



Introducing **DAFI**: The **D**ata **A**nalytics **F**unctionality **I**ndex

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April 2nd, 2024

What I do

- Help organisations organise their data science/data analytics capabilities
- Understand the requirements to generate value with data
- Implement rigorous ways of working
- Understand the landscape/possibilities
- Education-focused

Personal Motivation

- Gap between **expectations** and **reality** of leveraging data and data science in a business context
- Gap is **exacerbated** with new **AI**-related developpements

We are going to
embed AI in your org

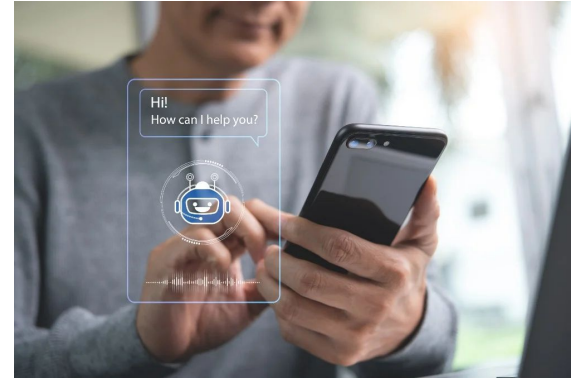


AI in your org



The promise of AI

- Boost efficiency & productivity
- Enhance customer experience
- Data-driven decision making
- Competitive advantage



AI failures

- Despite the current public fervor over the great potential of AI, many deployed algorithmic products do not work.
 - Poor ROI
 - Solutions unfit for purpose
 - Unexpected/unintended harms

Famous failures

Incident 101 6 Reports

Dutch Families Wrongfully Accused of Tax Fraud Due to Discriminatory Algorithm

2018-09-01

A childcare benefits system in the Netherlands falsely accused thousands of families of fraud, in part due to an algorithm that treated having a second nationality as a risk factor.

[More →](#)

Famous failures

OECD.org Going Digital Toolkit | EN

Blog ▾ Experts ▾ AI Principles ▾ Policy areas ▾ Trends & data ▾ Tools & metrics Countries About ▾ Q

Home > AI Incidents Monitor

With the support of
Patrick J McGovern
FOUNDATION

OECD AI Incidents Monitor (AIM)

AI-related legislation is gaining traction, and effective policymaking needs evidence, foresight and international cooperation. The OECD AI Incidents Monitor (AIM) documents AI incidents to help policymakers, AI practitioners, and all stakeholders worldwide gain valuable insights into the incidents and hazards that concretise AI risks. Over time, AIM will help to show patterns and establish a collective understanding of AI incidents and their multifaceted nature and serve as an important tool for trustworthy AI.

> [Please see methodology and disclosures here.](#)

Q Enter a concept or a keyword and press enter. Use advanced options to further narrow the search. Reset

ADVANCED SEARCH OPTIONS ▾

Summary visualisations

Evolution of incidents ▾

Summary statistics

	Incidents	Articles
All time total	7908	44779
Current month's total	83	336
Last month's total	573	2871

Illustration: COVID19 detection

2,212 studies, of which 415 were included after initial screening and, after quality screening, 62 studies were included in this systematic review

*Our review finds that **none of the models identified are of potential clinical** use due to methodological flaws and/or underlying biases.*

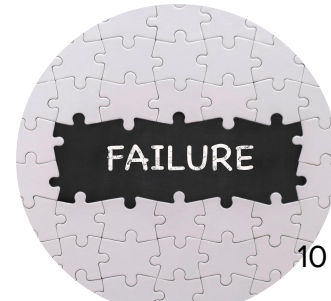
Roberts, Michael, et al. "Common pitfalls and recommendations for using machine learning to detect and prognosticate for COVID-19 using chest radiographs and CT scans." *Nature Machine Intelligence* 3.3 (2021): 199-217.

In the real world, many data& AI projects fail

Many organizations are launching data analytics or AI projects **without having a clear assessment** of their potential impact. In many cases this leads to failed projects or poor ROIs.

From an organizational perspective, **non-functional** solutions are the most common and the most **costly**

80% of AI projects fail



Non functional AI

Dictionary

Definitions from [Oxford Languages](#) · [Learn more](#)



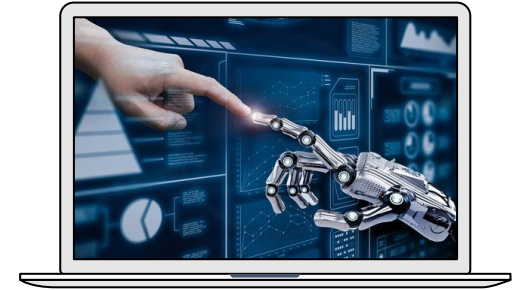
functionality

/ˌfʌŋ(k)ʃəˈnælɪti/

noun

1. the quality of being suited to serve a purpose well; practicality.
"I like the feel and functionality of this bakeware"
2. the range of operations that can be run on a computer or other electronic system.
"new software with additional functionality"

How did we get here?



- Highly competitive field and industries
- Overhyped AI capabilities
- Lack of (long- term) strategy around AI and data analytics
- Challenges around data quality & availability
- AI saviorism

D. Schwarz et al. A Framework for the Systematic Evaluation of Data and Analytics Use Cases at an Early Stage. Hawaii International Conference on System Sciences 2021

AI Saviorism

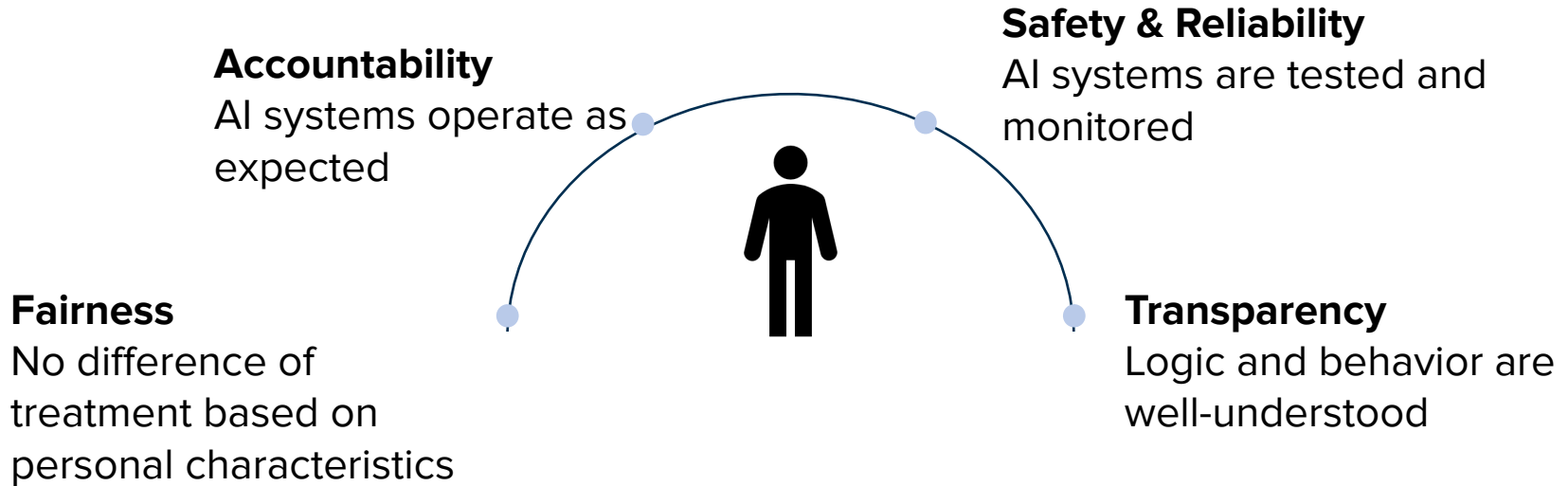
The view that AI-driven systems **can solve** societal challenges, while **ignoring** the technical, societal, economic and domain-specific constraints that make them **unusable** in practice.

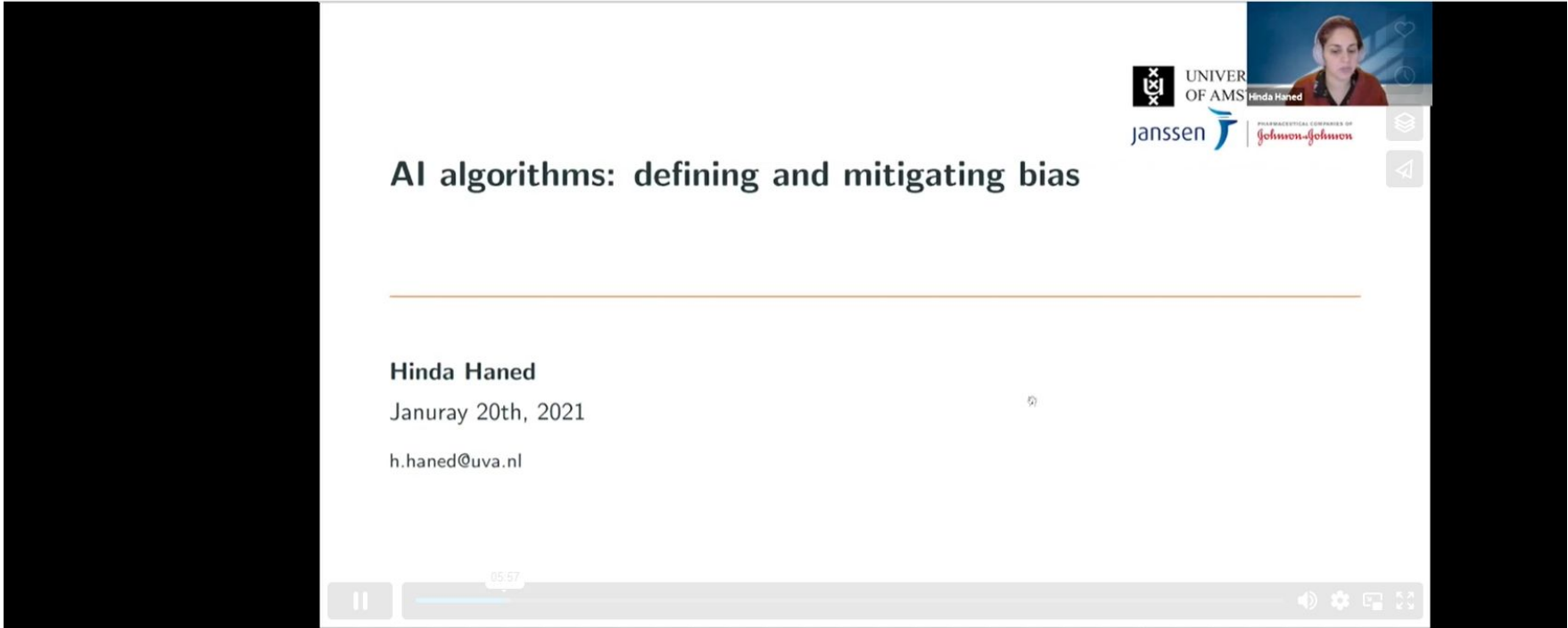
How could this be solved?

Responsible AI

A set of best practices, guidelines, and tools that ensure any AI-driven system is trustworthy, safe, and respectful of human rights and dignity

FAST principles





The video player displays a slide with the following content:

- AI algorithms: defining and mitigating bias**
- Hinda Haned**
- Januray 20th, 2021
- h.haned@uva.nl

Logos for UNIVER OF AMS, janssen, and PHARMACEUTICAL COMPANIES OF Johnson-Johnson are visible in the top right corner of the slide. A video player control bar is at the bottom of the slide, showing a play button, a progress bar at 85:57, and volume, settings, and full screen icons.

ICT Tafel - Online lezing 20 jan 2021

Do more with your account

AI regulation



EUROPEAN COMMISSION

Brussels, 21.4.2021

COM(2021) 206 final

2021/0106(COD)

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

LAYING DOWN HARMONISED RULES ON ARTIFICIAL INTELLIGENCE (ARTIFICIAL INTELLIGENCE ACT) AND AMENDING CERTAIN UNION LEGISLATIVE ACTS

{SEC(2021) 167 final} - {SWD(2021) 84 final} - {SWD(2021) 85 final}



INDEPENDENT

**HIGH-LEVEL EXPERT GROUP ON
ARTIFICIAL INTELLIGENCE**

SET UP BY THE EUROPEAN COMMISSION



**ETHICS GUIDELINES
FOR TRUSTWORTHY AI**

Responsible AI

- Risk-based approach
- Focus on high-risk applications
- Avoid or mitigate harm or (potential) bias

Functionality as an afterthought

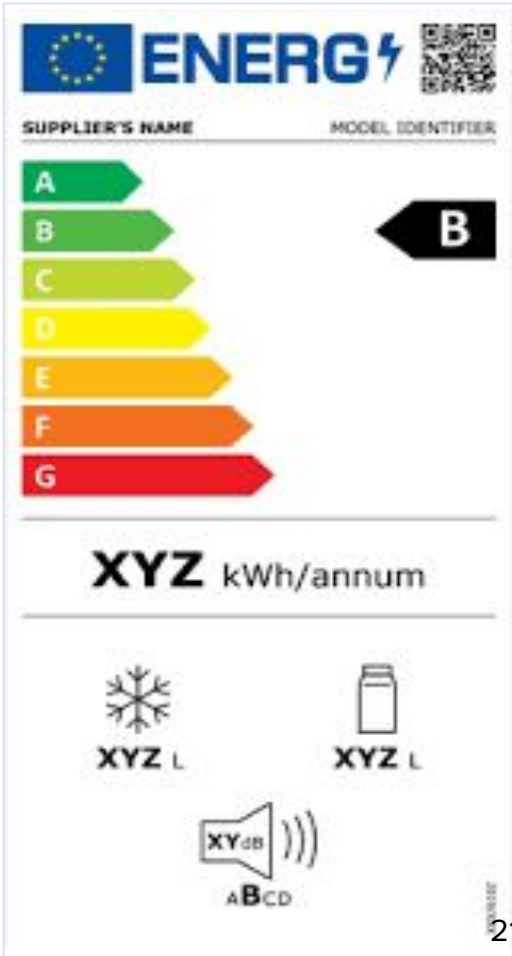
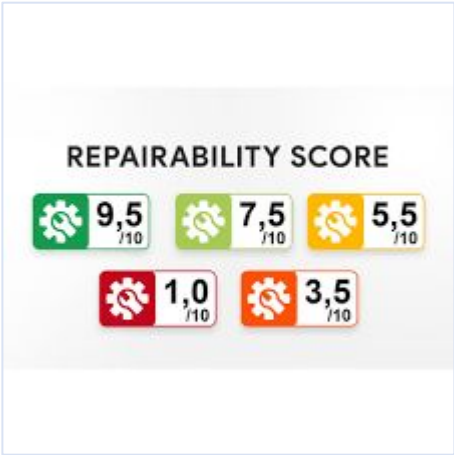
Problem definition

- Many organizations lack the ability to prioritise projects based on their needs
- Complex AI landscape requiring advanced technical skills
- Common problem with information overflow



Simplify complex information into straightforward and concrete scores

Common labels for decision-making



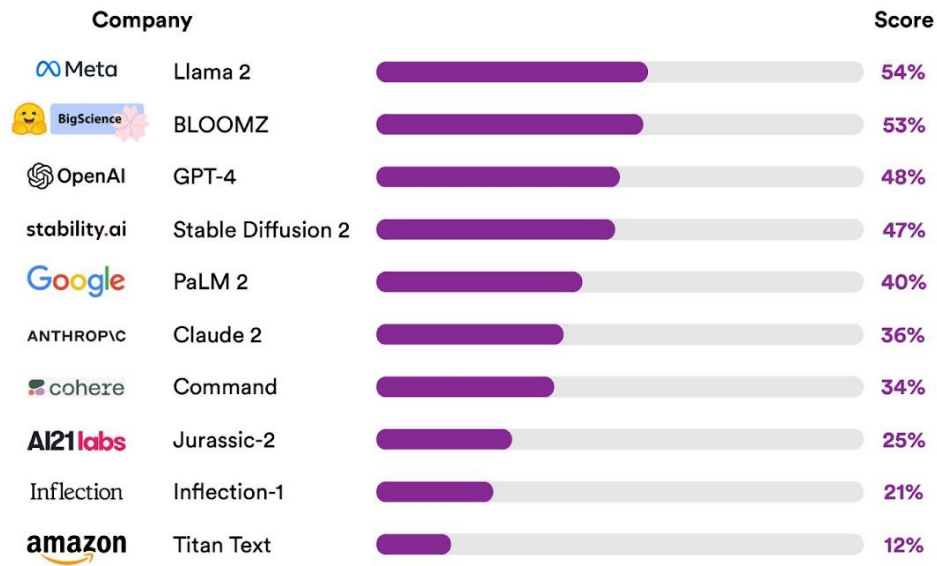
What if we could have an index that tells us how **functional** a given AI project will be for our organization?

State of the Art

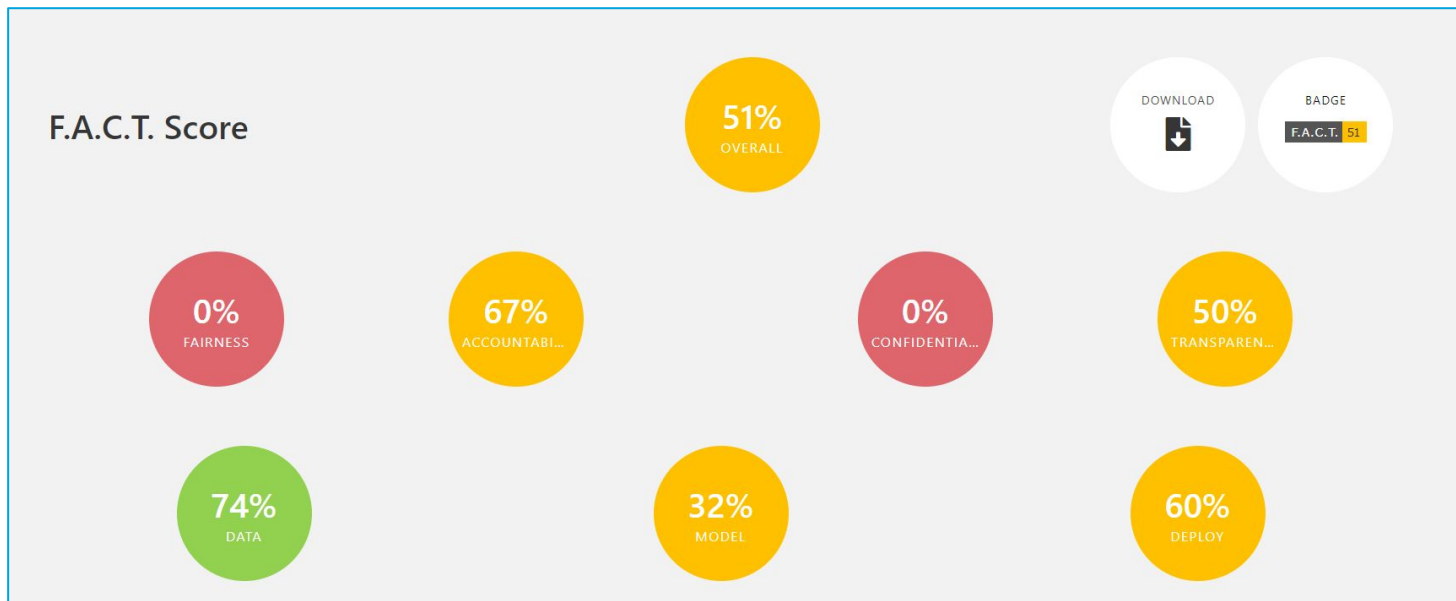
LLMs transparency index

Foundation Model Transparency Index Total Scores, 2023

Source: 2023 Foundation Model Transparency Index



FACT score for responsible AI




An initiative of
the Netherlands
Red Cross

https://rodekruis.github.io/responsible_ai

Data nutrition label

<https://datanutrition.org/>



DATA NUTRITION PROJECT

Get more details >

75% COMPLETENESS

What is this label?
The Dataset Nutrition Label enhances context, contents, and legibility of datasets. Information about this Dataset Nutrition Label, a standard of documentation that describes how to understand and use this dataset.

Consulted by	Name T. at DNP
First published on	Apr 6, 2021
Last updated on	Jan 6, 2022
Label version	Version 2.0

Hide ^

Public

Studies of Human Cognition with Neural Language Models

Preview data Download PDF

Description

Using crowdsourcing framework MTurk, researchers first collect recalled stories and summaries from workers, then provide these summaries to other workers who write imagined stories. Finally, months later, researchers collect a retold version of the recalled stories from a subset of recalled authors.

Keywords

Language Memory Cognition
Computer science Machine learning

How to use it?

Safe Caution Risky Unknown

- Intended Use**
Examining cognitive processes of remembering and imagin... [Read more](#)
- Restrictions on Use**
Change this copy with restrictions on use ... [Read more](#)
- Known Use**
Recollection versus imagination: Exploring memory an... [Read more](#)
- Do Not Use**
Predicting characteristics of specific U.S. sub-populations... [Read more](#)

About the dataset


People

Created by M. Sap, Y.Choi & 4 others

Owned by M. Sap, Y.Choi & 4 others

Inference Risks

At-a-glance



Thorough review of scientific & industry literature

Core idea

Indicators transform complex constructs into concrete easy-to-understand scores

Requirements

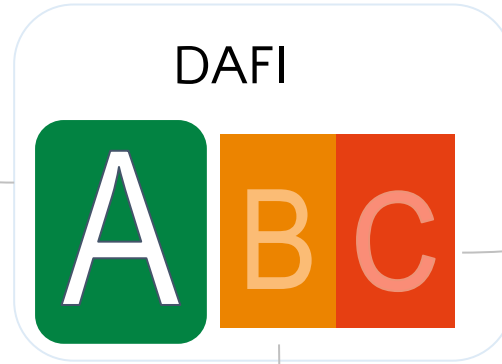
- Must be generalisable
- Must be easy to understand
- Must be fast to compute



DAFI: Data Analytics Functionality Index

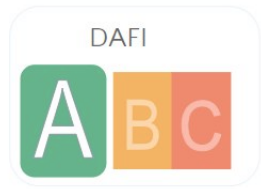
High potential project

High risk project, consider parking or postponing



Moderate potential, requires scoping and preparation

Indicators for functionality



UTILITY

Verifies how well the business question is defined.



FEASIBILITY

Measures strategic and operational feasibility within the organization.



Measures the actionability of the project's outcomes.

MEASURABILITY



Checks if the system can be validated and therefore trusted.

VERIFIABILITY



Indicators for functionality



A score is calculated for each indicator, and an overall score is used to determine the DAFI of the project.





DAFI questionnaire

Utility	Assessment
Is the business question well-defined?	no ▼
Is the project mapped to a clear KPI?	yes ▼
Are the expected outcomes aligned with the data strategy?	no ▼
Does the tool/model impact one or several quantitative KPIs? (e.g. sales forecast accuracy)	no ▼
Are the project's outcomes expected to improve a current business process?	no ▼
Feasibility (strategic & operational)	Assessment
Is the project supported and facilitated by clearly identified stakeholders?	no ▼
Do the stakeholders or domain experts involved have the required expertise?	no ▼
Have any regulatory or compliance-related constraints been identified and tackled?	no ▼
Are there clear resources (people, infrastructure) assigned to the project?	no ▼
Has a similar project been previously conducted in the organisation?	yes ▼
Are the required tools to process the data and build any data-related product (models) available?	yes ▼
Is the data required for the project readily available and accessible?	yes ▼

Benefits



Transparency

DAFI's criteria help shed light on details and pre-conditions for the project's execution.

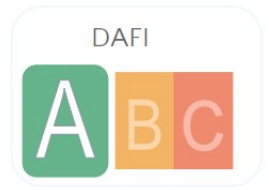
Reduced Complexity

Projects functionality is translated in a single easy-to-understand visual information.

Improved decisions

DAFI helps make informed decisions on whether or not to invest organizational resources in a project.

Limitations



- Over-simplification of a process and data
- Indicators should always be considered in conjugation with other business KPIs and practices

Use cases

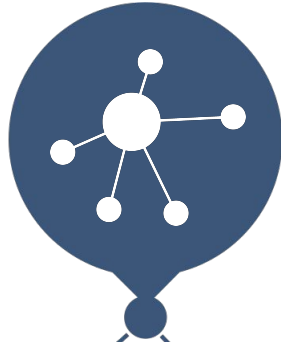
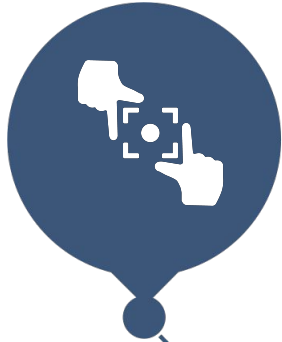


Use case #1: clothing company investing in a new AI product to enhance customer service

Pain points

- Multiple vendors
- Limited AI literacy
- Past experience of costly, non-functional AI solutions

Approach



SCOPING

Framing &
understanding the
problem

MAPPING

KPIs, Stakeholders, Skills,
Processes

TESTING


DAFI calculator

REFLECTING

Results & mitigation
plan

Vendor evaluation

- Several solutions were evaluated
- Internal discussions about what is actually needed and why
- Only one vendor presented a solution that could have been of use

 DAFI	DAF-index
Vendor 1	A
Vendor 2	C
Vendor 3	C

Lessons learned

“Sure, the DAFI score is a good **benchmark**, but for us, the real win was the **deeper dive into our data governance**. Identifying **weaknesses**, evaluating vendors critically - that's where the magic happened. The score itself? Just a reflection of the progress. I recommend the DAFI Index, but remember: it's a process, not a magic number. Embrace the journey, and the results will follow.”

- CEO retail company

Use case #2: succession planning tool



Pain points

- Solution evaluation
- Limited internal AI literacy
- Critical application with high risk of unintended algorithmic bias

DAFI as an impact assessment tool

- DAF-index: **B**
- High **utility**, low **measurability**, low **verifiability** score
- Debate of utility vs. risks of algorithmic bias

Conclusion:

- need to focus on re-scoping internal process where the tool would have been useful
- Impact assessment of the tool before deployment



Use case #3: government-affiliated agency investing in AI to prevent fraud

Pain points




- Solution evaluation
- Limited internal AI literacy
- Critical application with high public scrutiny

DAFI as an impact assessment tool

- Current solution: low **verifiability** score
- Internal discussion about KPIs linked to fraud detection vs. budget and cost
- DAFI not reported

Conclusion: need to focus on improving model quality and investing in monitoring

Other use cases

Retail Predicting next week's online sales	
Banking Project: Customer lead generation	
Cybersecurity Project: Personalised phishing campaigns	



Thank you!

Any questions ?

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- functionalai.org