

**NO JUSTICE
NO PEACE**

Chapter 6.2: SE Ethics

TOPICS: ETHICAL IMPLICATIONS OF REQUIREMENTS - PROCESSES FOR ASSURING ETHICS



Technology

ChatGPT wrote code that can make databases leak sensitive information

Six AI tools, including OpenAI's ChatGPT, were exploited to write code capable of damaging commercial databases – although OpenAI appears to have now fixed the vulnerability

By [Jeremy Hsu](#)

25 October 2023

ChatGPT is making up fake Guardian articles. Here's how we're responding

Chris Moran



NEWS 8 NOV 2023

Predator AI ChatGPT Integration Poses Risk to Cloud Services

PLATFORMER / MICROSOFT / TECH

Microsoft lays off team that taught employees how to make AI tools responsibly



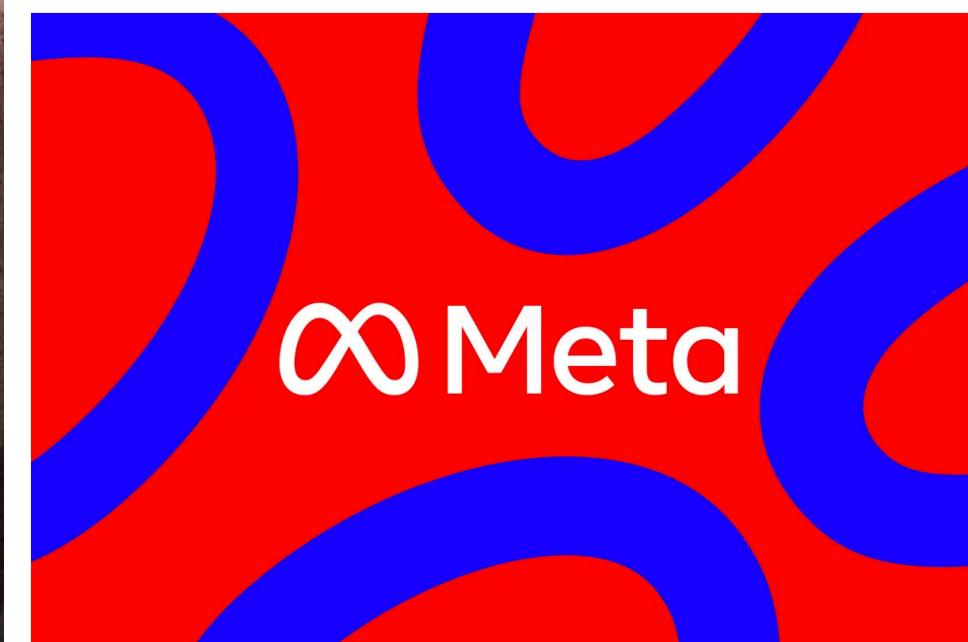
/ As the company accelerates its push into AI products, the ethics and society team is gone

By [Zoe Schiffer](#) and [Casey Newton](#)

Mar 14, 2023 at 1:15 AM GMT+1 | [24 Comments](#) / [24 New](#)

TECH / META / ARTIFICIAL INTELLIGENCE

Meta disbanded its Responsible AI team



/ A new report says Meta's Responsible AI team is now working on other AI teams.

By [Wes Davis](#), a weekend editor who covers the latest in tech and entertainment. He has written news, reviews, and more as a tech journalist since 2020.

Nov 18, 2023 at 10:24 PM GMT+1 | [21 Comments](#) / [21 New](#)



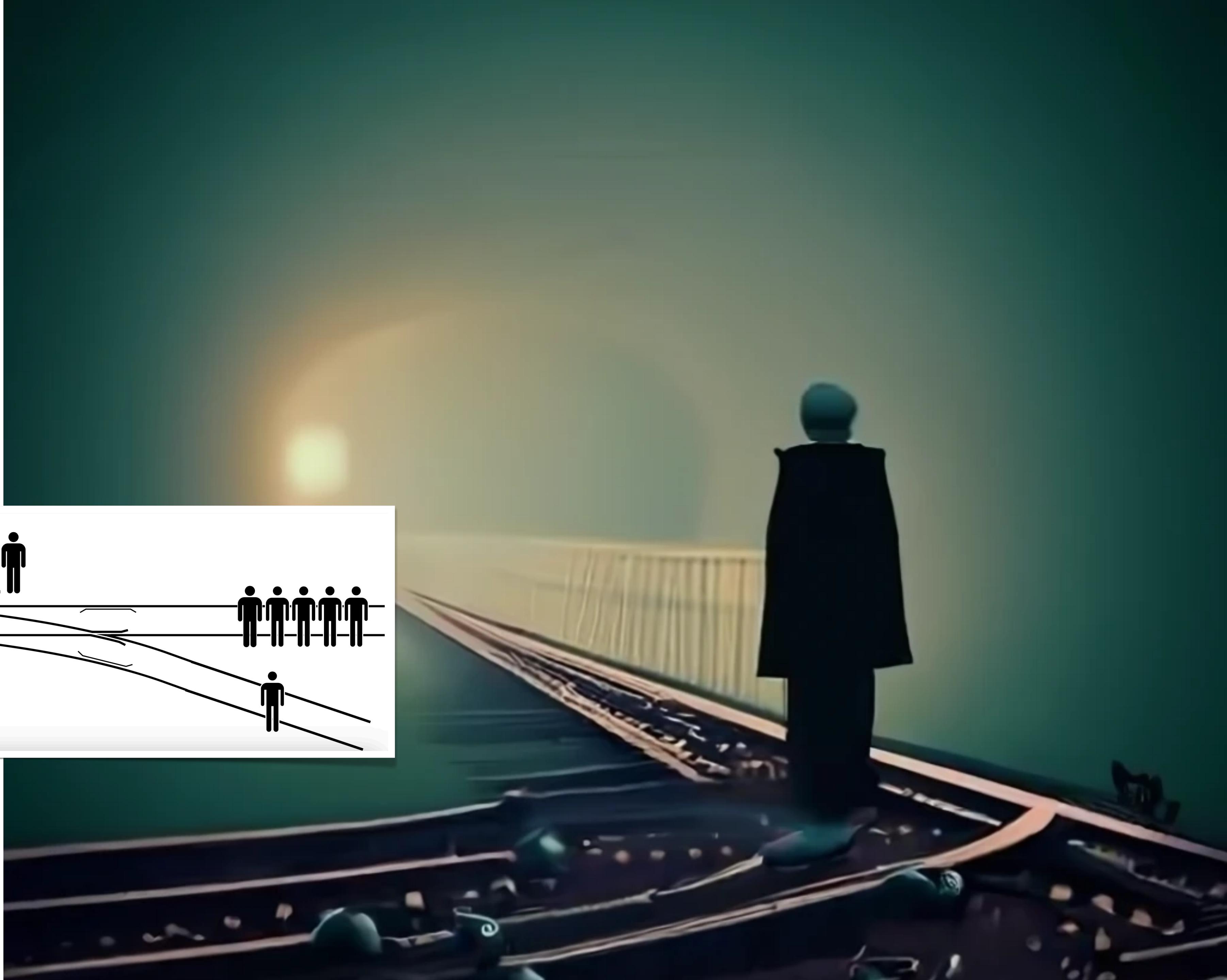
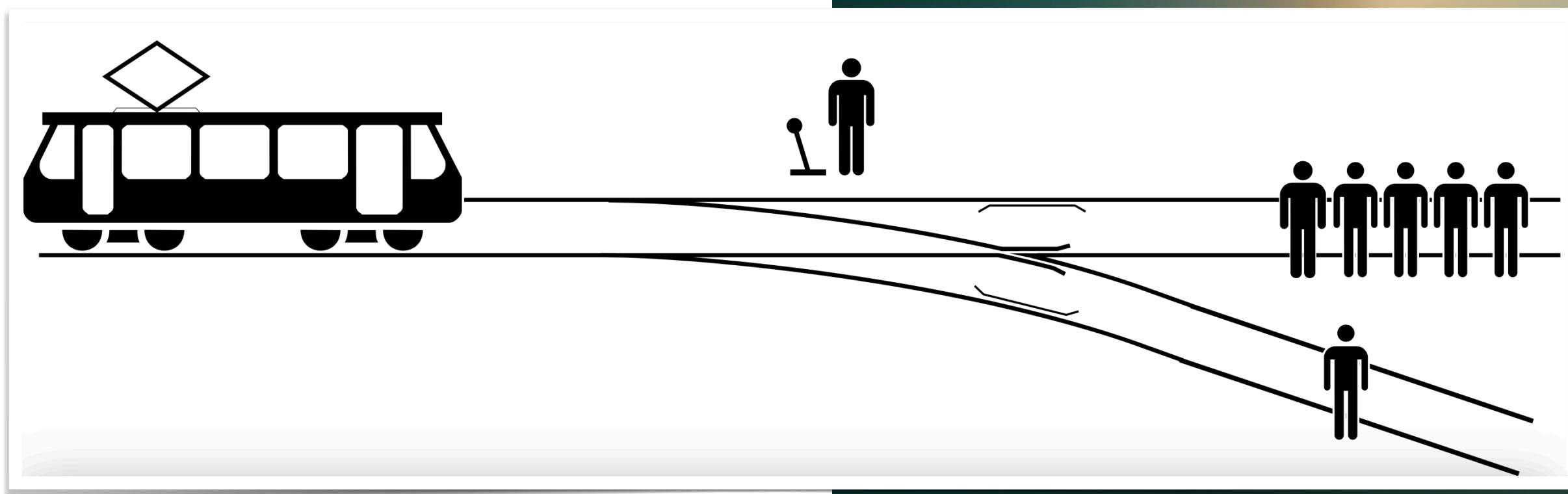
Important Disclaimer:
Today is **not** about defining right or wrong.
It's about understanding that **different positions** exist
and learning how to debate them.

Morality: Behavior of Individuals

Ethics: Discourse of Morality

Regulation: Fixation (implying enforcing) of Morality

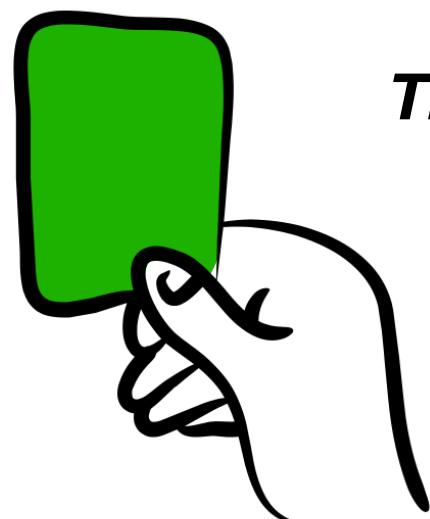
So, what's right?



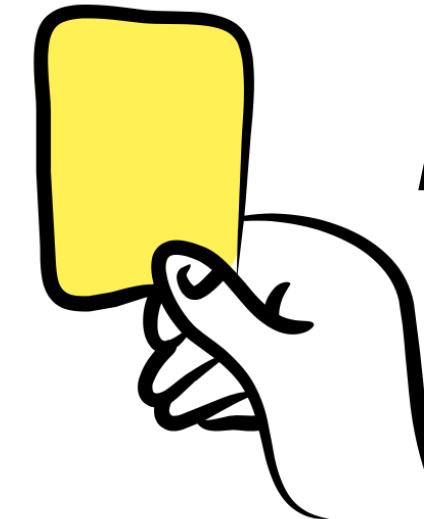
- *Utilitarian ethics* helps collect and judge positive and negative outcomes (synonyms: benefits and harms) in a broad and egalitarian manner. They ask: “What benefits or harms would arise if everyone were to build and/or deploy the SOI in the way we envision it?”
- *Virtue ethics* focus on system effects on individuals’ habitual character and wellbeing; in particular they ask for virtues affecting one’s role in a community: “What are the effects of the respective SOI for the virtues of stakeholders affecting their community behavior?”
- *Duty ethics* tap into the responsibility of stakeholders by calling for the use of value priority judgments (personal maxims) and refraining from the use of people as means only. They ask: “What are the potential personal value maxims that can be undermined or fostered by the respective system?” Duty ethics are also important for prioritizing values identified.



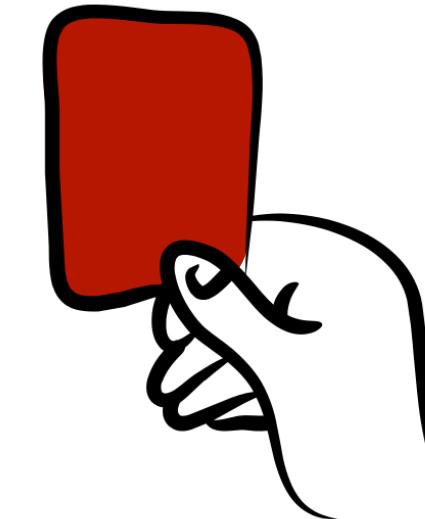
As a google user,
I want to be able to play a Les-Paul-Guitar from my search window,
so that I become interested in the life story of
Lester William Polsfuss.



means
This requirement does not require an ethics discussion.



means
I'm unsure.

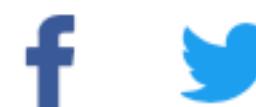


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As a google user,
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Lester William Polsfuss.

Google's Les Paul guitar doodle may have cost \$268 million in lost productivity

Updated: Mar. 22, 2019, 9:56 p.m. | Published: Jun. 17, 2011, 5:56 p.m.



By [Geoff Herbert](#) | gherbert@syracuse.com



Google The June 9

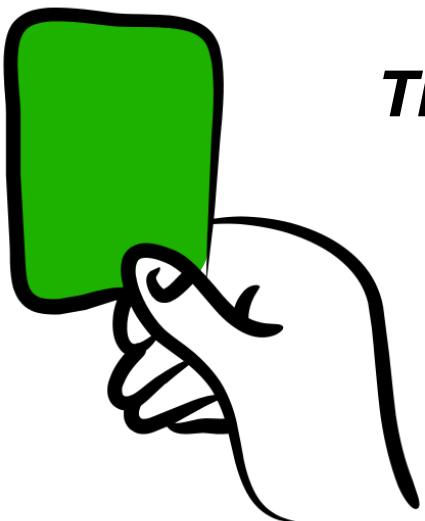
Google Doodle honored guitar innovator Les Paul's 96th birthday.

Last week, Google's homepage featured an [interactive guitar](#) honoring Les Paul. It played 10 notes, starting with a low G and climbing up to a high B. Users could literally play the guitar by dragging their mouse over the image's strings or use the keyboard to play each note.

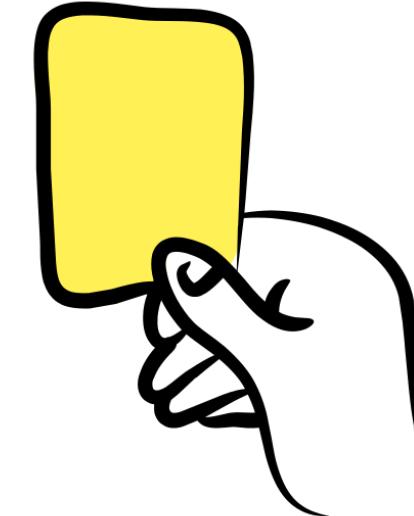
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Get top local stories in your inbox
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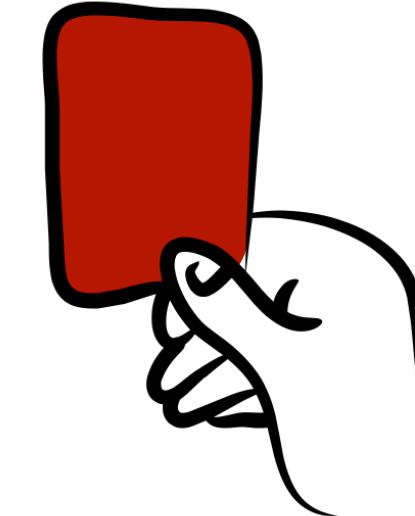
As a twitter user,
I want the system to crop my pictures automatically,
so that my timeline looks nicer.



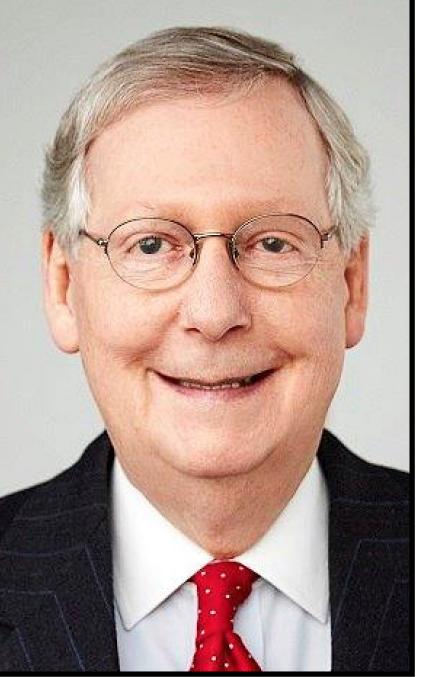
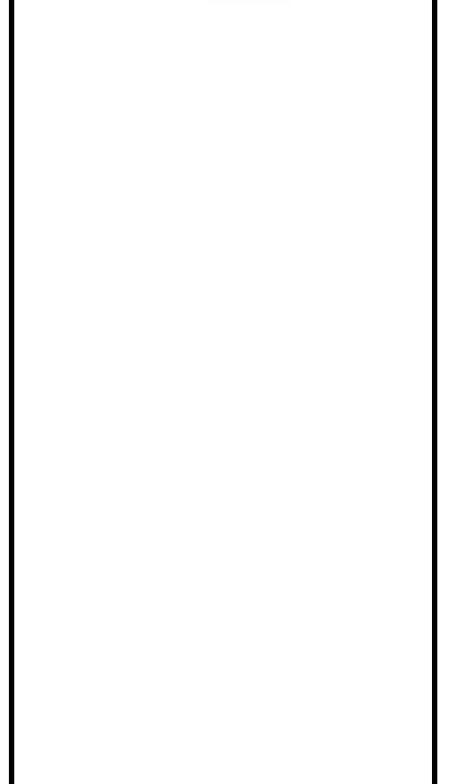
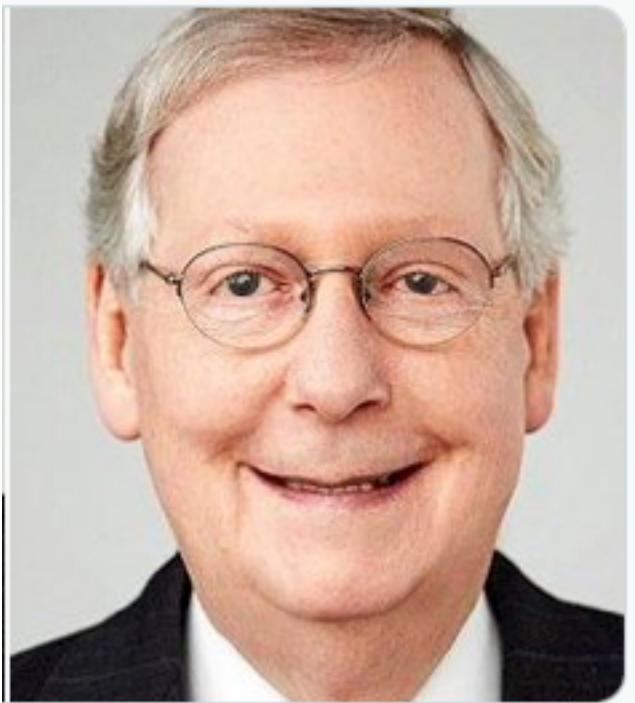
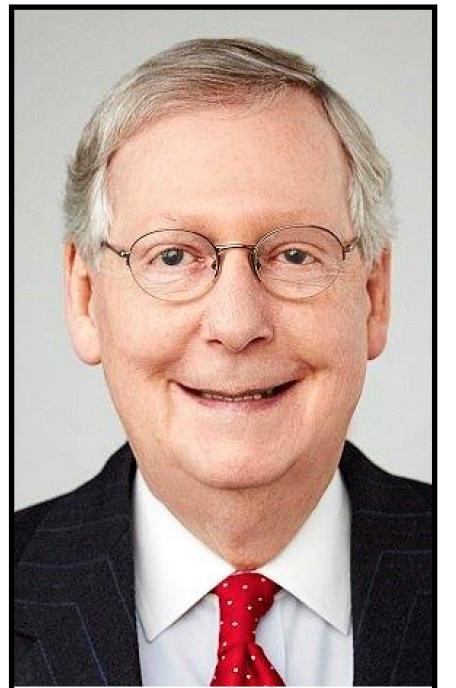
means
This requirement does not require an ethics discussion.



means
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means
This requirement requires an ethics discussion.



Twitter no longer crops image previews on the web

Aisha Malik @alishamalik1 6:29 PM GMT+1 • November 11, 2021 Comment

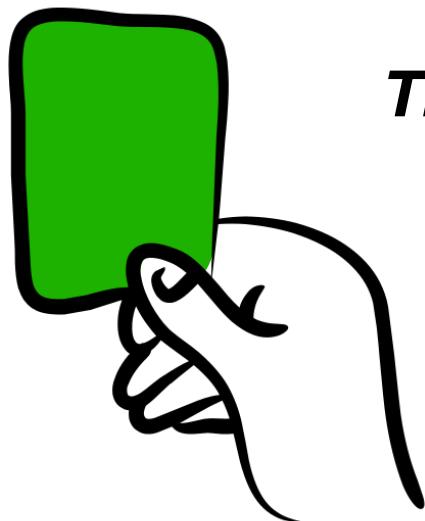


Bryce Durbin / TechCrunch

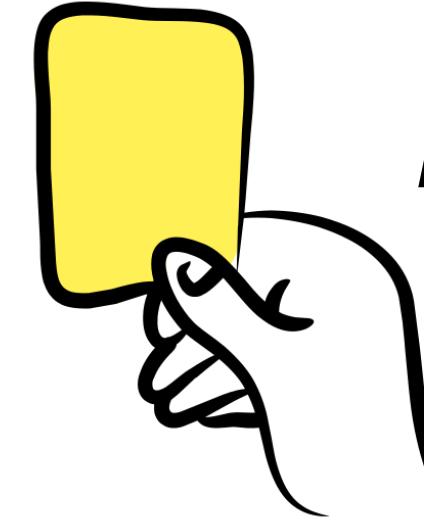
Image Credits: Bryce Durbin / TechCrunch

As a twitter user,
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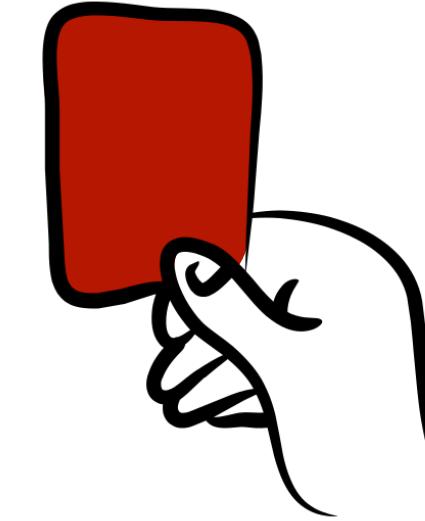
As a robot customer,
I want that the system is able to autonomously walk and run,
so that it does not fall over under unforeseen circumstances.



means
*This requirement **does not** require an ethics discussion.*



means
I'm unsure.



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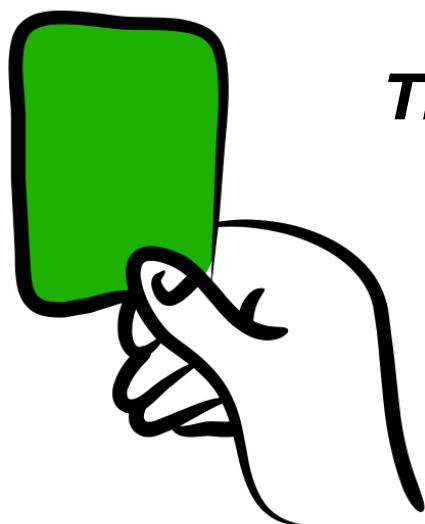


Boston Dynamics

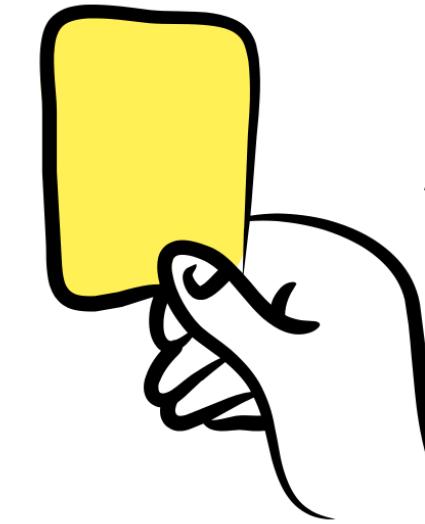
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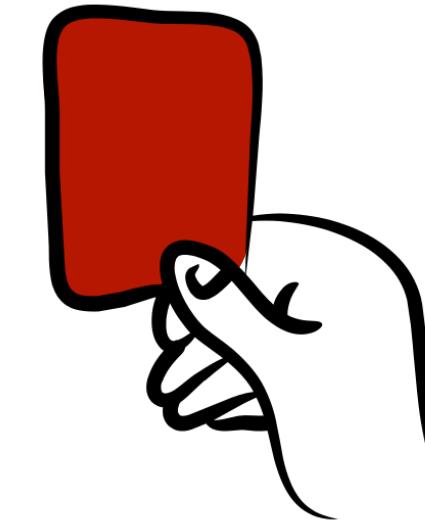
"As a Microsoft translate user,
I want that the system translates my text to the most probable translation,
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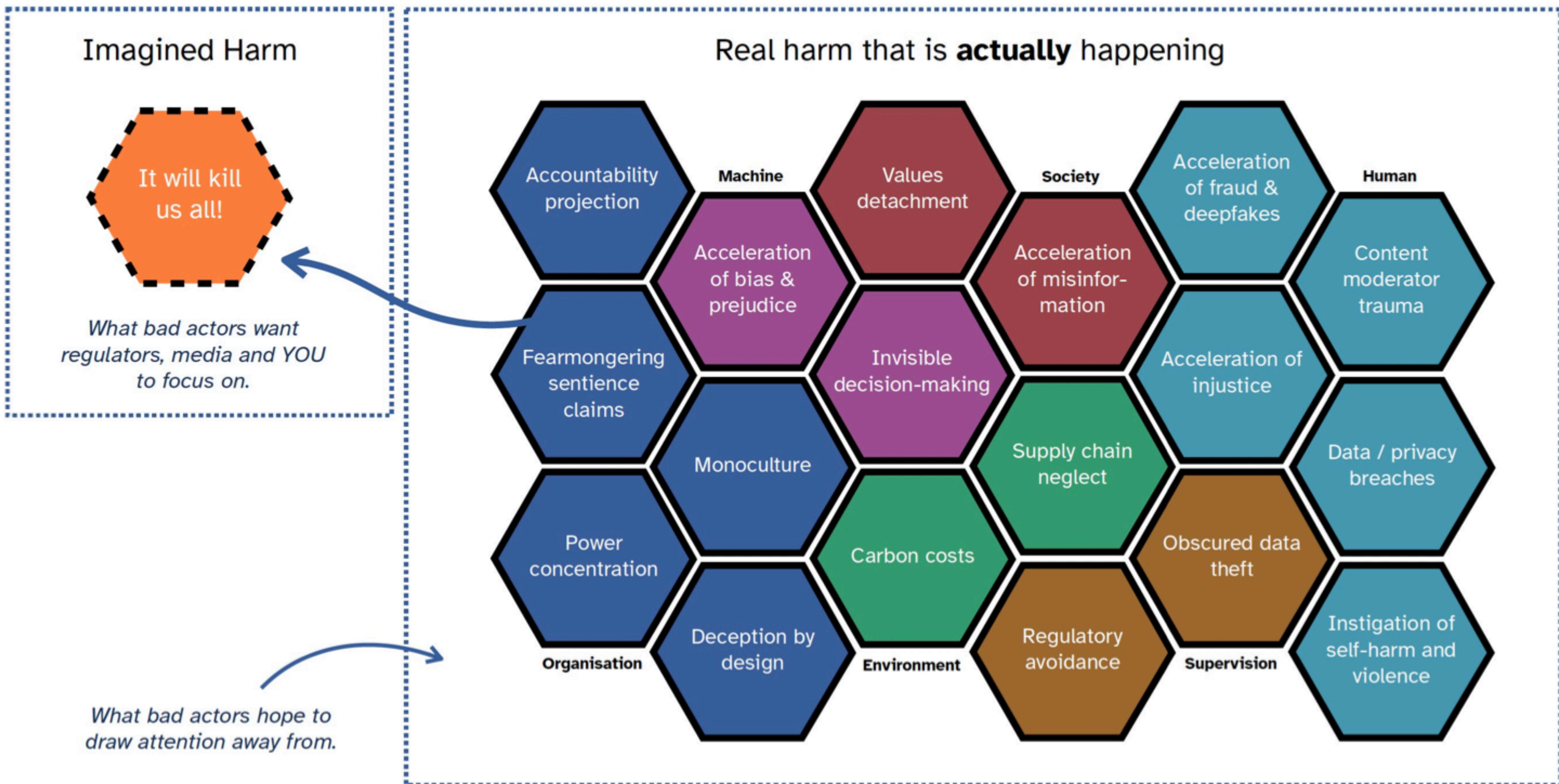


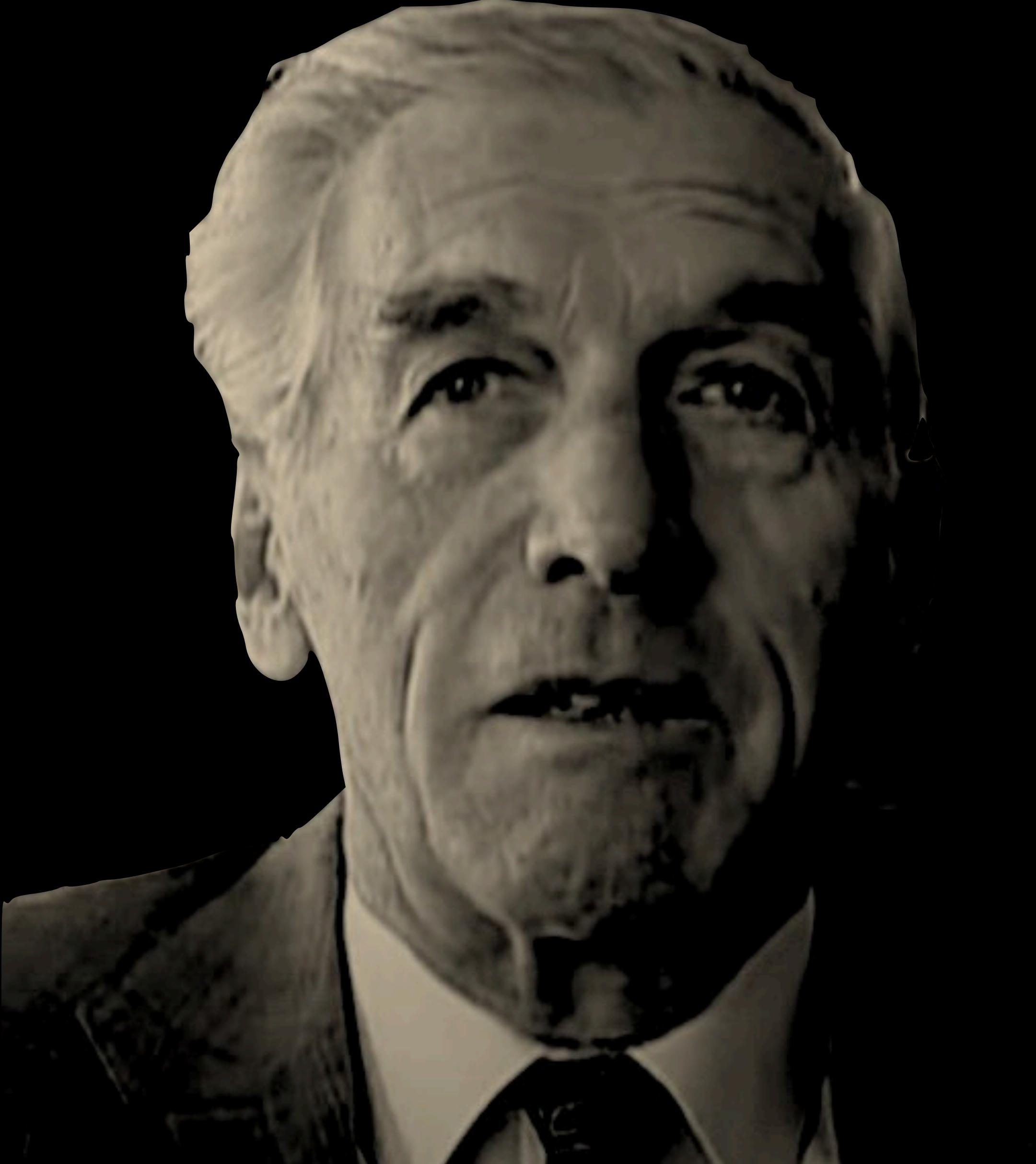
means
This requirement requires an ethics discussion.

"As a Microsoft translate user,
I want that the system translates my text to the most probable translation,
so that the translation sounds genuine."

The image displays four separate windows of the Microsoft Translator web interface, arranged in a 2x2 grid. Each window shows a translation between English and Turkish.

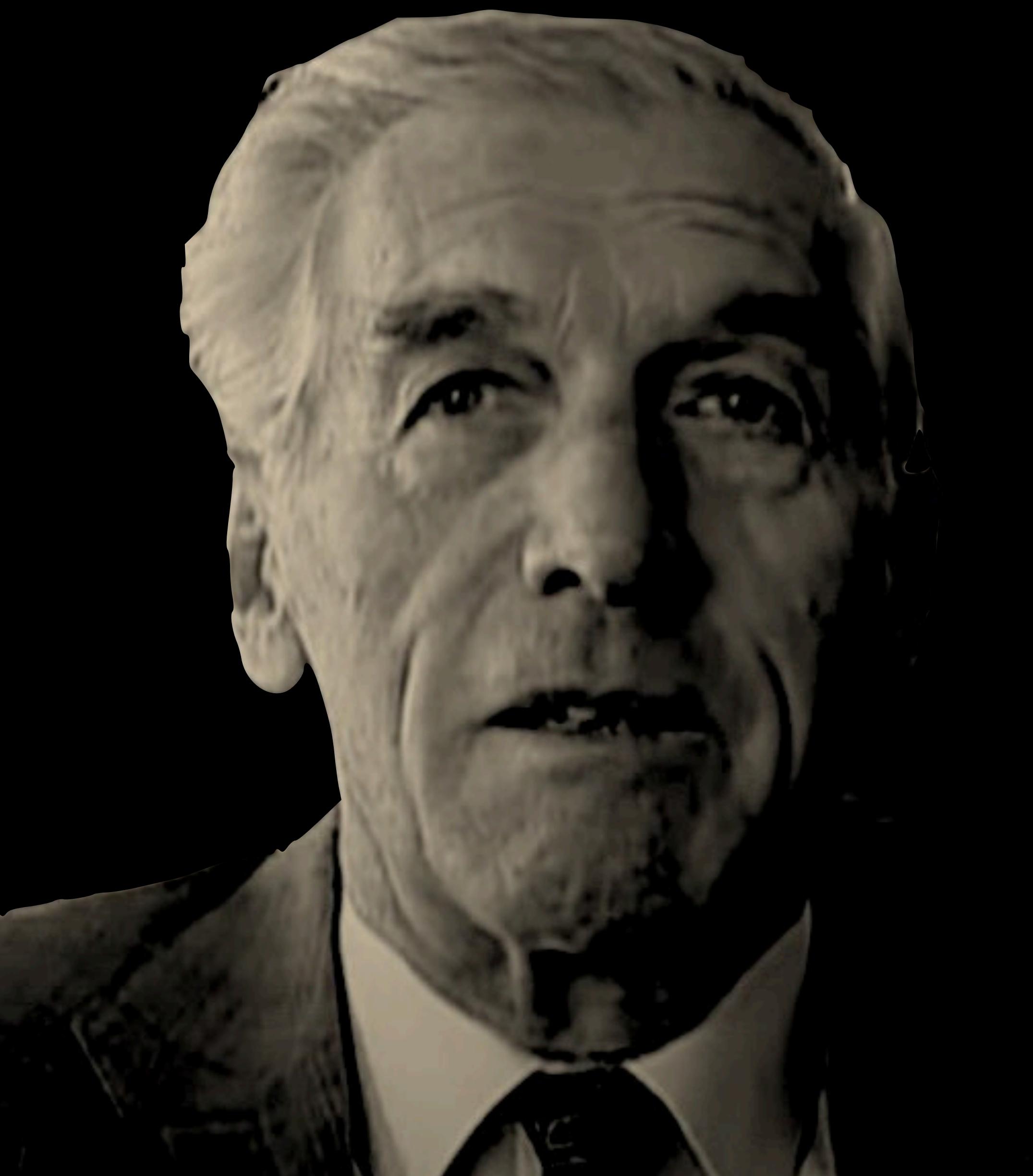
- Top Left (English to Turkish):** Shows the input "He is a nurse.
She is a doctor." and the output "O bir hemşire.
O bir doktor." The Microsoft logo is visible at the top left of the page.
- Top Right (Turkish to English):** Shows the input "O bir hemşire.
O bir doktor." and the output "He is a nurse.
She is a doctor." A search bar and sign-in link are at the top right.
- Bottom Left (Turkish to English):** Shows the input "O bir hemşire.
O bir doktor." and the output "She's a nurse.
He's a doctor." The Microsoft logo is visible at the top left of the page.
- Bottom Right (English to Turkish):** Shows the input "She's a nurse.
He's a doctor." and the output "O bir hemşire.
O bir doktor." A search bar and sign-in link are at the top right.





You cannot not
communicate.

– Paul Watzlawick, 1969



You cannot not
make ethical
decisions.

– Society, Now

① You cannot not make ethical decisions.

So what can you do?

So what can you do?

Principle-based approaches
vs.
Regulatory Approaches

So what can you do?

Principle-based approaches
vs.
Regulatory Approaches

Principle-based Approaches

- Everyone is doing it...

code of ethics ai

- <https://www.capgemini.com/uploads/2021/03/Our%20Code%20of%20Ethics%20for%20AI%20-%20Capgemini.pdf>
Our Code of Ethics for AI - Capgemini
Our Code of Ethics for AI guides our organization on how to embed ethical thinking in our business. It is illustrated by concrete examples from projects or ...
12 Seiten
- <https://a-ai.ru/wp-content/uploads/2021/10/Artificial%20Intelligence%20Code%20of%20Ethics.pdf>
Artificial Intelligence Code of Ethics
The Code applies to relationships related to the ethical aspects of the creation. (design, construction, piloting), implementation and use of AI technologies at ...
9 Seiten
- <https://www.bosch-ai.com/code-of-ethics.pdf>
Code of Ethics for AI | Bosch Center for Artificial Intelligence
19.02.2020 — All Bosch AI products should reflect our "Invented for life" ethos, which combines a quest for innovation with a sense of social responsibility.
- <https://www.ibm.com/watson/assets/duo/pdf/Everyday%20Ethics%20for%20Artificial%20Intelligence%20-%20IBM.pdf>
Everyday Ethics for Artificial Intelligence - IBM
Ethics is a set of moral principles which help us discern between right and wrong. AI ethics is a set of guidelines that advise on the design, development, and ...
27 Seiten
- <https://ec.europa.eu/.../Futurium/Diese%20Seite%20übersetzen.pdf>
Ethics Guidelines for Trustworthy AI - European Commission
Building trust in human-centric AI: The Ethics Guidelines for Trustworthy Artificial Intelligence (AI) is a document prepared by the High-Level Expert Group on ...
- <https://www.bosch.com/stories/Diese%20Seite%20übersetzen.pdf>
Ethical Guidelines for Artificial Intelligence | Bosch Global
AI will change every aspect of our lives. By 2025, the aim is for all Bosch products to either contain AI or have been developed or manufactured with its ...
- <https://www.bmwgroup.com/grpw/downloads/BMW%20Group%20Code%20of%20ethics%20for%20artificial%20intelligence.pdf>
BMW Group Code of ethics for artificial intelligence
12.10.2020 — BMW Group code of ethics for artificial intelligence, Munich. The use of artificial intelligence (AI) is a central element of the digital. 4 Seiten

Everyday Ethics for Artificial Intelligence



Everyday Ethics for Artificial Intelligence, IBM, 2014-2022.
<https://www.ibm.com/watson/assets/duo/pdf/everydayethics.pdf>

ACM's Code of Ethics

General Principles

1. Contribute to society and to human well-being, acknowledging that all people are stakeholders in computing.
2. Avoid harm.
3. Be honest and trustworthy.
4. Be fair and take action not to discriminate.
5. Respect the work required to produce new ideas, inventions, creative works, and computing artifacts.
6. Respect privacy.
7. Honor confidentiality.

2. PROFESSIONAL RESPONSIBILITIES.

- 2.1 Strive to achieve high quality in both the processes and products of professional work.
- 2.2 Maintain high standards of professional competence, conduct, and ethical practice.
- 2.3 Know and respect existing rules pertaining to professional work.
- 2.4 Accept and provide appropriate professional review.
- 2.5 Give comprehensive and thorough evaluations of computer systems and their impacts, including analysis of possible risks.
- 2.6 Perform work only in areas of competence.
- 2.7 Foster public awareness and understanding of computing, related technologies, and their consequences.
- 2.8 Access computing and communication resources only when authorized or when compelled by the public good.
- 2.9 Design and implement systems that are robustly and usably secure.

1.2 Avoid harm.

In this document, "harm" means negative consequences, especially when those consequences are significant and unjust. Examples of harm include unjustified physical or mental injury, unjustified destruction or disclosure of information, and unjustified damage to property, reputation, and the environment. This list is not exhaustive.

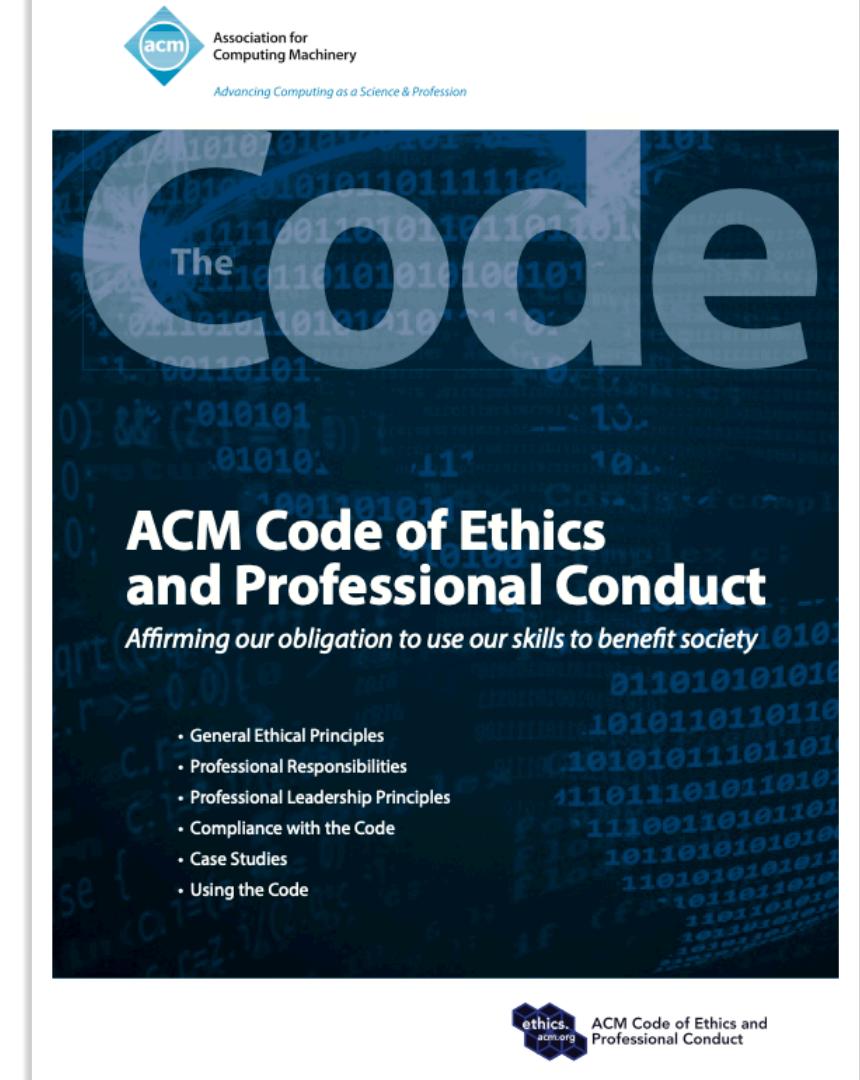
Well-intended actions, including those that accomplish assigned duties, may lead to harm. When that harm is unintended, those responsible are obliged to undo or mitigate the harm as much as possible. Avoiding harm begins with careful consideration of potential impacts on all those affected by decisions. When harm is an intentional part of the system, those responsible are obligated to ensure that the harm is ethically justified. In either case, ensure that all harm is minimized.

To minimize the possibility of indirectly or unintentionally harming others, computing professionals should follow generally accepted best practices unless there is a compelling ethical reason to do otherwise. Additionally, the consequences of data aggregation and emergent properties of systems should be carefully analyzed. Those involved with pervasive or infrastructure systems should also consider Principle 3.7.

A computing professional has an additional obligation to report any signs of system risks that might result in harm. If leaders do not act to curtail or mitigate such risks, it may be necessary to "blow the whistle" to reduce potential harm. However, capricious or misguided reporting of risks can itself be harmful. Before reporting risks, a computing professional should carefully assess relevant aspects of the situation.

3. PROFESSIONAL LEADERSHIP PRINCIPLES.

- 3.1 Ensure that the public good is the central concern during all professional computing work.
- 3.2 Articulate, encourage acceptance of, and evaluate fulfillment of social responsibilities by members of the organization or group.
- 3.3 Manage personnel and resources to enhance the quality of working life.
- 3.4 Articulate, apply, and support policies and processes that reflect the principles of the Code.
- 3.5 Create opportunities for members of the organization or group to grow as professionals.
- 3.6 Use care when modifying or retiring systems.
- 3.7 Recognize and take special care of systems that become integrated into the infrastructure of society.



Five Practices of Everyday Ethics

It's our collective responsibility to understand and evolve these ethical practices as AI capabilities increase over time. These practices provide an intentional framework for building and using AI systems alongside IBM's five pillars of trustworthy AI.



Take accountability for the outcomes of your AI system in the real world, no matter your role.



Be sensitive to a wide range of cultural norms and values, not just your own.



Work with your team to identify and address biases and promote inclusive representation.



Ensure humans can perceive, detect, and understand an AI decision process.



Preserve and fortify users' power over their own data and its uses.

Designers and developers of AI who want to go deeper into these practices should consider IBM's *Team Essentials for AI* course that trains practitioners on relevant design thinking methods.³

In addition, IBM Research has made their Trustworthy AI toolkits publicly available for use by developers and data scientists.⁴ They include:

01 AI Explainability 360:

This open source toolkit includes an extensive set of techniques as well as guidance on how to choose the explainability algorithm that's right for your use case.

02 AI Fairness 360:

This is an open source software toolkit that enables developers to use state-of-the-art algorithms to regularly check for unwanted biases from entering their machine learning pipeline and to mitigate any biases that are discovered.

03 AI FactSheets 360:

Similar to nutrition labels for food or information sheets for appliances, this project increases transparency so that AI consumers better understand how the AI model or service was created.

04 Adversarial Robustness Toolbox:

These tools enable developers and researchers to evaluate and defend machine learning models and applications against the adversarial threats of evasion, poisoning, extraction, and inference.

05 AI Privacy 360:

This toolbox includes several tools to support the assessment of privacy risks of AI-based solutions, and to help them adhere to any relevant privacy requirements. Tradeoffs between privacy, accuracy, and performance can be explored at different stages in the ML lifecycle.

Recommended actions to take

01

Make company policies clear and accessible to design and development teams from day one so that no one is confused about issues of responsibility or accountability. As an AI designer or developer, it is your responsibility to know.

02

Understand where the responsibility of the company/software ends. You may not have control over how data or a tool will be used by a user, client, or other external source.

03

Keep detailed records of your design processes and decision making. Determine a strategy for keeping records during the design and development process to encourage best practices and iteration.

04

Adhere to your company's business conduct guidelines. Also, understand national and international laws, regulations, and guidelines⁶ that your AI system may have to work within. You can find other related resources in the IEEE Ethically Aligned Design document.⁷

To consider

Understand the workings of your AI system even if you're not personally developing and monitoring its algorithms.

The entire team should work together to choose robust components that minimize risks and enable users' confidence in system outcomes.⁸

Refer to secondary research by sociologists, linguists, behaviorists, and other professionals to understand ethical issues in a holistic context.

Questions for your team

How does accountability change according to the levels of user influence over an AI system?

Is the AI to be embedded in a human decision-making process, is it making decisions on its own, or is it a hybrid?

How will our team keep records of our process?

How do we keep track of ethical design choices and considerations after the launch of the AI system?

Will others new to our effort be able to understand our records?

Code of Ethics don't work.

Experiment by McNamara et al.

Methodology: Controlled Experiment

- 105 professional and 63 student participants
- 1/2 of participants are shown the ACM CoE, the other half are told "*that the backbone of the company culture [are] strong ethical standards*"
- *11 non-obvious ethical questions from StackOverflow touching values, e.g. intellectual property issues, honesty,*
- ...

Research Question: Does the presence of a code of ethics influence software-related ethical decisions?

- **"No statistically significant difference in the responses for any vignette were found across individuals who did and did not see the code of ethics, either for students or for professionals."**

A deadline is quickly approaching for a project that you are working on. You realize that you will not be able to meet the deadline if you only work during normal hours. You are not allowed to take your computer out of the office. What do you do?

- Download the data on a personal hard drive so you can continue development at home
- Unsure
- Stay at work longer in order to continue development

Figure 1: Intellectual property (*Waymo*) vignette

Does ACM's Code of Ethics Change Ethical Decision Making in Software Development?

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Justin Smith
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Emerson Murphy-Hill
North Carolina State University
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emerson@csc.ncsu.edu

The first example is the Uber versus Waymo dispute [26], in which a software engineer at Waymo took self-driving car code to his home. Shortly thereafter, the engineer left Waymo to work for a competing company with a self-driving car business, Uber. When Waymo realized that their own code had been taken by their former employee, Waymo sued Uber. Even though the code was not apparently used for Uber's competitive advantage, the two companies settled the lawsuit for \$245 million dollars.

The second example is the "Dieselgate" scandal [21], where software inside certain diesel Volkswagen cars was programmed to run in one of two modes. In one mode, the car operated under normal, day-to-day driving conditions, but emitted pollution at levels above what is allowed by US and international regulators. In the other mode, the car emitted allowable pollution levels, but only when it detected that it was being inspected by regulators. Although software engineers raised objections to management about the devices, they did not bring these concerns to authorities [19]. Consequently, the company was forced to pay \$30 billion dollars in compensation so far [31] and an estimated 59 people suffered early deaths as a result of the excess emitted pollution in the US alone [5].

As early as 1913, organizations have published codes of ethics to guide people facing such ethical situations [3]. In 1972, the Association for Computing Machinery (ACM) adopted a code of ethics designed to specifically apply to software development. In 2018, the ACM code of ethics was updated for the first time since 1992 [2]. In light of recent software ethics scandals, like Dieselgate and the Uber versus Waymo dispute, and ACM's renewed interest in revising its guidelines, we are motivated to study the effect of ACM's code of ethics on ethical decision making in software development. While the ACM claims its code of ethics "is intended to serve as a basis for ethical decision making" [1] to "know the effectiveness of this claim has never been tested.

We asked 63 software engineering students and 105 professional software engineers to consider 11 software-related ethical decisions. We derived these decisions from real ethical dilemmas faced by software developers. To assess how much the ACM code of ethics influenced decision making, participants were divided into two groups, a control group, and a group explicitly instructed to use the ACM code of ethics. The primary contribution of this paper is a better understanding of ethical decision making in software development and the influence of the ACM code of ethics on those decisions.

1 INTRODUCTION
Software developers must constantly make ethical considerations, including deciding the proper amount of user data to collect; balancing added functionality with potential adverse environmental effects; and performing due diligence to reduce the risks of critical security bugs. Such ethical decisions can cause substantial harm to people, to organizations, and to our planet. Consider two recent examples.

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ESEC/FSE '18, November 4–9, 2018, Lake Buena Vista, FL, USA
© 2018 Association for Computing Machinery.
ACM ISBN 978-1-4503-5373-5/18/11...\$15.00
<https://doi.org/10.1145/3236024.3264833>

2 RELATED WORK
Researchers have postulated that many variables can influence ethical decision making [11]. Here we focus on the most relevant work pertaining to codes of ethics, including what their purposes

- ① You cannot not make ethical decisions.**
- ② Code of Ethics will not solve the problem.**

So what can you do?

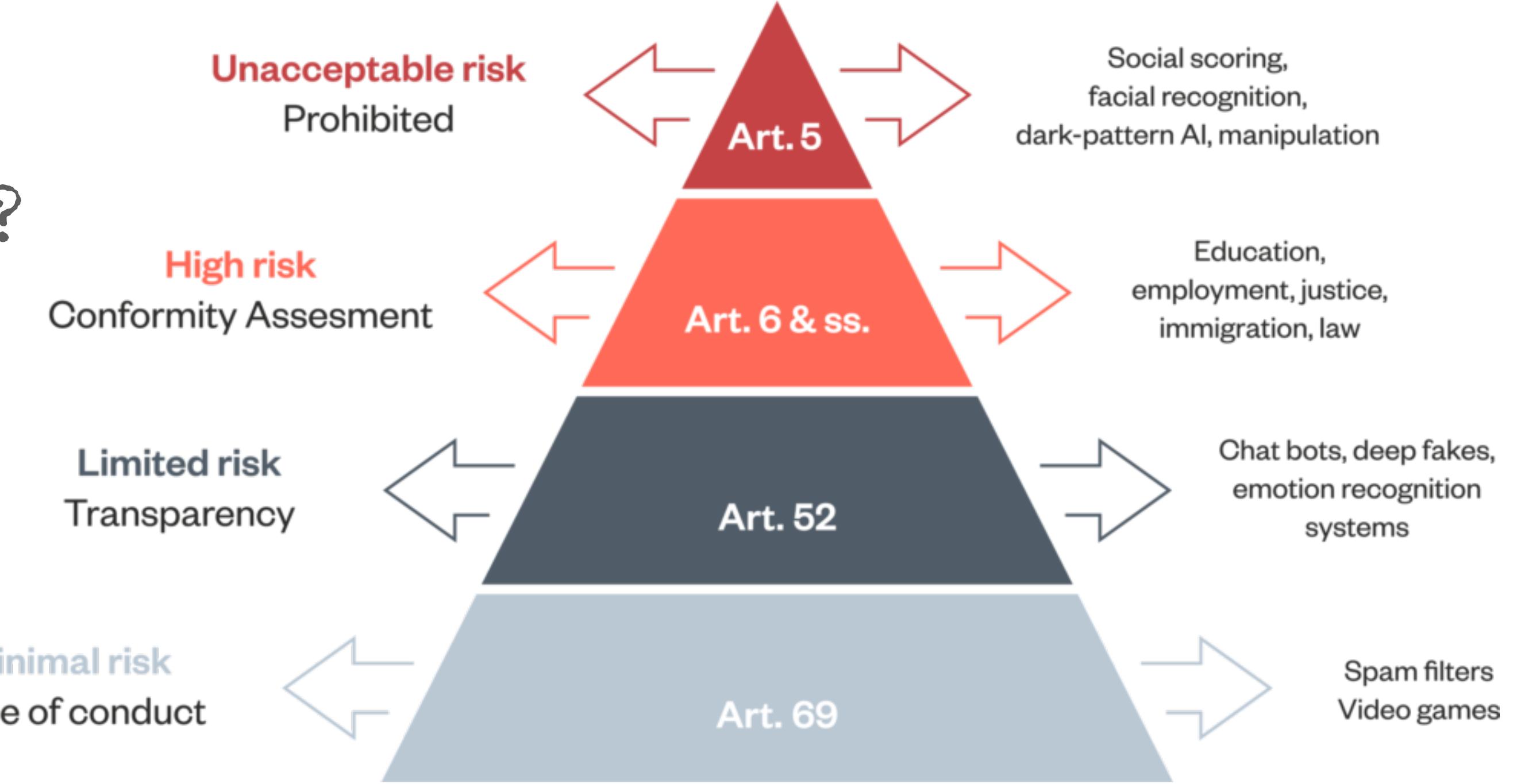
Principle-based approaches

vs.

Regulatory Approaches

The EU AI Act

Contents?



Challenges?

Timeline?

10 Principles

1. Ecosystem Responsibility
2. Stakeholder Inclusiveness
3. Context-Sensitivity
4. Value Identification with Moral Philosophy and/or Spiritual Tradition
5. Understanding values at depth
6. Leadership Engagement
7. Respect for Regional Laws and International Agreements
8. Willingness to renounce Investment
9. Transparency of the Value Mission
10. Risk-based System Design

INSTITUTE FOR INFORMATION
SYSTEMS & SOCIETY



Univ. Prof.
Dr. Sarah
Spiekermann
Chair of the
Institute for IS &
Society, IEEE 7000
Vice Chair

✉ vbe@wu.ac.at

<https://www.wu.ac.at/value-based-engineering/principles>



But how do we ensure that ethical aspects are considered?

- There is a new standard since September 15th, 2021!
- Process-oriented

IEEE SA
STANDARDS
ASSOCIATION

IEEE Standard Model Process
for Addressing Ethical Concerns
during System Design

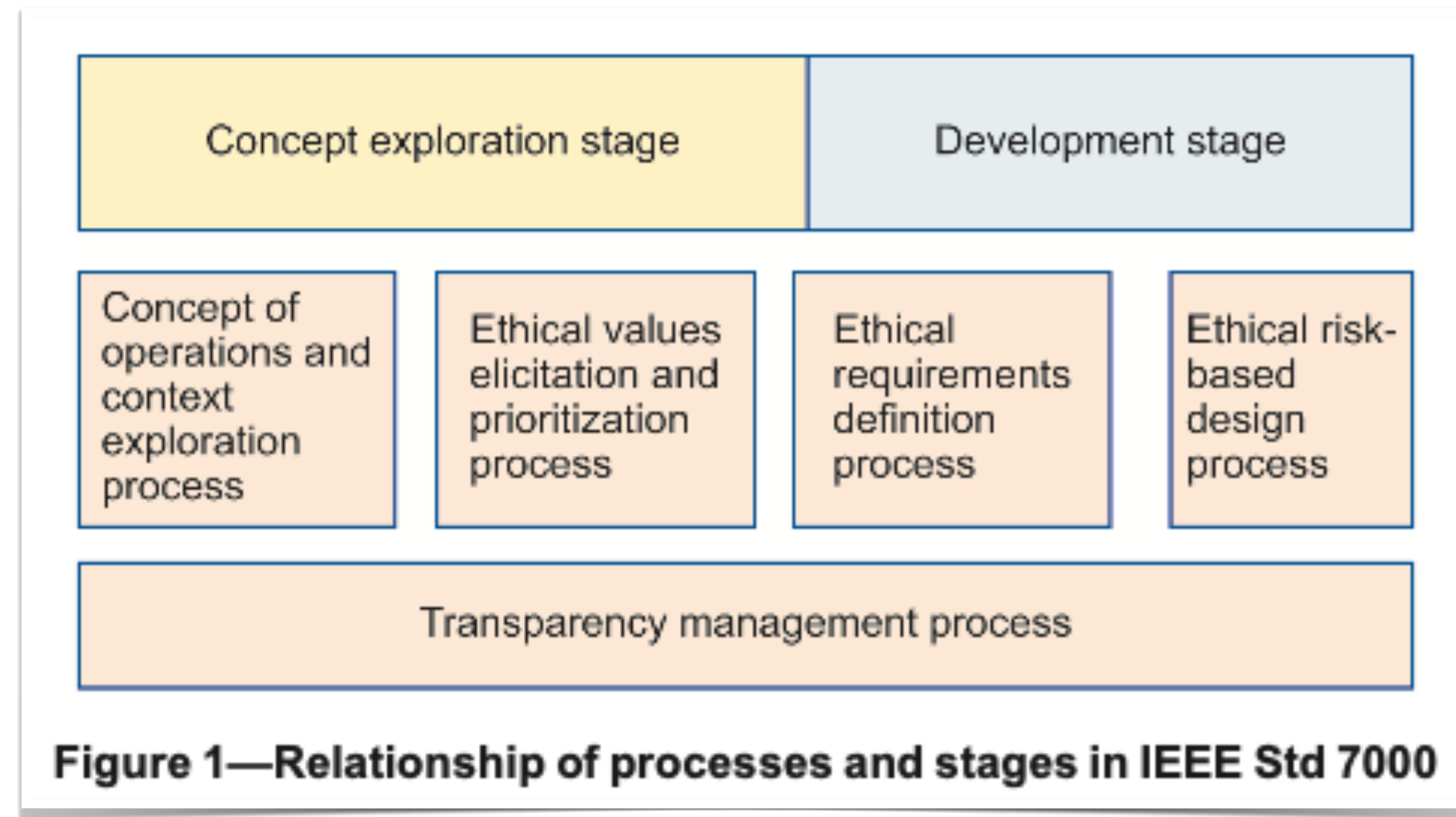
IEEE Computer Society

Committee

Abstract: A set of processes by which organizations can include consideration of ethical values throughout the stages of concept exploration and development is established by this standard. Management and engineering in transparent communication with selected stakeholders for ethical values elicitation and prioritization is supported by this standard, involving traceability of ethical values through an operational concept, value propositions, and value dispositions in the system design. Processes that provide for traceability of ethical values in the concept of operations, ethical requirements, and ethical risk-based design are described in the standard. All sizes and types of organizations using their own life cycle models are relevant to this standard.

Downloaded on October 08, 2021 at 15:21:46 UTC from IEEE Xplore. Restrictions apply.

IEEE 7000:2021 Process



IEEE 7000:2021 Process

"The purpose of the ConOps and Context Exploration Process is to define how a system is expected to operate from the users' perspective and its context of use, its stakeholders, and its potential for ethical benefit or harm."

Outputs:

- a) Context description
- b) Lists of stakeholders to be consulted and direct and indirect stakeholders affected by the ConOps
- c) Refined SOI (System of Interest) concept of operation
- d) Outcomes of feasibility studies

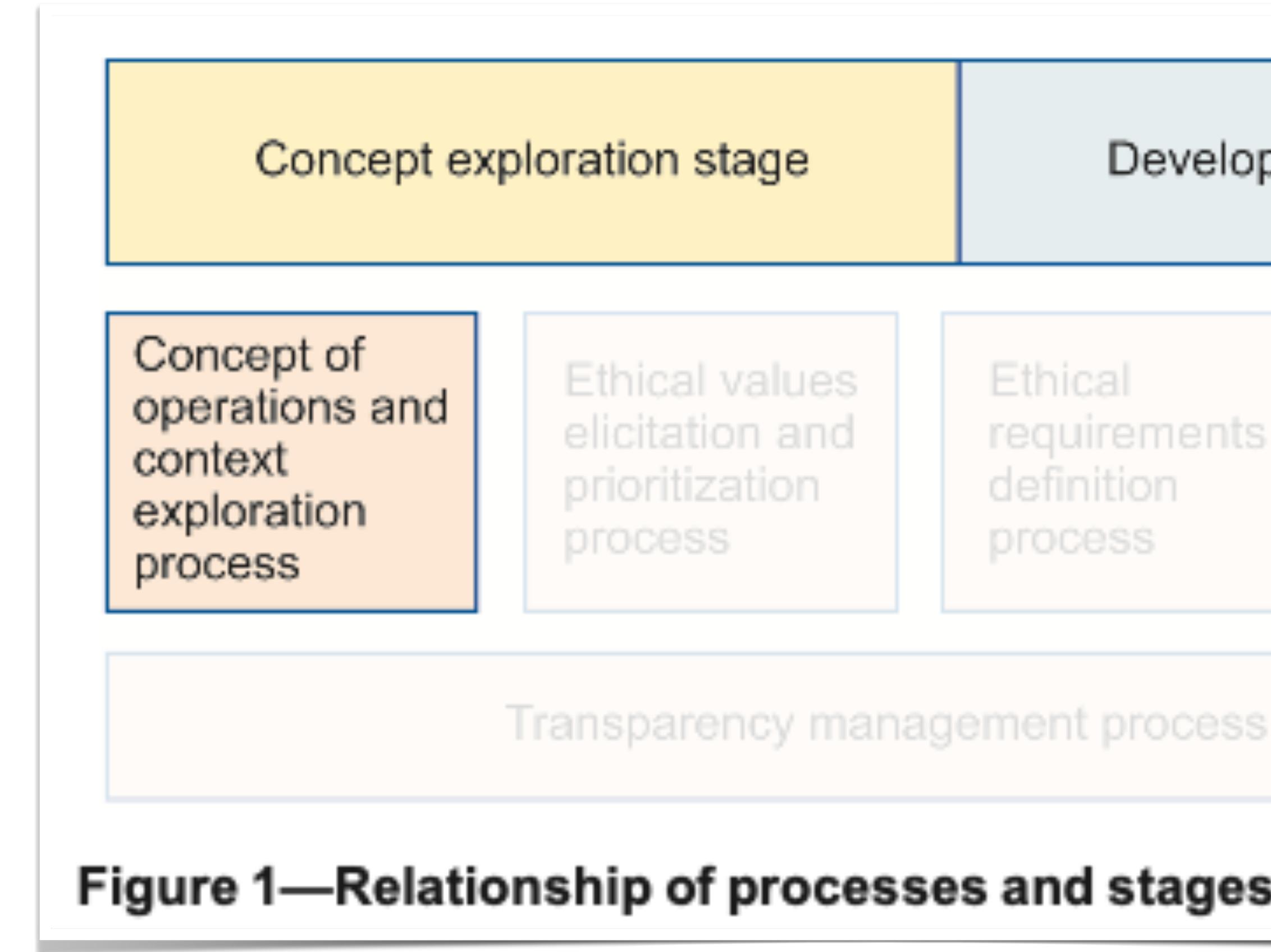


Figure 1—Relationship of processes and stages

**Table D.1—Legal, social, and environmental feasibility study and analysis guidelines
(continued)**

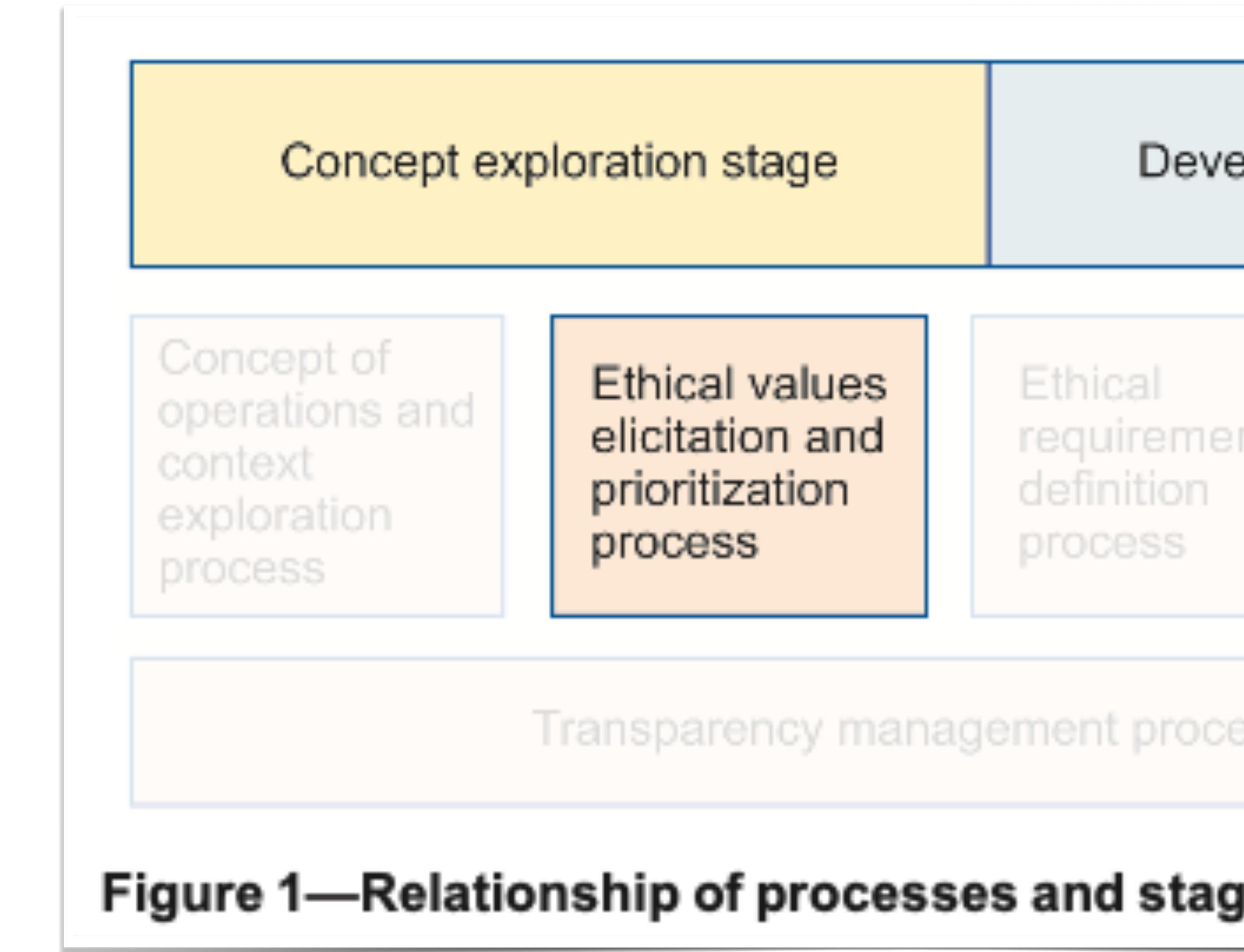
Analysis topic	Legal	Social	Environmental
Question 1	Who are the leaders, managers, consultants, individuals, or groups, legally accountable and responsible for the design milestones across the concept exploration and development stages? Record the full chain of command in the design custody.	What different kinds of demographics, geographies and cultures are impacted by the SOI as designed?	What is the project/SOI's approach to compliance with international environmental standards such as ISO 26000 [B28] and ISO 14001 [B27]?
Question 2	What local, regional, national, and international regulatory bodies should be consulted or enhanced to evaluate a full 360 view of the SOI's legal responsibilities to its stakeholders, users, society, and international policy?	Are any special interest groups or stakeholders differentially impacted by the SOI's design? If so, how are these to be identified and addressed?	What is the scope and scale of the environmental impact?
Question 3	Are any special interest groups or stakeholder legal rights differentially impacted by the SOI's design? If so, how are these to be identified and addressed?	Are there significant social, economic, political, or cultural issues among the stakeholders and users and their geographies/ cultures that should be analyzed using the precautionary principle? If so, they should be described in writing as a social feasibility baseline report.	How is the Precautionary Principle being applied? Describe how risks and threats are being identified and mitigated.
Question 4	What legislation relates to the granting of ownership/ control of the SOI design, data, use, storage and final disposition?	How can the SOI design be adapted to be more socially and culturally relevant for stakeholders and users?	What actions and policies are being taken for the SOI's use of rare earth materials, avoidance of contamination, recycling of waste materials, protection of habitats and wildlife?

IEEE 7000:2021 Process

"The purpose of the Ethical Values Elicitation and Prioritization Process is to obtain and rank values and value demonstrators for approval by management and other stakeholders as a basis for the requirements and the design of the SOI. "

Outputs:

- a) Value Register or case for ethics with selected and prioritized value clusters, core values, and value demonstrators
- b) List of potential technical and organizational risks and improvements for the value clusters
- c) Updates to the ConOps
- d) Updated list of stakeholders to be consulted



Key Terms in ISO 7000:2021

Abstract: A set of processes by which organizations can include consideration of ethical values throughout the stages of concept exploration and development is established by this standard. Management and engineering in transparent communication with selected stakeholders for ethical values elicitation and prioritization is supported by this standard, involving traceability of ethical values through an operational concept, value propositions, and value dispositions in the system design. Processes that provide for traceability of ethical values in the concept of operations, ethical requirements, and ethical risk-based design are described in the standard. All sizes and types of organizations using their own life cycle models are relevant to this standard.

value: A conception that influences the selection from available modes, means and ends of action:

- Examples of positive values: love, privacy, security, transparency, accountability, generosity, dignity, courage, fairness
- Examples of negative values: bias, absence of transparency, absence of privacy, selfishness, greediness

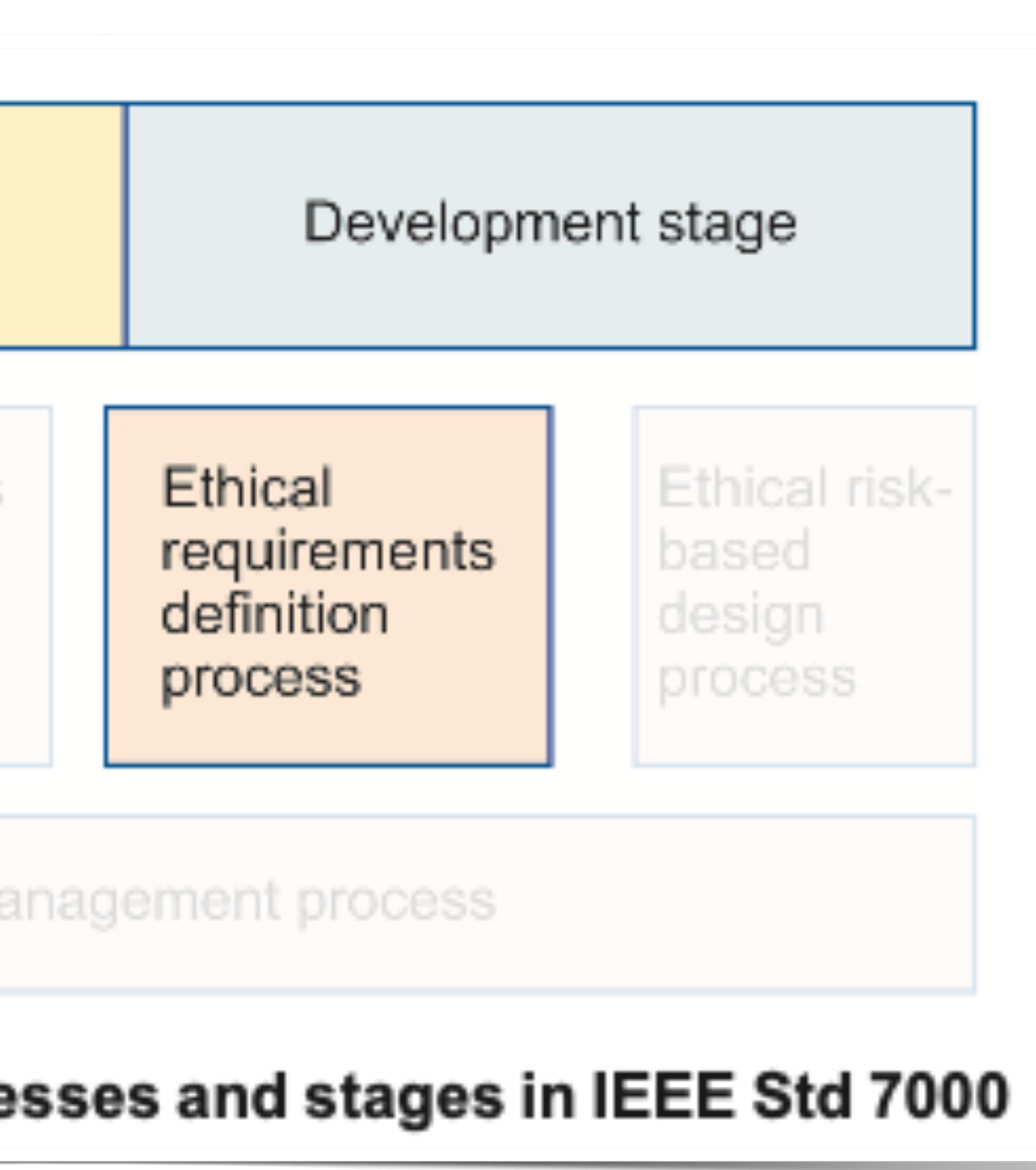
NOTE—A value can be positive or negative. A positive value is intuitively recognized because of its relatively high desirability. A negative value is marked by its undesirability.

EEE Std 7000-2021, p.18

ethical value: Value in the context of human culture that supports a judgment on what is right or wrong.

EEE Std 7000-2021, p.18

IEEE 7000:2021 Process



"The purpose of the Ethical Requirements Definition Process is to formulate EVRs and value-based system requirements that define how the prioritized core values and their value demonstrators are reflected in the SOI. "

Outputs:

- a) EVR and value-based systems/software requirements for the SOI traceable to one or more prioritized core values
- b) Potential technical and organizational risks and opportunities for the EVR
- c) Improvement ideas for the concept of operation
- d) Updated Value Register or Case for Ethics with traceability of values to EVR and value-based system requirements

Key Terms in ISO 7000:2021

Abstract: A set of processes by which organizations can include consideration of ethical values throughout the stages of concept exploration and development is established by this standard. Management and engineering in transparent communication with selected stakeholders for ethical values elicitation and prioritization is supported by this standard, involving traceability of ethical values through an operational concept, value propositions, and value dispositions in the system design. Processes that provide for traceability of ethical values in the concept of operations, ethical requirements, and ethical risk-based design are described in the standard. All sizes and types of organizations using their own life cycle models are relevant to this standard.

ethical requirement: Requirement that is either an ethical value requirement (EVR) or a value-based system requirement.

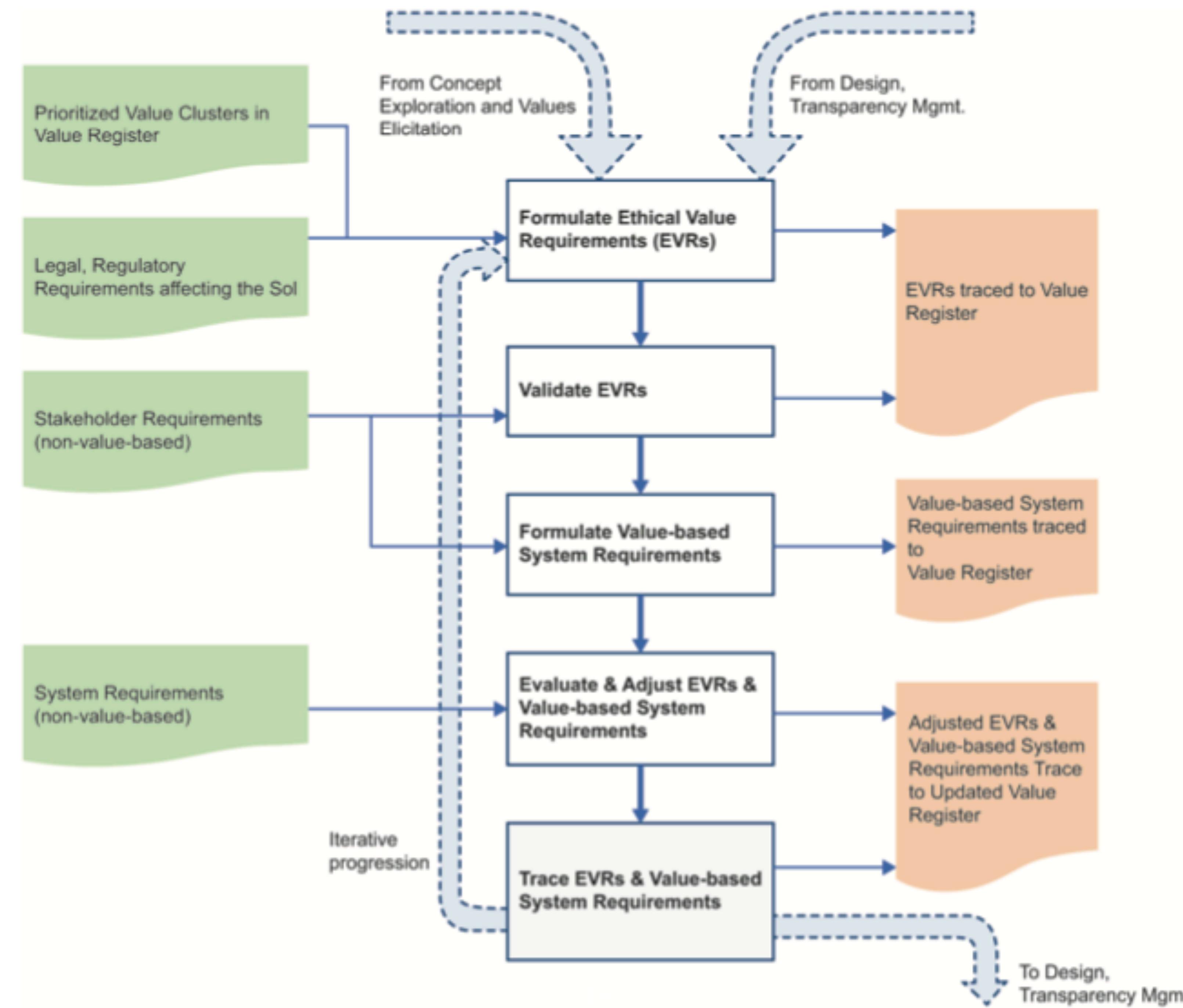
IEEE Std 7000-2021

ethical value requirement (EVR): Organizational or technical requirement catering to values that stakeholders and conceptual value analysis identified as relevant for the SOI.

IEEE Std 7000-2021

value-based system requirement: System requirement that is traceable from ethical value requirements, value clusters, and core values.

IEEE Std 7000-2021



IEEE 7000:2021 Process



"The purpose of Ethical Risk-Based Design is to realize ethical values and required functionality in the system or software design."

Outputs:

- a) An ethically aligned design for the SOI
- b) A refined concept of operation and operational concept
- c) An updated Value Register
- d) An updated Case for Ethics

IEEE 7000:2021 Process

"The purpose of the Transparency Management Process is to share with internal and external, short-term, and long-term stakeholders sufficient and appropriate information about how the developer has addressed ethical concerns during SOI design."

OutCOMES:

- a) Sufficient appropriate information about the ethical aspects of the SOI is made available during system development and afterward.
- b) Stakeholder and project communications reflect principles of transparency, accountability, and explainability.

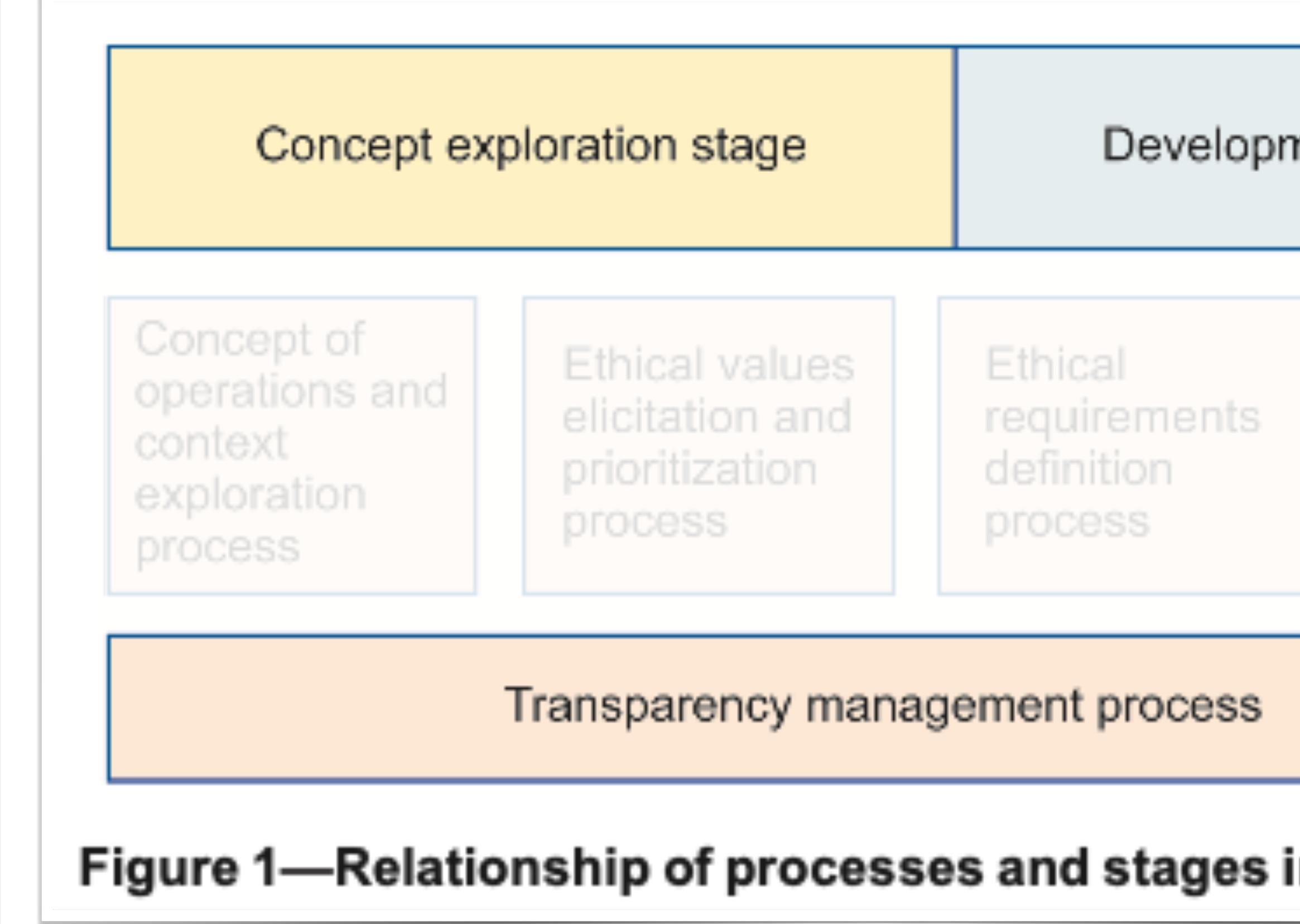
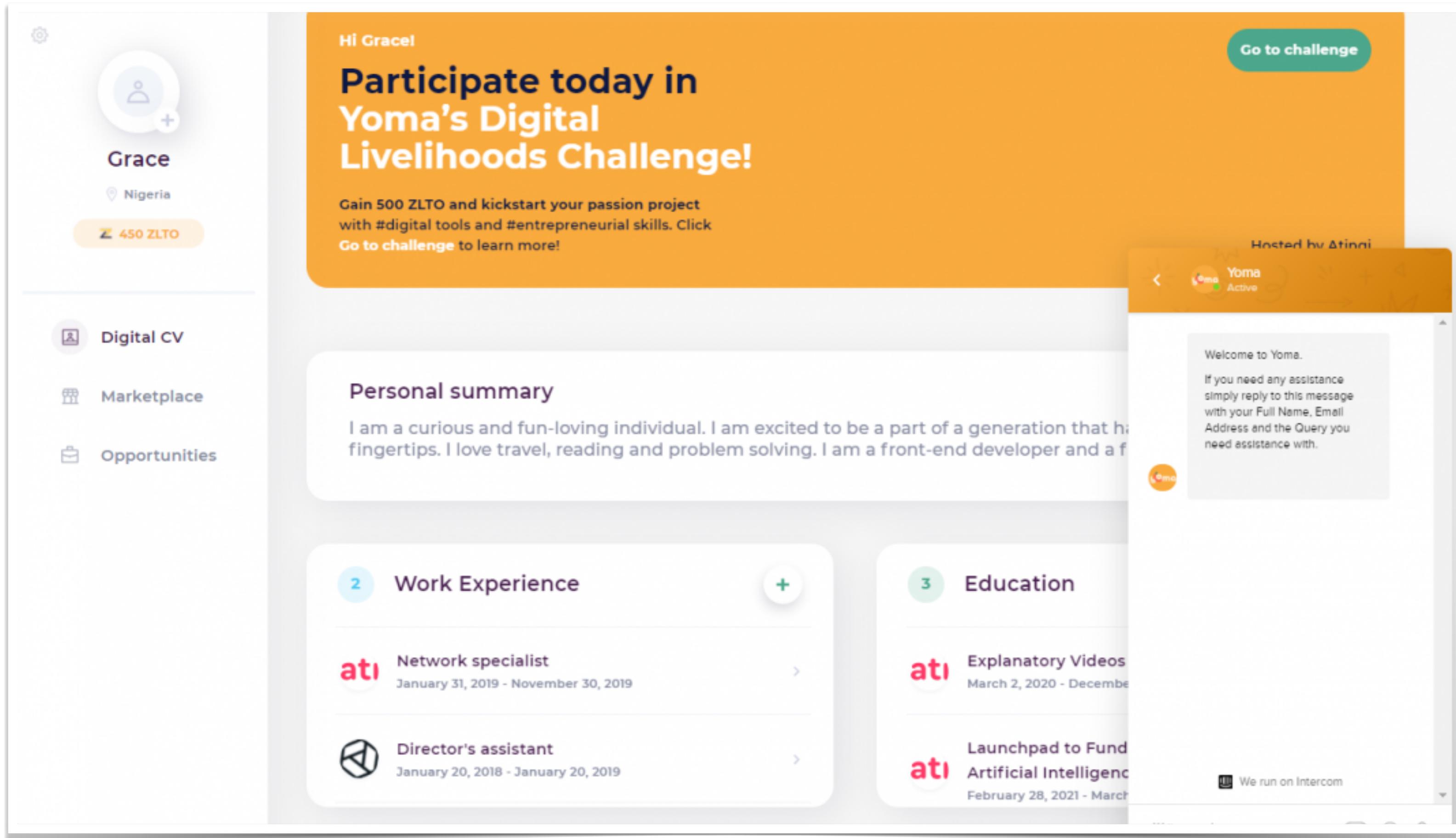
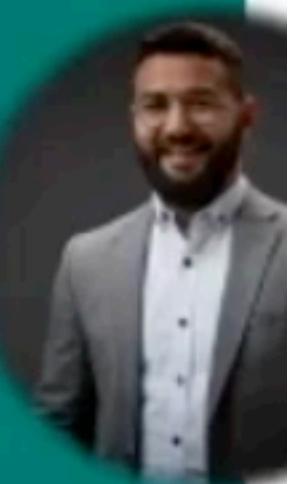


Figure 1—Relationship of processes and stages in

The Digital Marketplace Yoma: Empowering African youth on their journey from learning to earning





About us

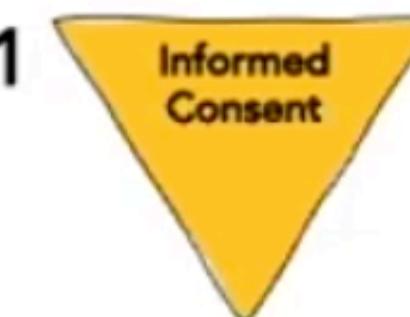
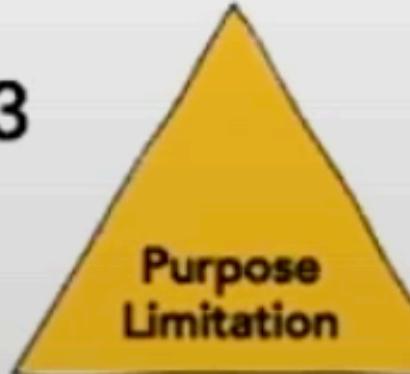
In 2020, young individuals were three times as likely to be unemployed as adults (ILO 2020). Many are not only facing a challenging present but also, an uncertain future. To meet the changing demands of the labor market, young people will need to be equipped with a set of skills and competencies to compete globally and locally, as well as have access to local and global job markets. The concept of Yoma was developed by young Africans as a holistic approach to address skills development and employment challenges, and increase youth agency across the globe.



GDTA Spotlight Special: Sarah Spiekermann. Value-Based Engineering with Design Thinking
<https://www.youtube.com/watch?v=fgrO-dhJCck>

Example

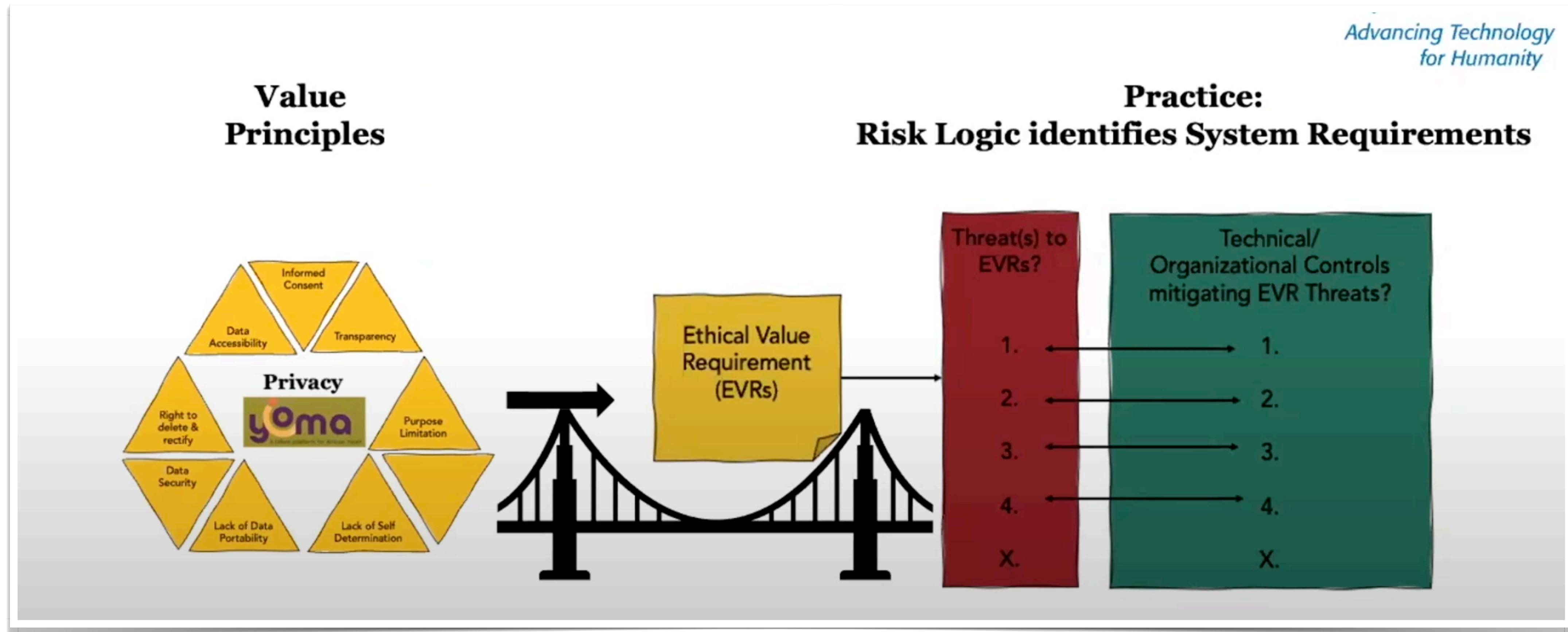
Advancing technology
for Humanity

Core Value	Value qualities	Ethical Value Requirements (EVRs)
1. Privacy	1.1 	<ul style="list-style-type: none">1.1.1 <u>meaningfully and comprehensively</u> describe the personal data processing activities1.1.2 <u>truly and voluntarily</u> obtain the users' processing consent1.1.3 offer users <u>easily accessible</u> options to provide or decline consent1.1.4 avoid user consent to something they don't understand
1. Privacy	1.2 	<ul style="list-style-type: none">1.2.1 <u>meaningfully and comprehensively</u> describe personal data processing activities including the calculation of scores and indices1.2.2 <u>meaningfully and comprehensively</u> describe personal data sharing activities, including the sharing of scores and indices1.2.3 ensure the <u>completeness</u> of descriptions of processing and sharing and thereby ensure that all concrete data recipients are named
1. Privacy	1.3 	<ul style="list-style-type: none">1.3.1 ensure that data sharing with partners is strictly <u>limited to purpose</u>1.3.2 ensure that where data is shared with partners contracts and SLAs <u>legally bind partners</u> to limit any further processing to purpose1.3.3. <u>Inform users in advance</u> if purposes change and request new <u>opt-in</u> consent

Example

Value quality	Ethical Value Requirements (EVRs)	Threats to EVRs	Org /Tech System Requirements (Controls)	Advancing Technology for Humanity
1.1	1.1.1 <u>meaningfully and comprehensively describe YOMA's personal data processing activities</u>	<p>T 1.1.1.1 activities are: - not complete (hide potentially relevant steps) T 1.1.1.2 are not easy to understand and</p>	<p>C 1.1.1.1 provide timely list & depictions of all core processing tasks available as a backup for DPA (e.g. as a model)</p> <p>C 1.1.1.2 like aggregate summary of processing (list/video/text) in an easy-to-read language ("What happens to my data?" section on Website)</p>	
1.1	1.1.2 <u>truly and voluntarily obtain YOMA users' processing consent</u>	<p>T 1.1.2.1 YOMA service cannot be used at all if not ALL data processing is consented to (coupling)</p> <p>T 1.1.2.2 YOMA service nudges users into data sharing</p>	<p>C 1.1.2.1 try to make parts of the YOMA service available even if user does not consent to all data processing (minimal version)</p> <p>C 1.1.2.2 set data sharing defaults such that only those data sharing boxes are pre-selected that are at a minimum required to run the service ("opt-in" scheme)</p>	
1.1	1.1.3 <u>offer YOMA users easily accessible options to provide or decline consent</u>	<p>T 1.1.3.1 YOMA user does not easily find the privacy settings</p> <p>T 1.1.3.2 privacy options are buried in complex legal text difficult to process</p> <p>T 1.1.3.3 privacy options are not aligned locally with descriptions</p>	<p>C 1.1.3.1 Prominently place privacy button on a permanent and well visible part of the website frame</p> <p>C 1.1.3.2 use layered privacy policies that make the privacy dimensions cognitively easily accessible and discernable</p> <p>C 1.1.3.3 align the privacy choice buttons with the respective policy descriptions</p>	
1.1	1.1.4 <u>avoid YOMA user consent to something they don't understand</u>	<p>T 1.1.4.1 complex legal language is used</p> <p>T 1.1.4.2 only one language is offered for the privacy policy</p>	<p>C 1.1.4.1 provide the privacy policy in language easily understandable by laymen and test that that is the case</p> <p>C 1.1.4.2 offer the privacy policy in those languages most common in the region</p>	

Example



Yoma went from an AI-driven talent calculation machine to a community platform for mutual and local support of African youth



Before (very first idea November 2019):

AI focus

- Young peoples' data is combined and aggregated to calculate individuals' 'talent scores' with an AI engine hosted in Germany.
- Young people are represented through an AI-based talent score and homogenized, comparable profiles are created.
- All data providers can pull talent scores from young people.
- "Diamonds in the rough" are contacted to be channeled into innovation hubs to support African businesses.

After (summer 2021):

Bottom-up Youth support

- Youth gets richest possible self-presentation opportunity and no talent score is calculated, but young people can participate in local challenges and education and can build up a CV (self-development).
- Young people have maximum privacy and control over CV data (using a self-sovereign identity framework).
- Only those can get access to the young people who the young people want to be in touch with.
- "Diamonds in the rough" become mentors for other young people to provide local community support AND can respond to African businesses if they want to.

Value-based Engineering with IEEE 7000™

"It's been a very interesting learning experience and kind of looking at a system design from a completely different angle."

"...The amount of change, that came out of this project is significant for me. Because it goes down into a level of detail; we really unpack each one of these core values that they expect from a system like this...I would say 80-85% change in terms of how you design a system"

"I really enjoyed it, so I'll definitely use it again."

"Instead of just saying, "hey let's do it as quickly as possible to tick off the feature", now you need to think a bit deeper ..."

IEEE P7012™

Standard for Machine Readable Personal Privacy Terms

IEEE Standards Project for Machine Readable Personal Privacy Terms. The purpose of the standard is to provide individuals with means to proffer their own terms respecting personal privacy, in ways that can be read, acknowledged, and agreed to by machines operated by the networked world. In a more formal sense, the purpose of the standard is to enable individuals to operate as first parties in agreements with others—mostly companies—operating as second parties. Note that the purpose of this standard is not to address privacy policies, since those are one-sided and need no agreement. (Terms require agreement; privacy policies do not.) [Join](#)

IEEE P7014™

Get involved!

Standard for Data and AI Literacy, Skills, and Readiness

IEEE Standards Project to coordinate global data and AI literacy building efforts, this standard establishes an operational framework and associated capabilities for designing policy interventions, tracking their progress, and empirically evaluating their outcomes. The standard includes a common set of definitions, language, and understanding of data and AI literacy, skills, and readiness. [Join](#)

Join any of the IEEE P7000™ Standards Working Groups already in motion. Your insights can literally change the world. These groups are working on standards for the future of ethically aligned autonomous and intelligent systems.

[EMAIL US](#)

More explanation and details on this topic

A screenshot of a YouTube video thumbnail. The thumbnail features a black and white illustration of a traditional water well with a yellow triangle pointing to the center. The title 'Value-based Engineering with IEEE 7000™' is displayed in bold black text. Below the title, the speaker's name 'Dr. Sarah Spiekermann,' and the date 'GDTA Special Spotlight – March 10th 2022' are shown. In the top right corner of the thumbnail, there are logos for WU (Wirtschaftsuniversität Wien Vienna University of Economics and Business) and IEEE (Institute of Electrical and Electronics Engineers). The IEEE logo includes the tagline 'Advancing Technology for Humanity'. The bottom right corner of the thumbnail has a small play button icon.

GDTA Spotlight Special: Sarah Spiekermann. Value-Based
Engineering with Design Thinking
<https://www.youtube.com/watch?v=fgrO-dhJCck>

- ① You cannot not make ethical decisions.
- ② Code of Ethics will not solve the problem, so the government will have to put in regulations.
- ③ With the IEEE 7000:2021 a whole set of new requirements engineering tasks are necessary.