations?

The main contributions of this paper are as follows:

- Find the link between Team-level governance patterns with the Organization-level patterns.
- Suggest navigation and utilisation Team-level governance patterns with the Organization-level patterns.
- Explore a case study that suits this type of multi-level governance pattern.

II. Methodology

To build up the links of the multi-level governance for responsible AI systems within organizations, we performed a systematic combinations of organization-level and team-level governance to collect patterns. Figure illustrates the transition from the traditional approach to the new approach.

A. Maintaining the Integrity of the Specifications

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Number equations consecutively. To make your equations more compact, you may use the solidus (/), the exp function, or appropriate exponents. Italicize Roman symbols for quantities and variables, but not Greek symbols. Use a long dash rather than a hyphen for a minus sign. Punctuate equations with commas or periods when they are part of a sentence, as in:

$$a + b = \gamma \tag{1}$$

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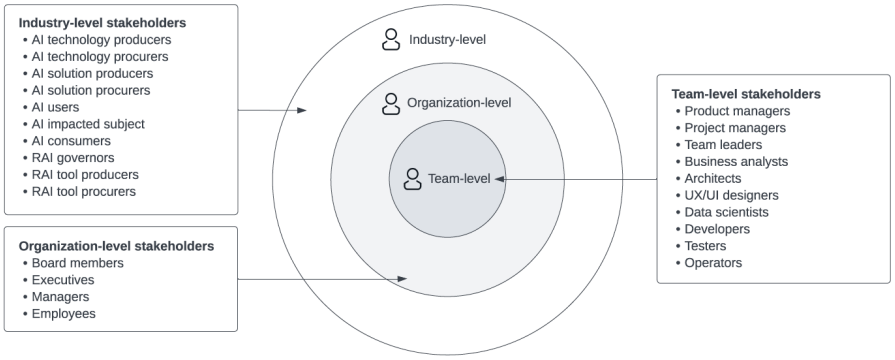

Fig. 1. Transition from traditional to the current approach

a `\label` command should not go before the caption of a figure or a table.

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TABLE I
TABLE TYPE STYLES

Table Head	Table Column Head		
	Table column subhead	*Subhead*	*Subhead*
copy	More table copy[a]		

[a]Sample of a Table footnote.

Fig. 2. Example of a figure caption.

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader. As an example, write the quantity "Magnetization", or "Magnetization, M", not just "M". If including units in the label, present them within parentheses. Do not label axes only with units. In the example, write "Magnetization (A/m)" or "Magnetization {A[m(1)]}", not just "A/m". Do not label axes with a ratio of quantities and units. For example, write "Temperature (K)", not "Temperature/K".

ACKNOWLEDGMENT

The preferred spelling of the word "acknowledgment" in America is without an "e" after the "g". Avoid the stilted expression "one of us (R. B. G.) thanks ...". Instead, try "R. B. G. thanks...". Put sponsor acknowledgments in the unnumbered footnote on the first page.

REFERENCES

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