Management Information Systems (MIS)

37C00100 Spring 2024

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School of Business

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Learning objectives today

Brief course wrap-up

- Know how the ISS field has evolved in 50+ years
- Know digital maturity state of companies
- Know latest trends for digital & data leadership
- Know skills that are valued in business

& Further learning

- Know where can you study more the MIS course topics
- Know the question types in the exam
- Rehearse answering to exam questions via Presemo

Brief course wrap-up and latest company surveys

Recap from 1st lecture:

Discipline behind MIS is Information Systems Science (ISS), which is a relatively young business school discipline (ca. 55 years).

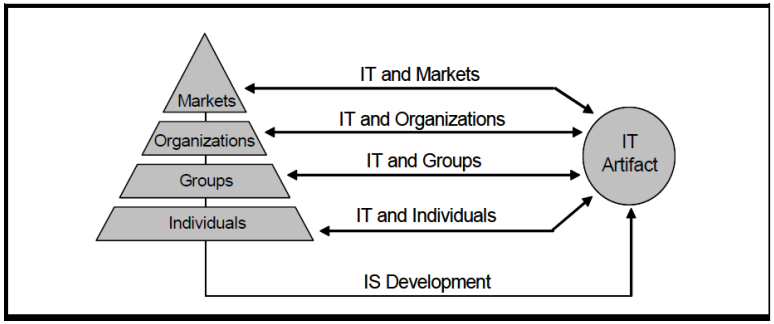


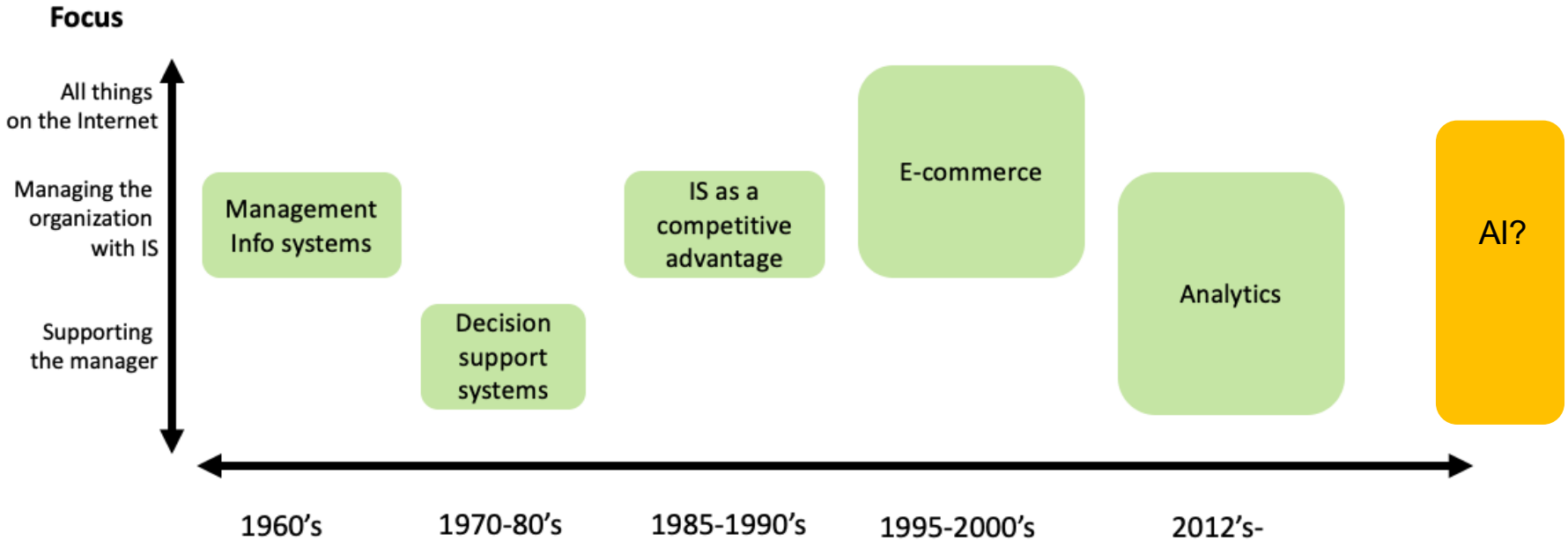
Table A1. High-Loading Terms for the 5-Factor Solution

F5.#	F5 Label	Top 30 Terms
F5.1	IT and Organizations	plan, strateg, busi, firm, organiz, execut, competit, issu, organ, resourc, success, invest, industri, chang, project, system, coordin, role, implement, innov, integr, advantag, technologi, compani, knowledg, inform, corpor, factor, capabl, valu
F5.2	IS Development	dss, decision, design, system, problem, approach, method, requir, databas, techniqu, methodologi, expert, applic, analysi, tool, support, gener, framework, propos, prototyp, base, knowledg, evalu, structur, softwar, object, solv, maker, environ, plan
F5.3	IT and Individuals	instrum, valid, measur, construct, perceiv, satisfac, usag, accept, reliabl, user, factor, eas, influenc, test, job, variabl, survei, comput, behavior, empir, success, individu, inten, attitud, scale, adop, train, relationship, determin, find
F5.4	IT and Markets	price, market, consum, product, seller, custom, buyer, onlin, cost, invest, electron, servic, supplier, firm, trade, network, valu, transac, trust, profit, internet, commerc, econom, optim, strategi, industri, vendor, increas, offer, reduc
F5.5	IT and Groups	gss, team, meet, task, commun, collabor, outcom, gdss, trust, facilit, work, particip, social, experi, support, interac, instrum, electron, learn, virtual, influenc, comput, individu, behavior, idea, perceiv, affect, em, structur, mediat

Source: Sidorova et al. (2008), "Uncovering the Intellectual Core of the IS Discipline", *MIS Quarterly*, 32(3), 467-482.

Main topics studied based on Topic modelling (LDA)

Development of central themes in ISS (MIS) discipline based on Distinguished Prof. Emeritus Joey George



Based on: George, Joey F. and Hadidi, Rassule (2023) **"What's in a Name? Central Themes in MIS Since the Field's Founding**," *Journal of the Midwest Association for Information Systems,* Iss. 1, Article 1, Available at: https://aisel.aisnet.org/jmwais/vol2023/iss1/1

Main IS conferences' tracks 2024: ICIS, HICSS and ECIS

- Digital Platforms for Emerging Societies
- General IS Topics
- Digital Learning and IS Curricula
- Digital Technologies and the Future of Work
- Societal Impact of IS
- Cybersecurity and Privacy
- Blockchain, DLT, and Fintech
- Sharing Economy, Platforms, and Crowds
- Human Technology Interaction
- AI in Business and Society
- IS Design, Development and Project Management
- IT Implementation and Adoption
- Data Analytics for Business and Societal Challenges
- Digital Innovation, Transformation, and Entrepreneurship
- Social Media and Digital Collaboration
- Information Systems in Healthcare
- IoT, Smart Cities, Services, and Government
- Governance, Digital Strategy, and Value
- Organizing Business Processes in the Digital Age
- Advances in Methods, Theories, and Philosophy
- User Behaviors, User Engagement, and Consequences
- Digital and Mobile Commerce
- Enterprise Systems
- Practitioner-Oriented Research
- Literature Review

COLLABORATION SYSTEMS AND TECHNOLOGIES	DECISION ANALYTICS AND SERVICE SCIENCE	DIGITAL AND SOCIAL MEDIA
DIGITAL GOVERNMENT	ELECTRIC ENERGY SYSTEMS	INFORMATION TECHNOLOGY IN HEALTHCARE
INTERNET AND THE DIGITAL ECONOMY	KNOWLEDGE INNOVATION AND ENTREPRENEURIAL SYSTEMS	ORGANIZATIONAL SYSTEMS AND TECHNOLOGY
SOFTWARE TECHNOLOGY	SPECIAL TRACK: INFORMATION TECHNOLOGY, SOCIAL JUSTICE, AND MARGINALIZED CONTEXTS	SPECIAL TRACK: LOCATION INTELLIGENCE

- Track 01 | People First: Constructing Digital Futures Together
- Track 02 | General Track
- Track 03 | Artificial Intelligence in IS Research and Practice
- Track 04 | Impact of Artificial Intelligence on Organizations and Society
- Track 05 | Future of Work
- Track 06 | Human-AI Collaboration
- Track 07 | Business Analytics
- Track 08 | Business Process Management and Digital Innovation
- Track 09 | Cognition and Human Behavior in Information Systems
- Track 10 | Data Management and Data Sharing in Ecosystems
- Track 11 | Digital Service Systems
- Track 12 | Digital Transformation
- Track 13 | Digitized Learning and Teaching
- Track 14 | (e)Sports, Gaming, and the Metaverse
- Track 15 | Social and Ethical Implications of ICT Use
- Track 16 | Blockchain and Fintech
- Track 17 | Green Information Systems and Sustainable Development
- Track 18 | Health Information Technology and IS for Healthcare
- Track 19 | Human-Computer Interaction
- Track 20 | IS Innovation, Adoption and Diffusion
- Track 21 | IS Strategy, Governance and Sourcing in the Digital Age
- Track 22 | Innovative Research Methods
- Track 23 | Design Research and Design Methods in Information Systems
- Track 24 | Social Media, Virtual Worlds, and Digital Work
- Track 25 | Futures: A Novel Site of Inquiry and Imagination

Good sources for finding current research topics!
Previous article PDF's can be found e.g. at
Hawaii International Conference on System Sciences 2024

Links to forthcoming conference tracks seen in the screenshots:
Track Descriptions – ICIS 2024 (aisconferences.org)
Tracks & Minitracks – HICSS (hawaii.edu)
Track Descriptions - ECIS (ecis2024.eu)

Example:
HICSS minitrack on AI, Organizing and Management
(under the Organisational Systems and Technology track)

Suggestions for research topics can be found in HICSS mini-track descriptions >

AI, ORGANIZING, AND MANAGEMENT MINITRACK

The emergence and recent popularity of ChatGPT, Bard, DALL-E, midjourney, and Stable Diffusion show the potential of generative AI. Software tools based on artificial intelligence (AI) methods are now used within a variety of organizational routines and practices, creating new types of human-machine configurations and playing an increasing role in the context of contemporary organizing. Application areas include management decision making, manufacturing, and design and creativity. These tools use machine learning models to generate predictive insights. They act increasingly autonomously—i.e., with little or no user intervention—and constitute new types of material agency in the context of contemporary organizing.

As organizations become more reliant on AI tools, they need new management theories, frameworks, and methodologies that can help them understand the implications of using these tools—both at the level of organizational structures and practices. AI based agents often rely on complex internal processing and their behavior is less predictable than that of the types of IT artifacts. This opens up a number of problem areas with regards to managing and organizing AI tools. For example:

- What is the impact of using AI on those processes that have traditionally been seen as being entirely driven and controlled by humans? What are early examples of such use?
- In particular, how can AI be useful in group and collective creative processes? Is it proving useful?
- How does coordination shift as AI tools are used, and what new types of organizational hierarchies and structures are emerging?
- How do power relations change, and how do different organizational actors use these new technologies to reshape power relations?
- How can the organization evaluate the ethical implications of deployed AI tools? How can they regulate AI tools?
- What are relevant KPIs and metrics for assessing the effectiveness of AI applications?
- How should an organization manage, staff and coordinate AI development teams?

This minitrack aims to contribute to our understanding of the mechanisms through which humans organize together with AI-based tools as well as the process organizations use to develop them.

We aim to provide a platform for thought and discussion in this important and emergent field within information systems and IT research. We invite conceptual as well as empirical contributions using different methodological approaches (qualitative, quantitative, design-oriented, simulation, etc.). We think there is a need for case studies, trace data analysis, and ethnographies. We would prefer theory development pieces to frameworks and lit reviews. In addition to the questions raised above, potential topics include, but are not limited to:

- Trace data: how is AI actually being used?
- Case Studies and ethnographies: What are people learning? What are the machines learning? What are organizations learning?
- AI & coordination: How does AI change the way humans coordinate?
- AI & crypto: How can smart contracts and DAOs create new organizational forms? Are there interesting examples in enterprises? In the public sphere?
- AI & power: How does AI affect corporations, markets, and peer production structures? Who is capturing value?
- AI & governance: Who runs the technology? What does the technology run?
- AI & software development: How to manage AI project and deployment risk?
- AI as coder: how well do co-pilot and other tools work in terms of increasing programmer productivity?
- AI & creativity: How can AI be creative? How can humans and AI be co-creators? How does and should attribution work when AI synthesizes based on human-created artifacts?
- AI & design: What has AI designed? Can it and should it design itself?
- AI & innovation: How does AI foster or corrupt innovation?
- AI & news work: How does AI change news and civic engagement?
- AI & crowds: What do crowds do for machine learning, and what's in it for the crowds?
- AI & organizational routines: How does AI change the nature of work?

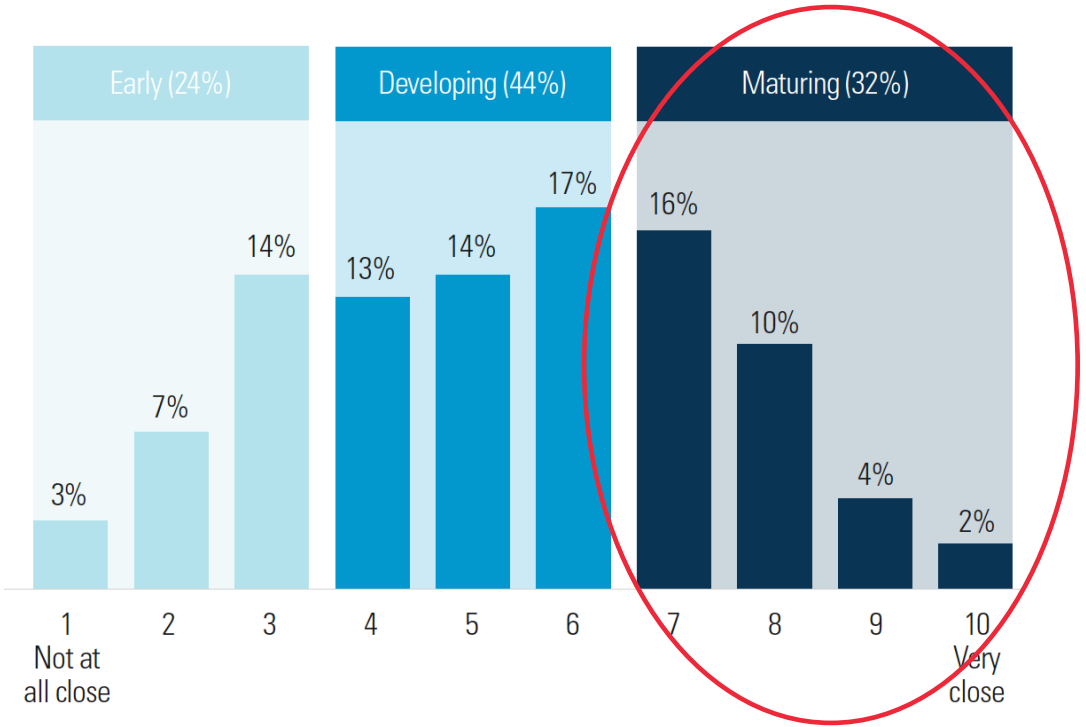
Organizational Systems and Technology – HICSS (hawaii.edu)

Global survey* on companies' digital maturity – in 2018 – how about currently?

The respondents were asked to imagine **an ideal organization utilizing digital technologies and capabilities to improve processes, engage talent across the organization, and drive new value-generating business models.**

They were then asked to **rate their company against that ideal on a scale of 1 to 10**.

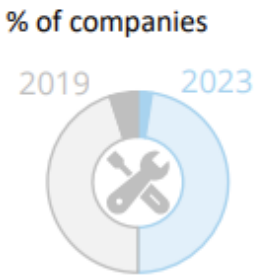
Three maturity groups were observed: **early** (1-3), **developing** (4-6), and **maturing** (7-10).



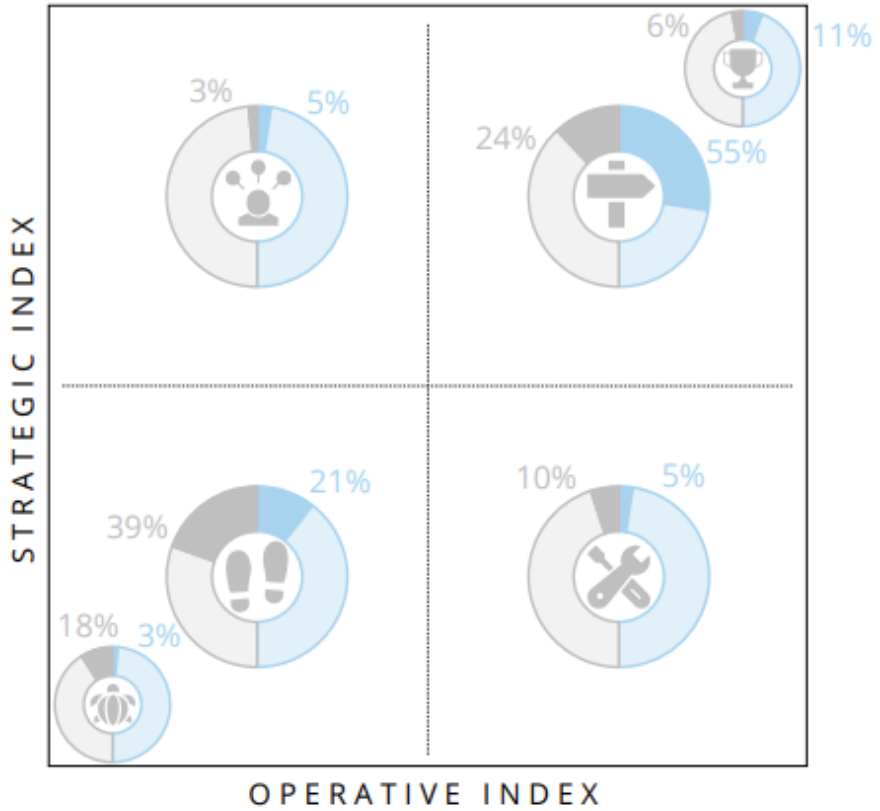
Source: Kane et al. (2019), "Accelerating Digital Innovation Inside and Out", *MIT Sloan Management Review* with Deloitte Digital, https://sloanreview.mit.edu/projects/accelerating-digital-innovation-inside-and-out ***Survey of over 4800 respondents and 14 interviews in 125 countries & 28 industries in Fall 2018.**

Deloitte's latest digital maturity index survey 2023

Archetypes distribution from 2019 to 2023

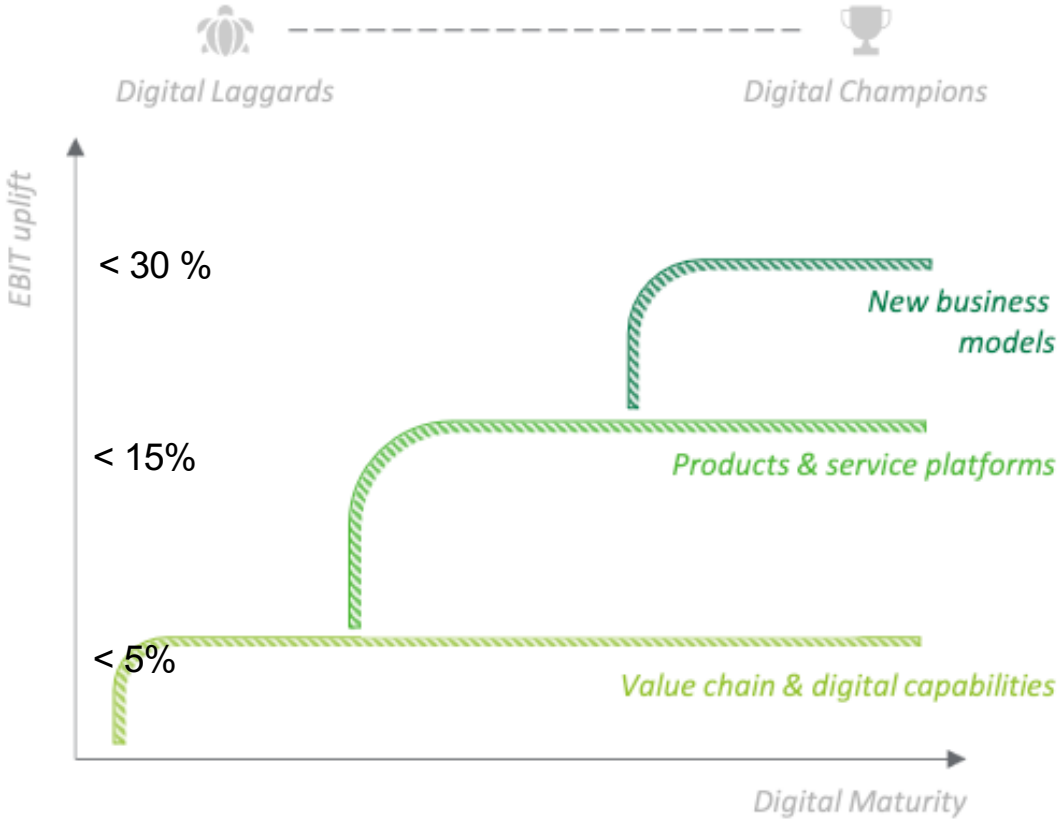


Champions + Potentials from **30% to 66%** in 5 years
(24%+6% and 55%+11%)



Deloitte Digital 2023: Digital Maturity Index Survey 2023, Enabling business growth through digitalization, https://www2.deloitte.com/content/dam/Deloitte/de/Documents/industry-operations/Deloitte-Digital-Maturity-Index-Survey-2023.pdf

Digital Maturity drives profitability uplifts



NEW BUSINESS MODELS

The faster strategic measures, such as the creation of digital products/ services or new business models are taken, the higher the success

PRODUCTS & SERVICES PLATFORMS

Significant investments and the creation of organizational prerequisites are the preconditions to realize higher EBIT impact

VALUE CHAIN & DIGITAL CAPABILITIES

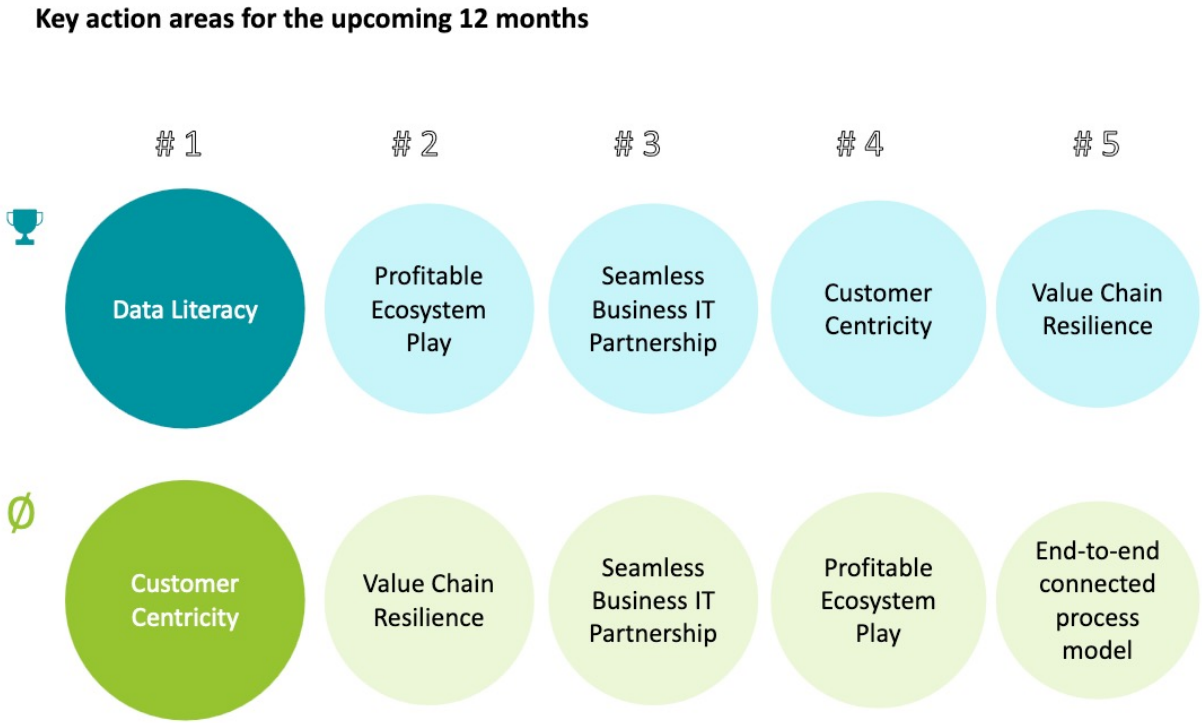
Initial EBIT impact is achieved through classic measures and use cases along the value chain and is based on efficiency gains

EBIT = Earnings before Interest and Taxes Source: Deloitte 2022: Digital Maturity Index Survey 2022, Digital value creation in an unsettled environment
https://www2.deloitte.com/content/dam/Deloitte/de/Documents/Deloitte%20Digital%20Maturity%20Index-Survey%202022.pdf

Top-5 priorities for the next 12 months

Leading companies have put data literacy as top priority to achieve end-to-end connectivity entering next transformation into a profitable ecosystem play.

However, majority of companies top priorities on CDO agendas solve key digital transformation requirements for example customer centricity, and resilience and collaboration between business and IT, which still remains a seemingly insurmountable hurdle for all companies.

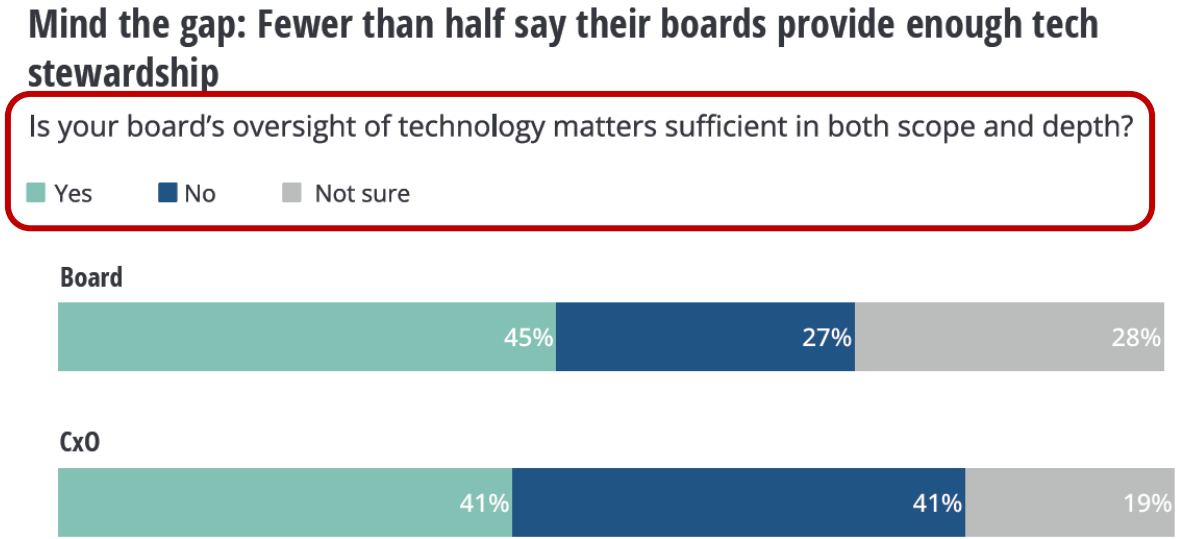


Deloitte 2022: Digital Maturity Index Survey 2022, Digital value creation in an unsettled environment
https://www2.deloitte.com/content/dam/Deloitte/de/Documents/Deloitte%20Digital%20Maturity%20Index-Survey%202022.pdf

Global Boardroom Program survey ‘22

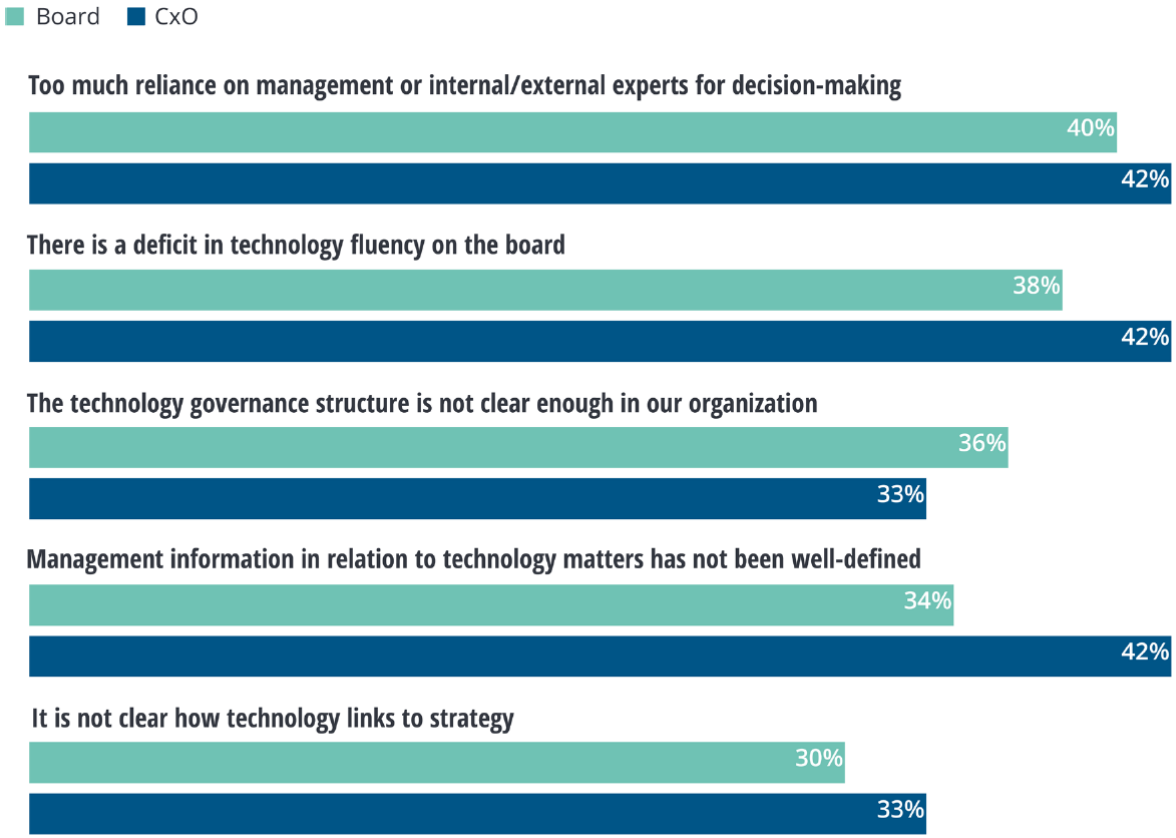
Deloitte Global Boardroom Program surveyed in 2022 over 550 directors and C-suite executives (CxOs) from companies based in 55 countries to understand the **degree of board engagement in technology** today.

The survey revealed **gaps in board understanding and engagement on digital transformation!**



Source: Touche et al. (2022) Digital frontier: A technology deficit in the boardroom
https://www2.deloitte.com/us/en/insights/topics/leadership/digital-transformation-topics-for-corporate-technology-leadership.html

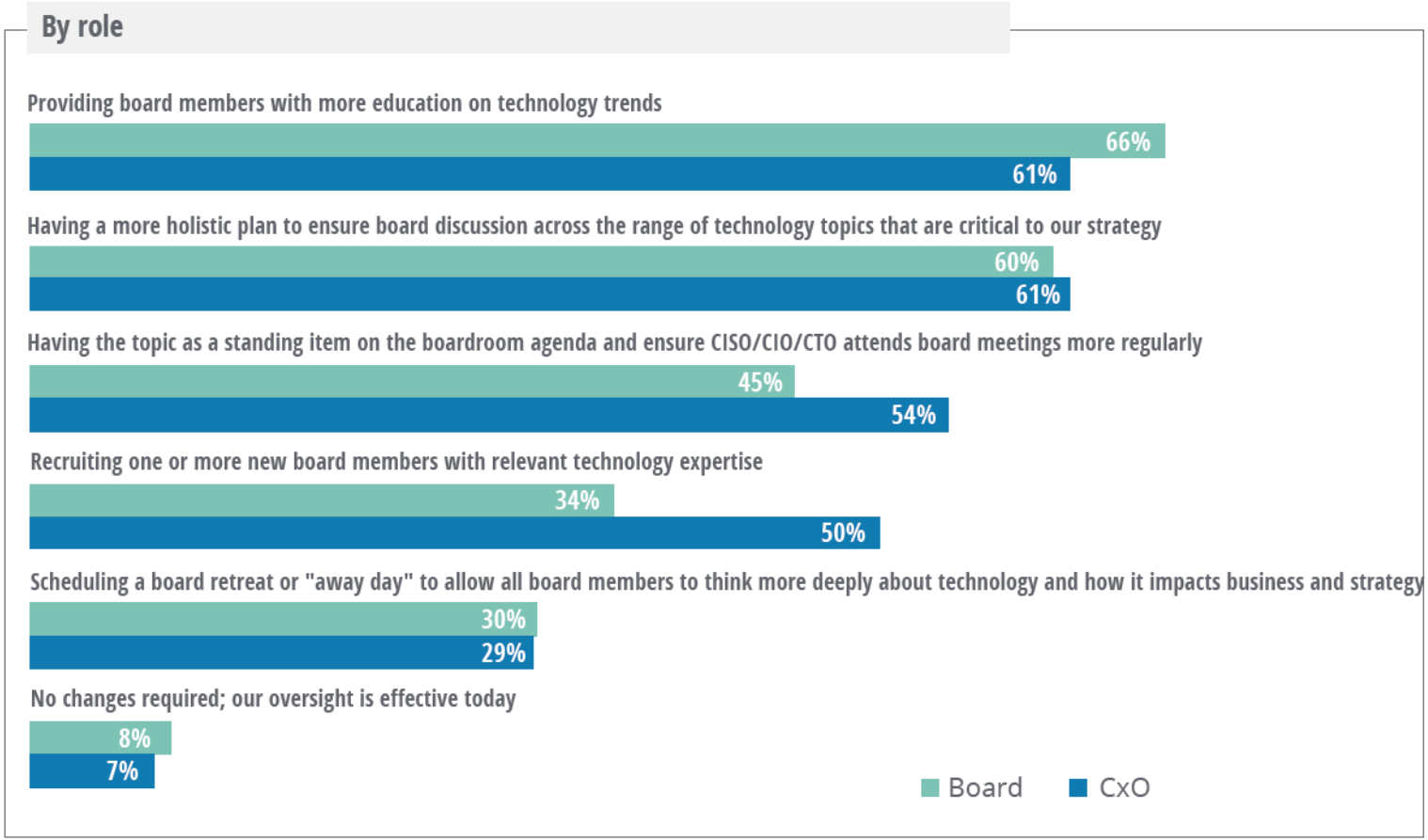
Top-5 challenges to board oversight of digital, cyber, and new tech's



Multiple-option question

Source: Touche et al. (2022) Digital frontier: A technology deficit in the boardroom
https://www2.deloitte.com/us/en/insights/topics/leadership/digital-transformation-topics-for-corporate-technology-leadership.html

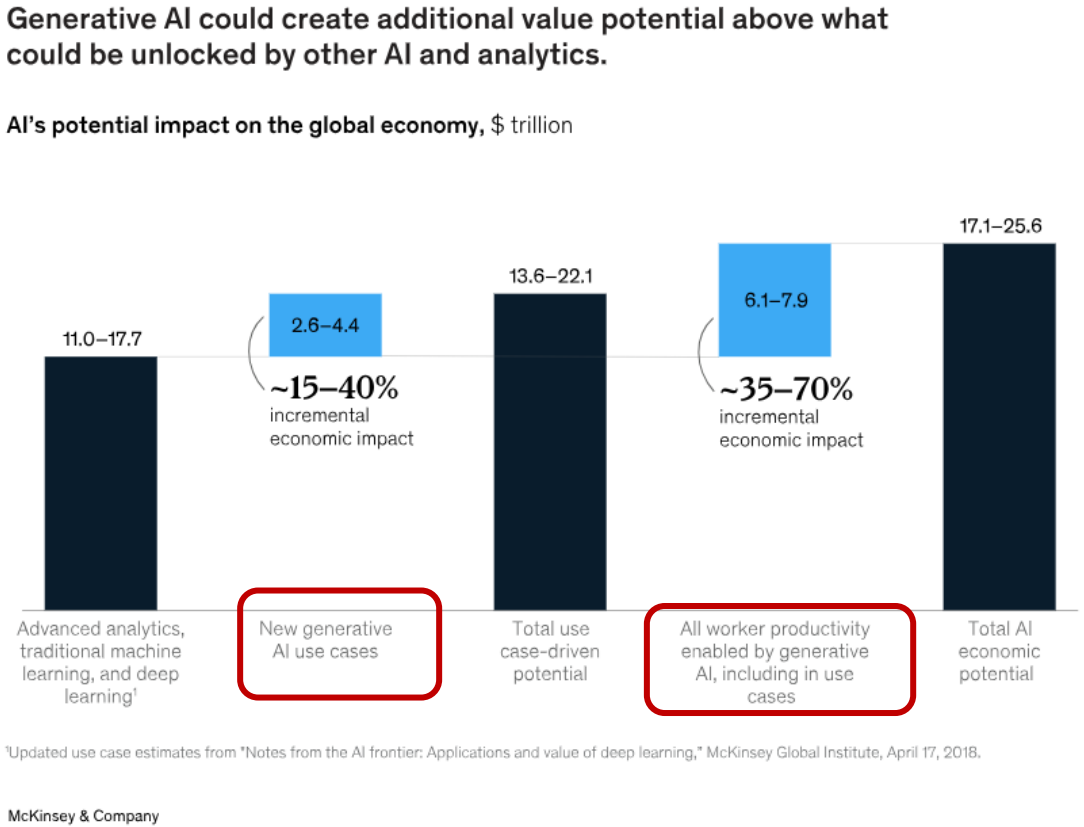
Most effective ways boards could strengthen their tech oversight



Source: Touche et al. (2022) Digital frontier: A technology deficit in the boardroom
https://www2.deloitte.com/us/en/insights/topics/leadership/digital-transformation-topics-for-corporate-technology-leadership.html

Multiple-option question

McKinsey report on the economic potential of generative AI

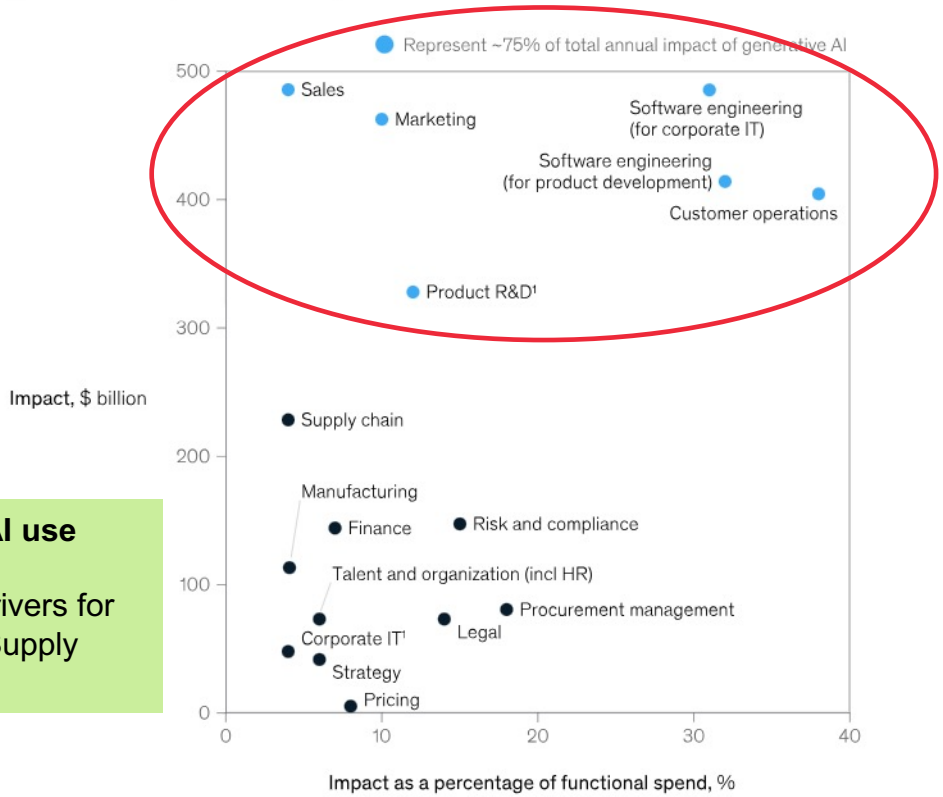


Source: McKinsey (2023): The economic potential of generative AI: The next productivity frontier, available at: https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier#business-value, June 14, 2023

McKinsey report on the economic potential of generative AI - most impact (75%) from only a few corporate functions

This is largely explained by the **nature of generative AI use cases, which exclude most of the numerical and optimization applications** that were the main value drivers for previous applications of AI (e.g. in Manufacturing and Supply chain functions).

Using generative AI in just a few functions could drive most of the technology's impact across potential corporate use cases.

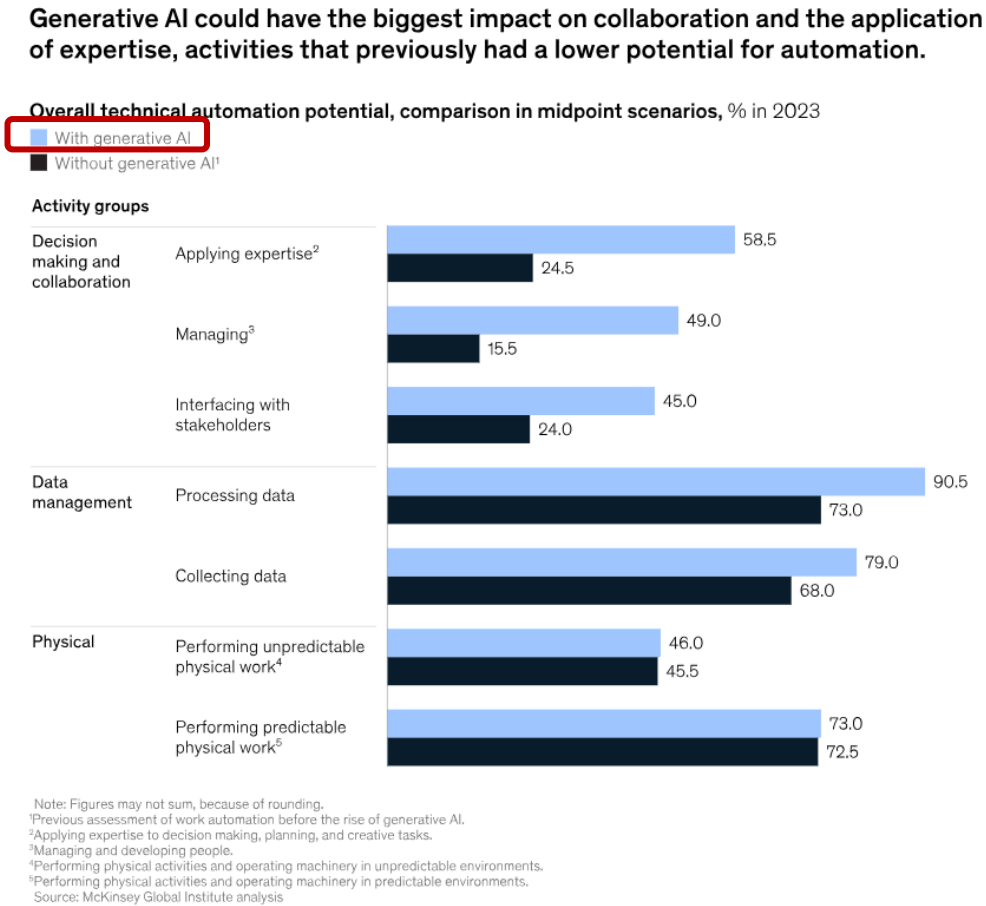


Note: Impact is averaged.
¹Excluding software engineering.
Source: Comparative Industry Service (CIS), IHS Markit; Oxford Economics; McKinsey Corporate and Business Functions database; McKinsey Manufacturing and Supply Chain 360; McKinsey Sales Navigator; Ignite, a McKinsey database; McKinsey analysis

Source: McKinsey (2023): The economic potential of generative AI: The next productivity frontier, available at: https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier#business-value, June 14, 2023

McKinsey report on the economic potential of generative AI - it could have the biggest impact on collaboration and expertise

In 2012, the McKinsey Global Institute (MGI) estimated that **knowledge workers spent about a fifth of their time, or one day each work week, searching for and gathering information**. If generative AI could take on such tasks, increasing the efficiency and effectiveness of the workers doing them, the benefits would be huge.



Source: McKinsey (2023): The economic potential of generative AI: The next productivity frontier, available at: https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier#business-value, June 14, 2023

McKinsey Global survey - GenAI related risks

Only 32% of respondents say their organizations are mitigating even the risk they consider most relevant: **inaccuracy.**

Inaccuracy, cybersecurity, and intellectual-property infringement are the most-cited risks of generative AI adoption.

Generative AI–related risks that organizations consider relevant and are working to mitigate, % of respondents[1]

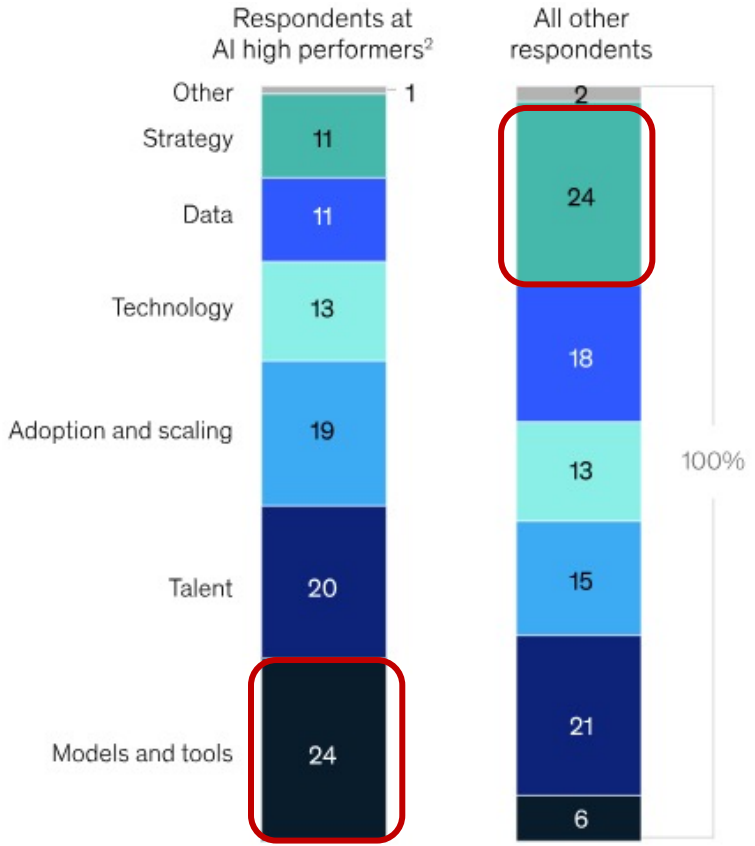
[1]Asked only of respondents whose organizations have adopted AI in at least 1 function. For both risks considered relevant and risks mitigated, n = 913.
Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

Source:McKinsey Global survey - State of AI 2023: Gen AI's breakout year (2023) https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-AIs-breakout-year

McKinsey Global survey – biggest challenges

Element that poses the biggest challenge in capturing value from AI, % of respondents[1]

Models and tools pose the biggest AI-related challenge for **AI high performers**, while **strategy** is a common stumbling block for **all others**.

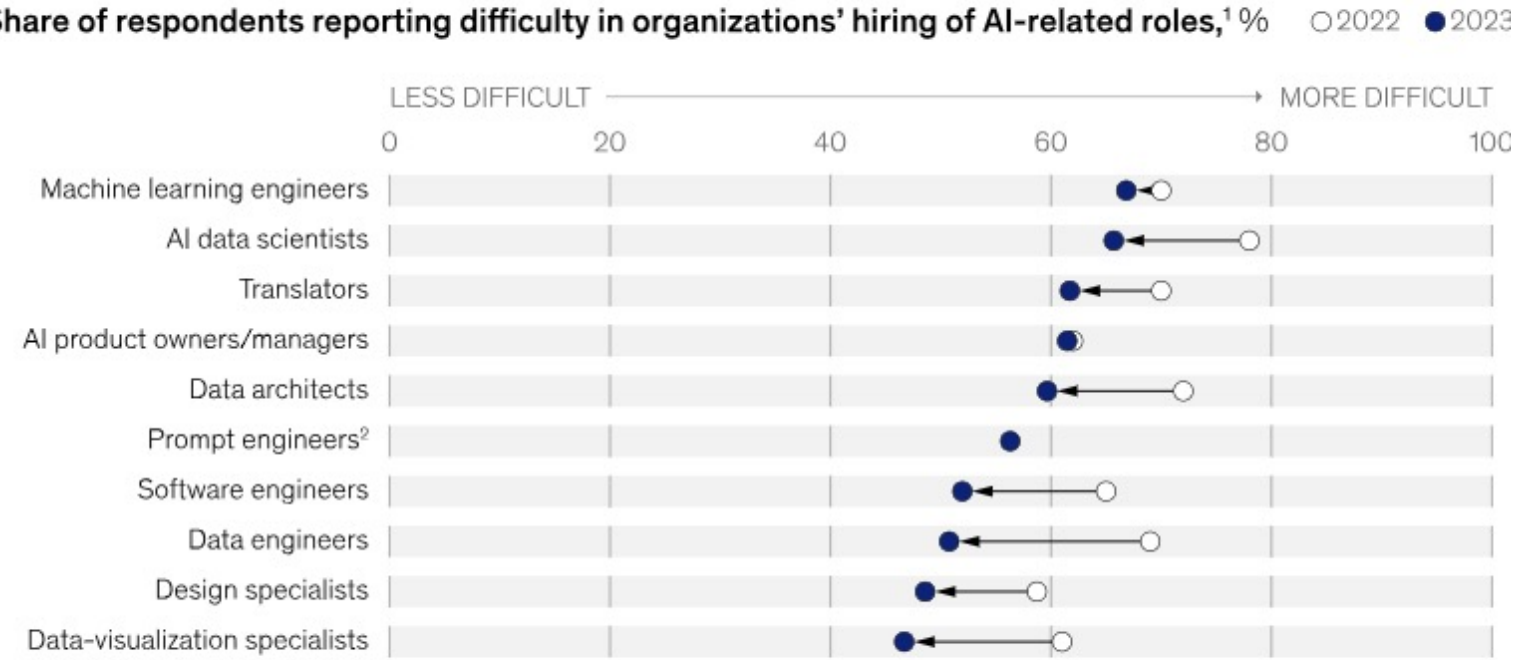


Note: Figures do not sum to 100%, because of rounding.
[1]Asked only of respondents whose organizations have adopted AI in at least 1 function.
[2]Respondents who said that at least 20 percent of their organizations' EBIT in 2022 was attributable to their use of AI. For respondents at AI high performers, n = 49; for all other respondents, n = 792.
Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

Source:McKinsey Global survey - State of AI 2023: https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-AIs-breakout-year

McKinsey Global survey - hiring for AI-related roles still challenging

Hiring for AI-related roles remains a challenge, though reported difficulty has decreased since 2022 for many roles.

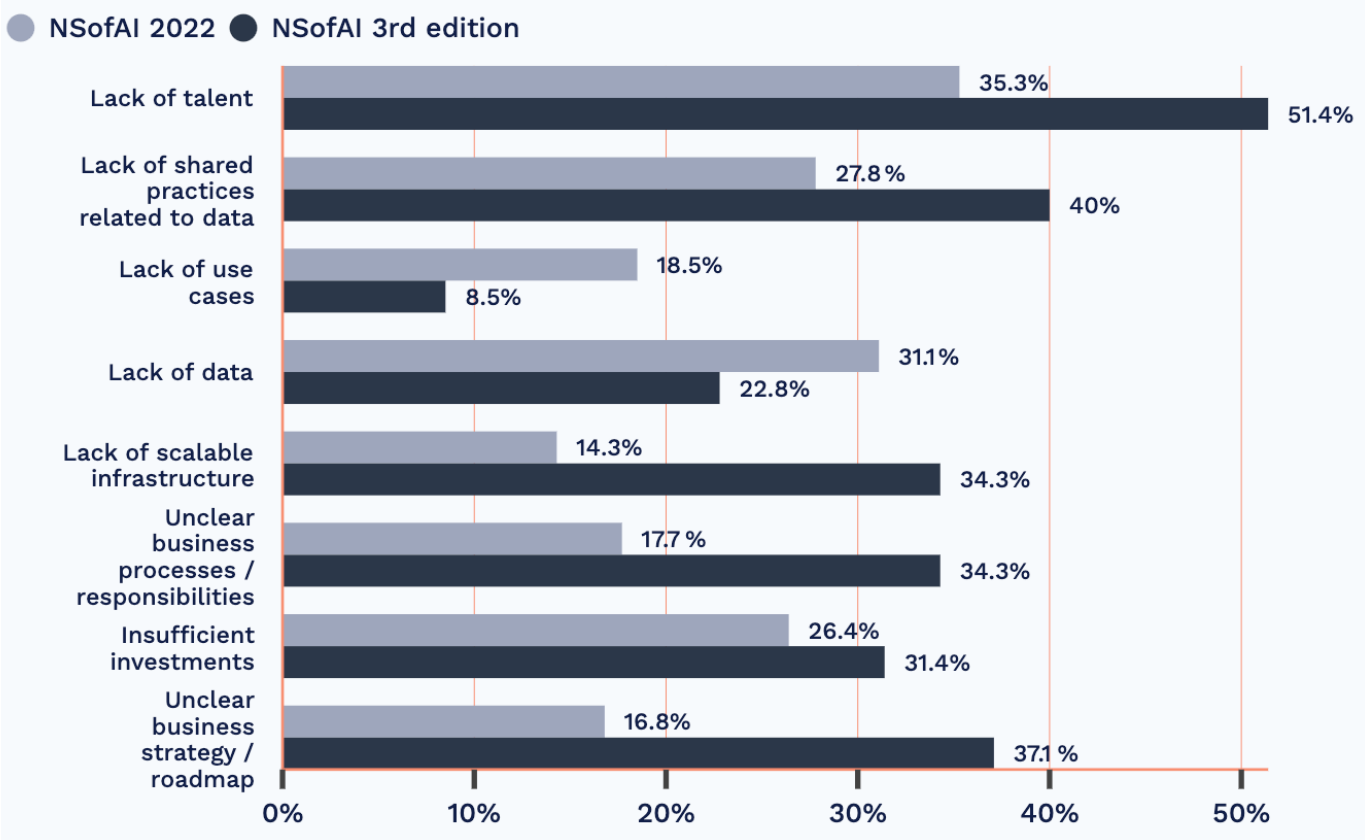


[1]Asked only of respondents whose organizations have adopted AI in at least 1 function and who said their organization hired the given role in the past 12 months. Respondents who said "easy," "neither difficult nor easy," or "don't know" are not shown.
[2]Not asked of respondents in 2022.
Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

Source:McKinsey Global survey - State of AI 2023: https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-AIs-breakout-year

SILO.ai
Nordic State of AI survey, 3rd ed.

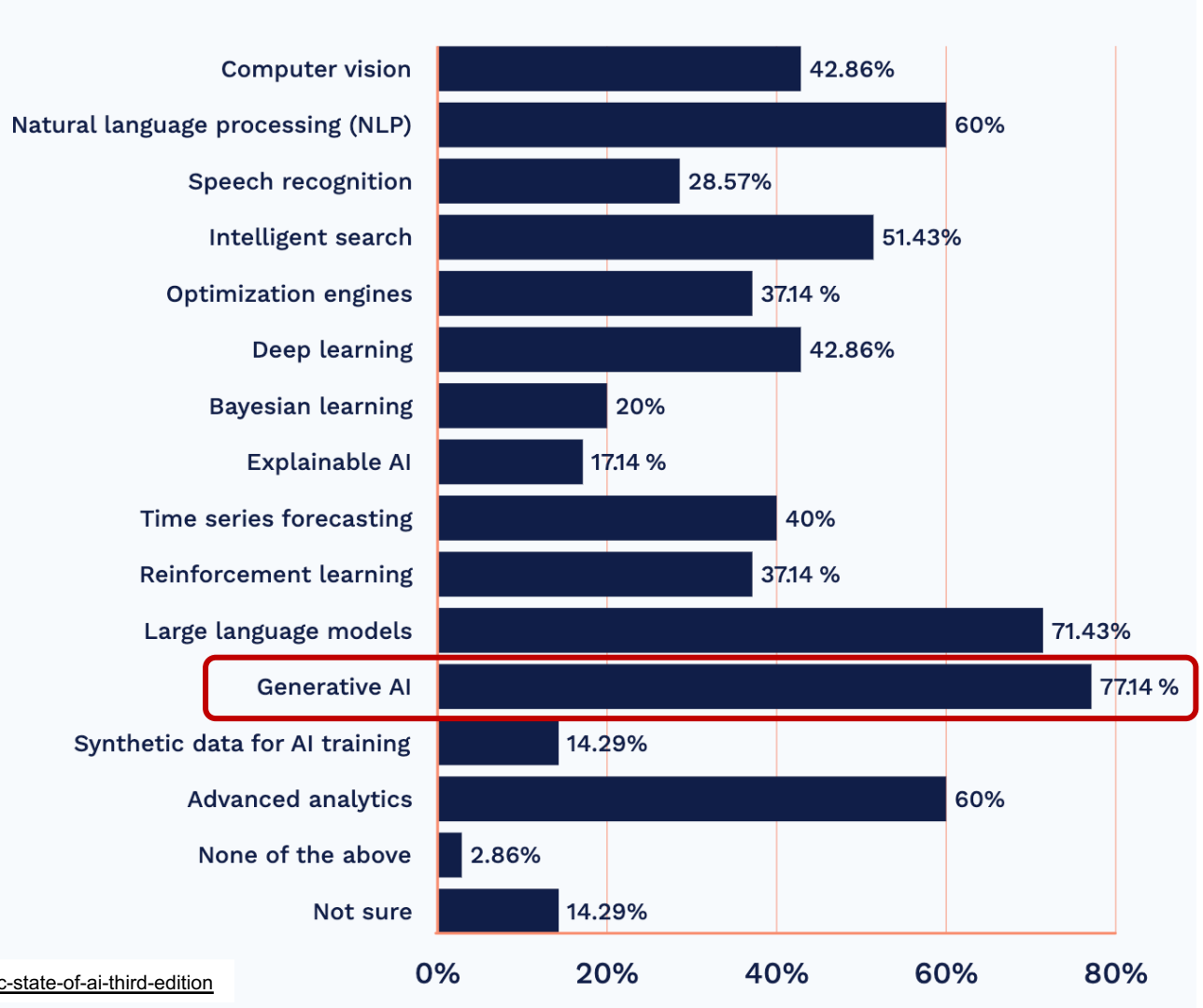
Biggest challenges in scaling the use of AI across entire company:
lack of talent, lack of shared practices related to data, and unclear business strategy/roadmap



Source: SILO.ai 2024 https://www.silo.ai/ebooks-reports/nordic-state-of-ai-third-edition

SILO.ai
Nordic State of AI survey, 3rd ed.

Which AI technologies the companies use



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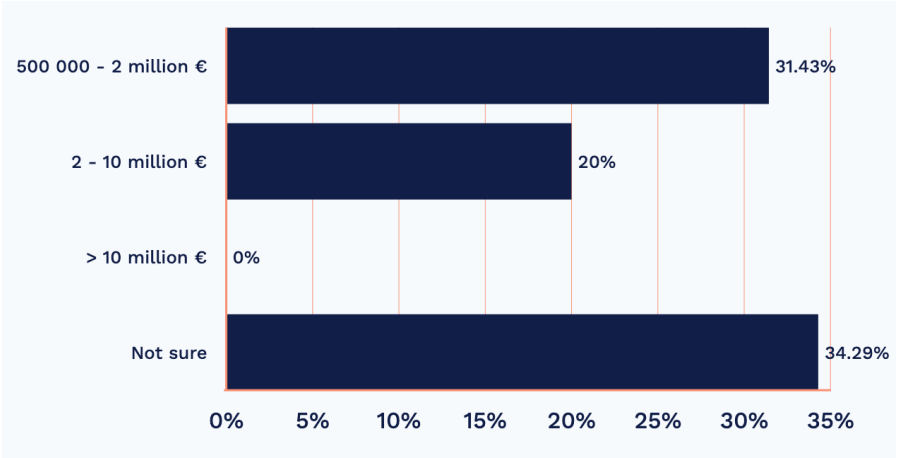
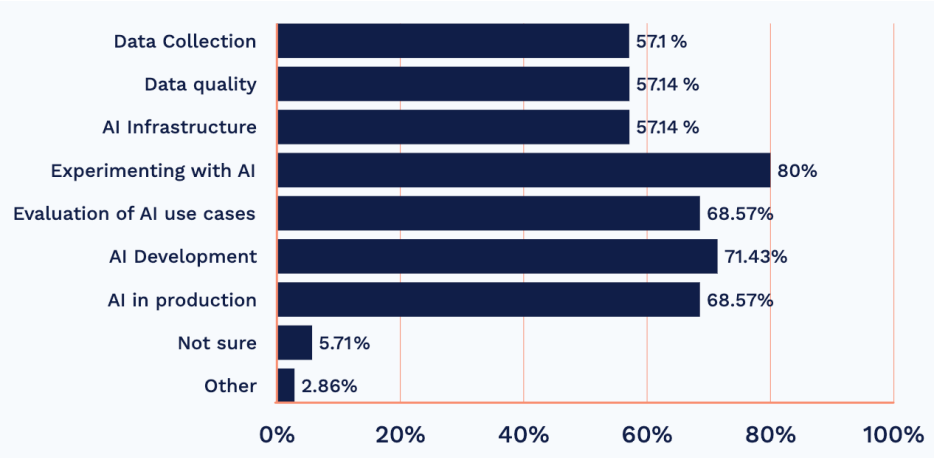
SILO.ai Nordic State of AI survey, 3rd ed.



How much are you planning to invest into AI in the next 12 months?

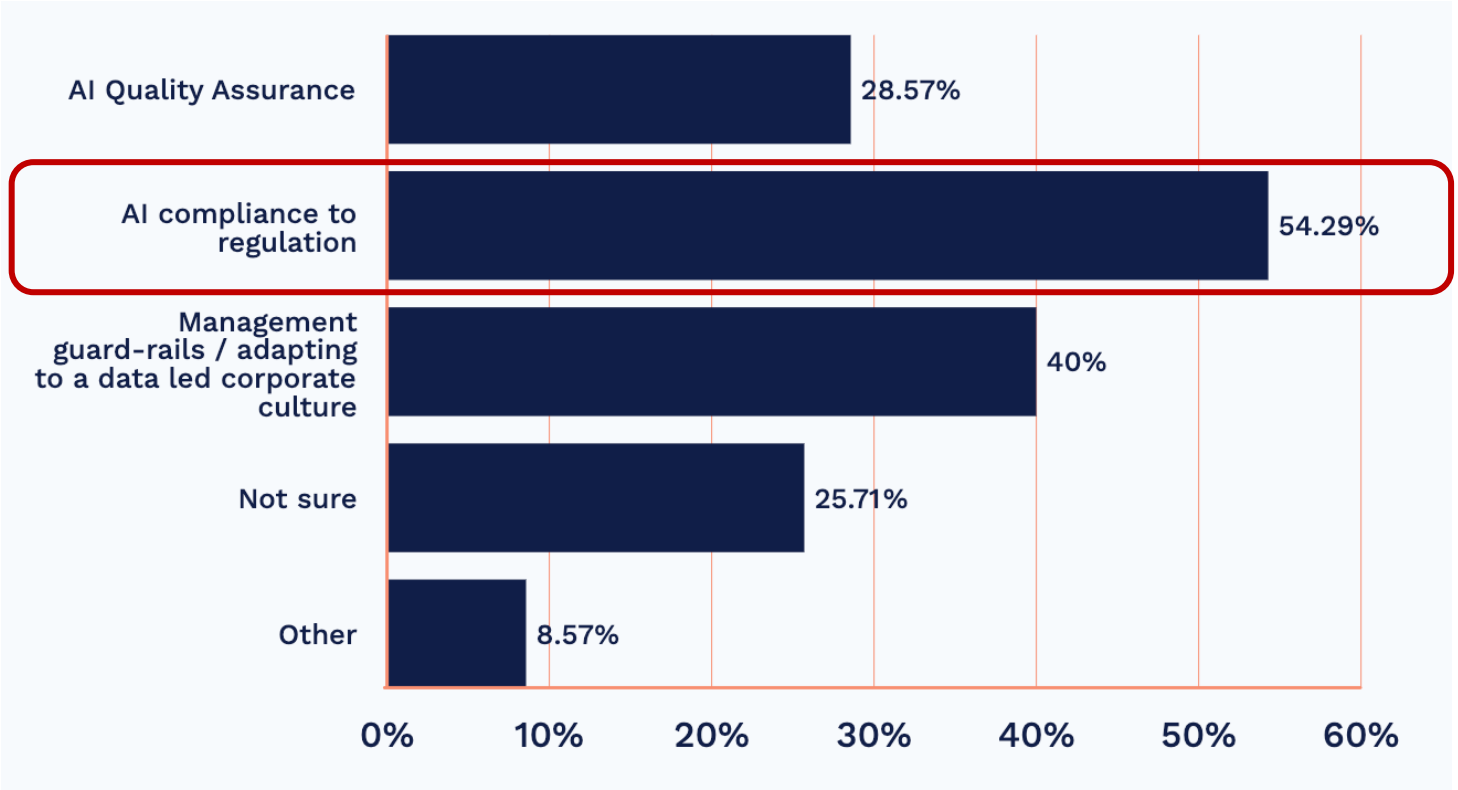


Which AI development initiatives are you investing in financially during the next 12 months?

Source: SILO.ai 2024 https://www.silo.ai/ebooks-reports/nordic-state-of-ai-third-edition

SILO.ai Nordic State of AI survey, 3rd ed.

Which AI oversight activities are you investing in financially during the next 12 months?

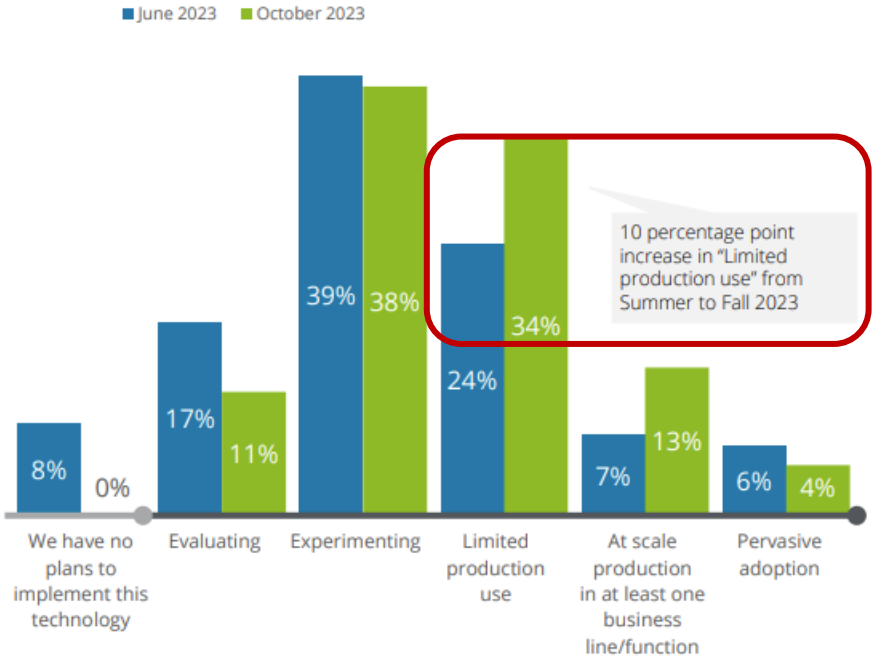


Source: SILO.ai 2024 https://www.silo.ai/ebooks-reports/nordic-state-of-ai-third-edition

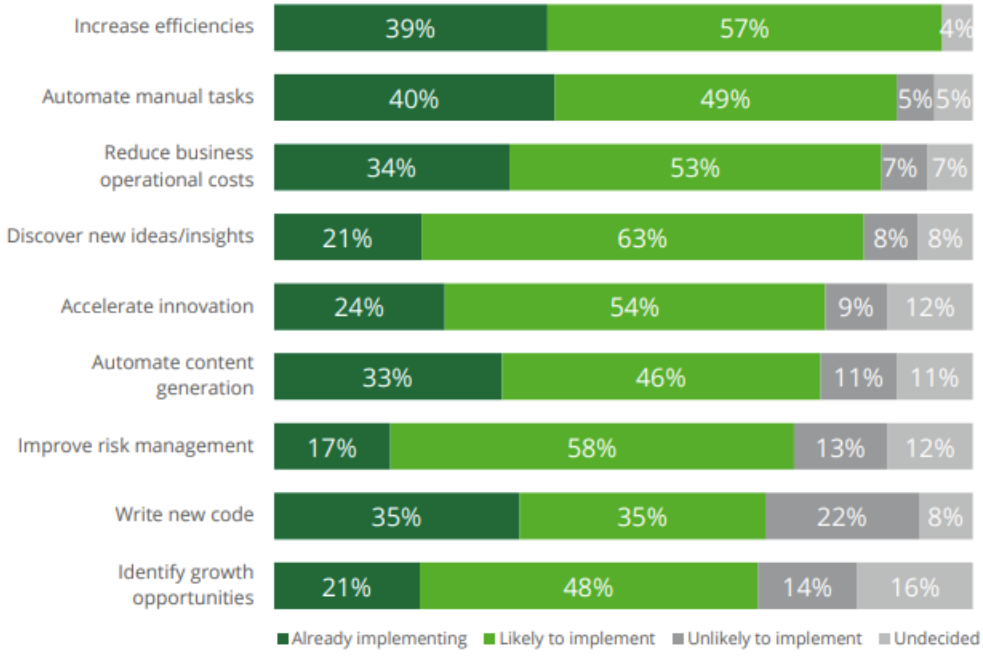
Generative AI: no longer a buzzword for CEOs, it's becoming a reality

CEOs are moving from evaluation and experimentation to broader adoption

Please indicate your organization's current level of adoption of Generative AI:



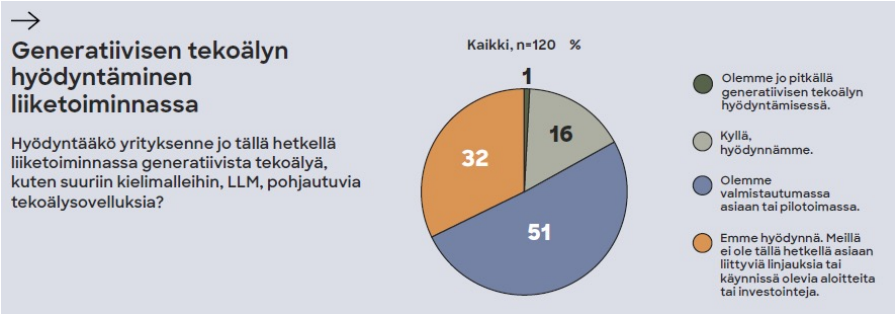
To what extent is your organization currently planning to implement Generative AI to improve how you do business:

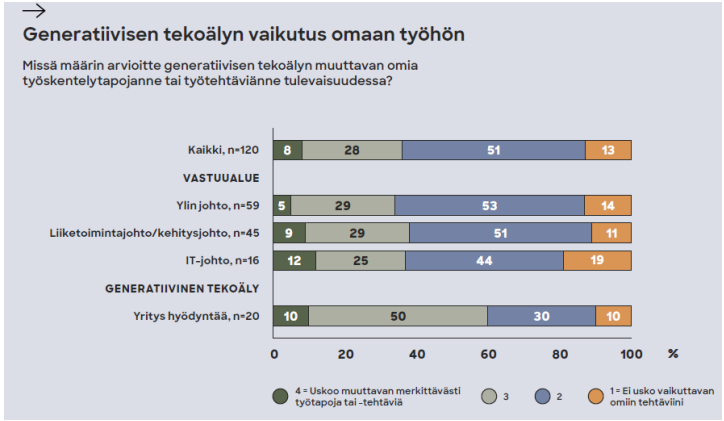


Source: Fall 2023 Fortune/Deloitte CEO Survey Insights, at https://www2.deloitte.com/us/en/pages/chief-executive-officer/articles/ceo-survey.html
Fielded **on Oct 3-11, 2023, with 104 CEO respondents, 93% US-based** (Fortune 500 and Global 500 CEOs, select public and private CEOs in global Fortune community).

Solita and IRO Research's study on Gen AI in Finnish Companies

Business management in Finland is clearly in a wait-and-see position. However, companies that already have experience using AI strongly believe in its positive effects.





17% of large companies already utilize GenAI.
51 % say they are preparing for some kind of utilization of Gen AI.
32%, do not use GenAI in their business, and there are no initiatives or policies in progress…

The target group in the study was the top business, development and IT management of Finland's top-500 companies (N=120).
The data was collected between 21 June and 3 August 2023 - the situation evolves (hopefully) rapidly in Finland too!

Generatiivinen tekoäly suomalaisyrityksissä -tutkimus: Suomalaiset suuryritykset hitaita generatiivisen tekoälyn hyödyntämisessä | Solita (sttinfo.fi)

Strategy: Who leads digital progress?

Respondents in digitally maturing companies say their CEO's office is primarily heading up transformation efforts. In early-stage companies, it's often IT.

EARLY STAGE	DEVELOPING	DIGITALLY MATURING
Information technology 23%	CEO's office 31%	CEO's office 41%
CEO's office 22%	Information technology 20%	Information technology 16%
Marketing 10%	Marketing 9%	Marketing 7%
Operations 7%	Operations 7%	Product development 7%

PERCENTAGES REFLECT THOSE RESPONDENTS RANKING THE CHOICE AS NO. 1.

Kane et al. (2019), "How Digital Leadership Is(n't) Different", *MIT Sloan Management Review*, March 12, 2019, available at https://sloanreview.mit.edu/article/how-digital-leadership-isnt-different/

Data and Analytics Leadership Survey on Fortune 1000 companies

The Data and AI Executive Leadership Survey *has evolved over the past 12 years and is now the longest running survey of Fortune 1000 and global data, analytics, and AI leaders.*

It has become an industry benchmark, widely quoted in the business press, including Forbes, HBR, MIT SMR, and The WSJ. The survey is also noted for its highly curated participation, on an invitation-only basis, for the most senior data and AI leaders in Fortune 1000 and leading global organizations.

This year, 89.8% of survey respondents held the title of CDO/CDAO or Head of Data, Analytics, and AI for their organization.

CDO = Chief Data Officer
CDAO = Chief Data and Analytics Officer

Wavestone (2024), Data and analytics Leadership Annual Executive Survey 2024, over 100 answers by large companies
https://www.wavestone.com/app/uploads/2023/12/DataAI-ExecutiveLeadershipSurveyFinalAsset_13627007.pdf

Survey on Fortune 1000 companies

"The majority believes Gen AI is more potentially transformational than any other technology in a generation and views it as a top organizational priority. Even further, 90% of their organizations **are increasing investment in Gen AI**. They expect Gen AI, among other benefits, to deliver exponential productivity gains, liberate knowledge workers from mundane tasks, and improve customer service and experience.

However, it's also fair to say that most organizations are not yet achieving substantial value from Generative AI. **Only 5% have implemented Gen AI in production at scale**. Only half have the needed talent to implement GenAI well. Almost all -- 99% -- of respondents believe **Gen AI requires safeguards and guardrails, but only 63% already have them in place**. These organizations worry about its role in **misinformation, ethical bias, job loss, and other risks**. In short, organizations are primarily experimenting with Gen AI now and aren't quite ready for prime time."

Wavestone (2024), Data and analytics Leadership Annual Executive Survey 2024, over 100 answers by large companies
https://www.wavestone.com/app/uploads/2023/12/DataAI-ExecutiveLeadershipSurveyFinalAsset_13627007.pdf
Citation from the foreword by Thomas Davenport (Distinguished Professor of IT and Management, Babson College, MA) and Randy Bean (Innovation Fellow, Data Strategy, Wavestone)

Survey on Fortune 1000 companies

"Regardless of its novelty, however, **Gen AI seems to have catalyzed more positive change in organizations' data and analytical cultures than in any time since the inception of this survey**. This year saw big increases in the perception that the CDO/CDAO role is "successful and established" and "well understood within our organization." More respondents than ever—two-thirds now—say that the CDO/CDAO has "primary responsibility for data and analytics."

There were also substantial jumps in this year's survey in the percentage who feel that their organizations are **"driving business innovation with data," "competing on data and analytics,"** and **"managing data as a business asset."** The percentage of organizations believed to have **"created a data-driven organization"** and **"established a data and analytics culture"** both doubled over the low-to-mid 20 percent range of the last several years. And **investment increases and perceived business value from data and analytics are high**—in the 80% or higher range—as well. **We can think of no other reason for these momentous improvements in culture and confidence than the advent and visibility of Gen AI."**

Wavestone (2024), Data and analytics Leadership Annual Executive Survey 2024, over 100 answers by large companies
https://www.wavestone.com/app/uploads/2023/12/DataAI-ExecutiveLeadershipSurveyFinalAsset_13627007.pdf
Citation from the foreword by Thomas Davenport and Randy Bean.

Survey on Fortune 1000 companies

"Of course, there are still problematic areas revealed by the survey. **Data quality remains challenging**; only 37% say they have been able to improve it. And the CDO/CDAO role is still considered "nascent and evolving/struggling with turnover" for 43% of respondents.

Human factors—culture/people/process/organization—remain a barrier to becoming data-driven for 78% of respondents. And while **data ethics are considered a top priority** at 74% of the responding organizations, only 42% have the needed policies and practices in place, and only 16% believe the tech industry has done enough to address data and AI ethics."

MIT-based **Chief Data Officer and Information Quality** symposium: https://cdoiq2024.org/

First Nordic CDOIQ symposium in Aalto EE in 2025: https://www.aaltoee.fi/en/programs/cdoiq-nordic-symposium

Wavestone (2024), Data and analytics Leadership Annual Executive Survey 2024, over 100 answers by large companies
https://www.wavestone.com/app/uploads/2023/12/DataAI-ExecutiveLeadershipSurveyFinalAsset_13627007.pdf
Citation from the foreword by Thomas Davenport and Randy Bean.

Survey on Fortune 1000 companies

The Chief Data Officer (CDO) or Chief Data and Analytics Officer (CDAO) remains a relatively new role for most organizations. It has only been within the past half decade or so that the role has gained adoption among a majority of organizations, to the point where it is close to becoming ubiquitous, with 83.2% organizations now report having appointed a CDO/CDAO (it was 12.0% in just 2012).

CDO/CDAO Appointed	2012	2017	2021	2022	2023	2024
Yes	12.0%	55.9%	65.0%	73.7%	82.6%	**83.2%**
No	88.0%	44.1%	35.0%	26.3%	17.4%	**16.8%**

Wavestone (2024), Data and analytics Leadership Annual Executive Survey 2024,
https://www.wavestone.com/app/uploads/2023/12/DataAI-ExecutiveLeadershipSurveyFinalAsset_13627007.pdf

Survey on Fortune 1000 companies

Investments in data and analytics are once again a top organization priority. This year, 82.2% of CDO/CDAO and data/AI leaders stated that their organizations were increasing their investment in data and analytics, with 87.0% reporting successful delivery of measurable business value to the organization.

State of Data & Analytics Investment and Business Results	2024
Investments in Data & Analytics are a Top Organizational Priority	**87.9%**
Our Organization is Increasing its Investment in Data & Analytics	**82.2%**
Delivering Measurable Business Value from Data & Analytics Investments	**87.0%**
Strong Business Leadership and Partnership In Place at Our Organization	**84.3%**
Our Organization is an Industry Leader in Data and Analytics	**47.7%**
Efforts to Improve Data Quality Have Been Successful	**37.0%**

Further, 84.3% stated that strong business leadership and partnership was in place as their organization. However, at this at this stage, less than half of participants – 47.7% -- indicated their organization is an industry leader in data and analytics. And data quality continues to be a challenge for 63% of organizations.

Wavestone (2024), Data and analytics Leadership Annual Executive Survey 2024, over 100 answers by large companies
https://www.wavestone.com/app/uploads/2023/12/DataAI-ExecutiveLeadershipSurveyFinalAsset_13627007.pdf

Survey on Fortune 1000 companies

State of Investment in Generative AI	2024
Investments in Generative AI a Top Organizational Priority	**62.3%**
Increasing Investment in Generative AI	**89.6%**
Has Potential to be Most Transformational Technology in a Generation	**64.2%**
Need for Safeguards and Guardrails for Governing Generative AI	**99.0%**
Safeguards and Guardrails for Generarative AI Are In Place	**62.9%**
Talent in Place to Responsibly Implement Generative AI	**50.5%**

Wavestone (2024), Data and analytics Leadership Annual Executive Survey 2024, over 100 answers by large companies
https://www.wavestone.com/app/uploads/2023/12/DataAI-ExecutiveLeadershipSurveyFinalAsset_13627007.pdf

Survey on Fortune 1000 companies

Progress of Data and Analytics Initiatives	2019	2020	2021	2022	2023	2024
Driving Business Innovation with Data	59.5%	64.2%	48.5%	56.5%	59.5%	**77.6%**
Competing on Data and Analytics	47.6%	45.1%	41.2%	47.4%	40.8%	**50.0%**
Managing Data as a Business Asset	46.9%	50.0%	39.3%	39.7%	39.5%	**49.1%**
Created a Data-Driven Organization	31.0%	37.8%	24.0%	26.5%	23.9%	**48.1%**
Established a Data & Analytics Culture	28.3%	26.8%	24.4%	19.3%	20.6%	**42.6%**

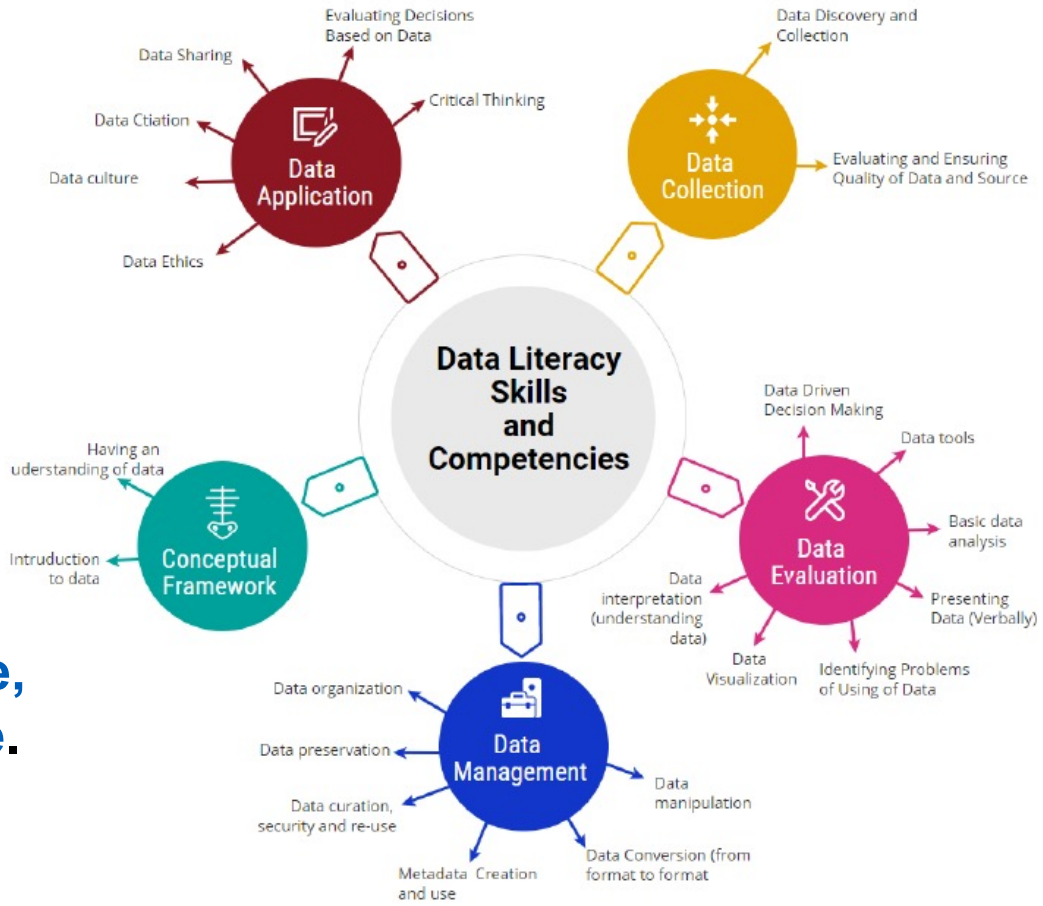
Quite large increases in one year! Gen AI assumed to be the reason on the background

Wavestone (2024), Data and analytics Leadership Annual Executive Survey 2024, https://www.wavestone.com/app/uploads/2023/12/DataAI-ExecutiveLeadershipSurveyFinalAsset_13627007.pdf

Recap on Data literacy

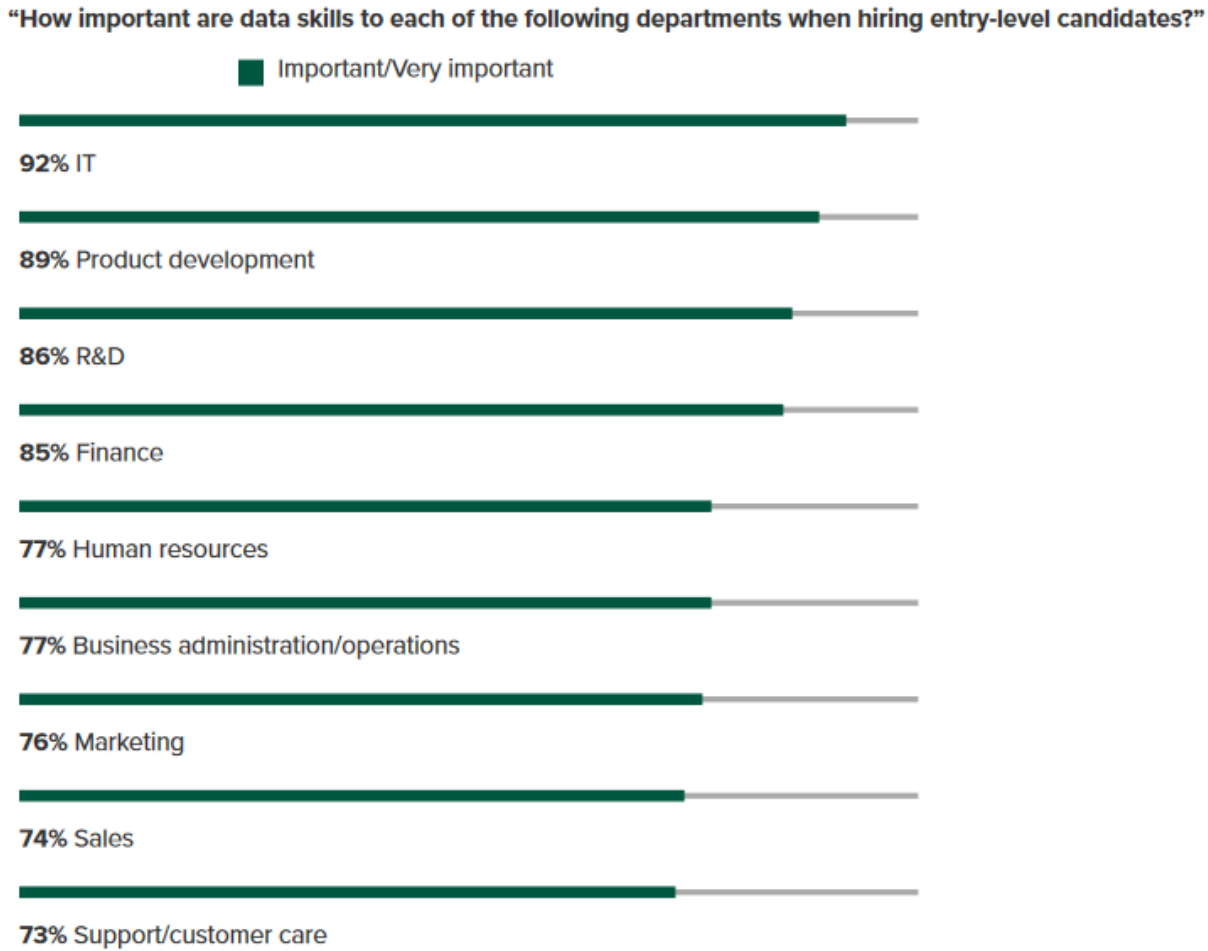
The ability to read, write and communicate data in context, including an understanding of data sources and constructs, analytical methods and techniques applied — and the ability to describe the use case, application and resulting value.

(Gartner, 2019)



Sources: Gartner (2019) , “A Data and Analytics Leader’s Guide to Data Literacy”, , https://www.gartner.com/smarterwithgartner/a-data-and-analytics-leaders-guide-to-data-literacy/
Graphical illustration by Guler (2019) https://www.researchgate.net/figure/Schematic-representation-of-data-literacy-skills-and-competencies-Adapted-from-Ridsdale_fig2_335620777 , adapted from Risdale et al. (2015, p. 38) https://dalspace.library.dal.ca/bitstream/handle/10222/64578/Strategies%20and%20Best%20Practices%20for%20Data%20Literacy%20Education.pdf

Data skills are needed in all business areas, not just in IT!



Base: 37 to 125 US hiring managers or recruiters involved with decision making regarding recruiting new employees or creating job role requirements.

Source: Forrester Consulting (2021), "The Great data literacy gap: demand for data skills exceeds supply", https://www.tableau.com/sites/default/files/2021-06/Tableau_Data_Literacy_Report.pdf

7 key business data literacy competencies for BIZ students

...for becoming data literate employees:

1. Data organization and storage
2. Understanding data used in business contexts
3. Evaluating the quality of data sources
4. Interpreting data
5. Data-driven decision making
6. Communicating and presenting effectively with data
7. Data ethics and security

Pothier and Condon (2020), ”Towards data literacy competencies: Business students, workforce needs, and the role of the librarian”, *Journal of Business & Finance Librarianship*, https://doi.org/10.1080/08963568.2019.1680189

Recommended skills for our business graduates

CEO Elina Björklund, Reima, Alumna of the year 2018, at Kauppis 110 years thank you event, April 2, 2022.

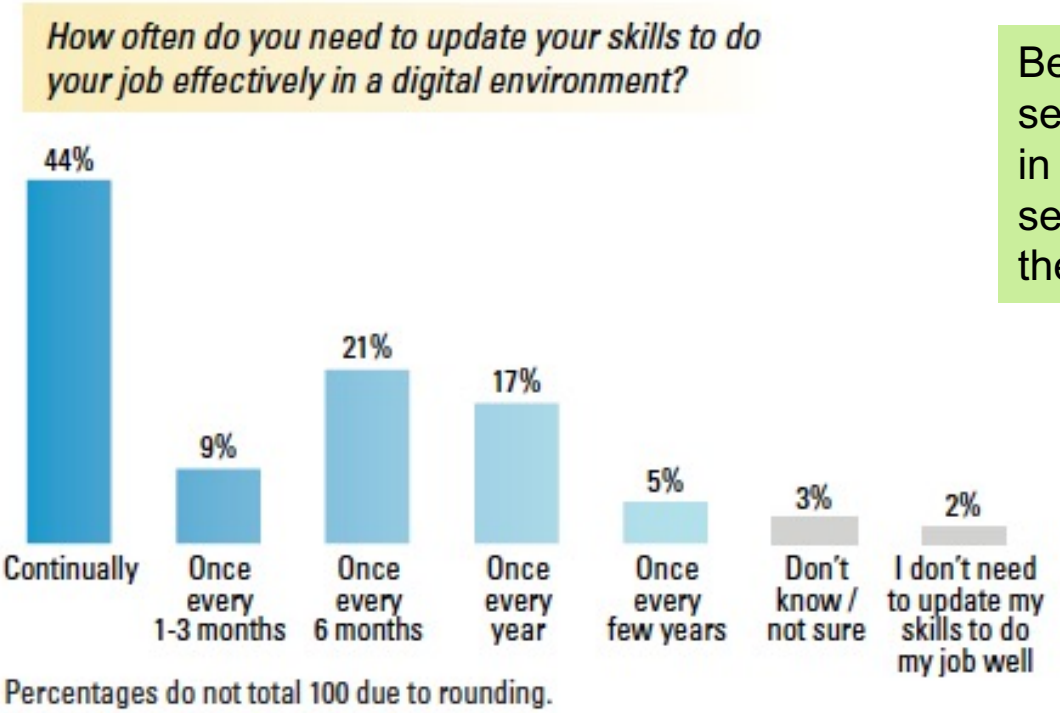
"I could divide the competences in three areas. First of all, all new Masters in Economics should **manage numbers and analytical thinking**. The solving of complex problems requires this, so at least at a good level there is reason to know these skills.

As a second skill, I lift **communication and interaction skills** and as the third, the **management and grasp of technologies**.

In addition, I hope that all new Masters of Economics have a **passion to utilize their skills and the desire to learn new, every day**. I would also recommend going to **study exchange** to anyone who is able to leave. "

Source: Ollikainen (2022), “Suurkiitos Kauppakorkeakoulun tukijoille!”, April 6, 2022, at https://www.aalto.fi/fi/uutiset/suurkiitos-kauppakorkeakoulun-tukijoille, picture by Heli Sorjonen

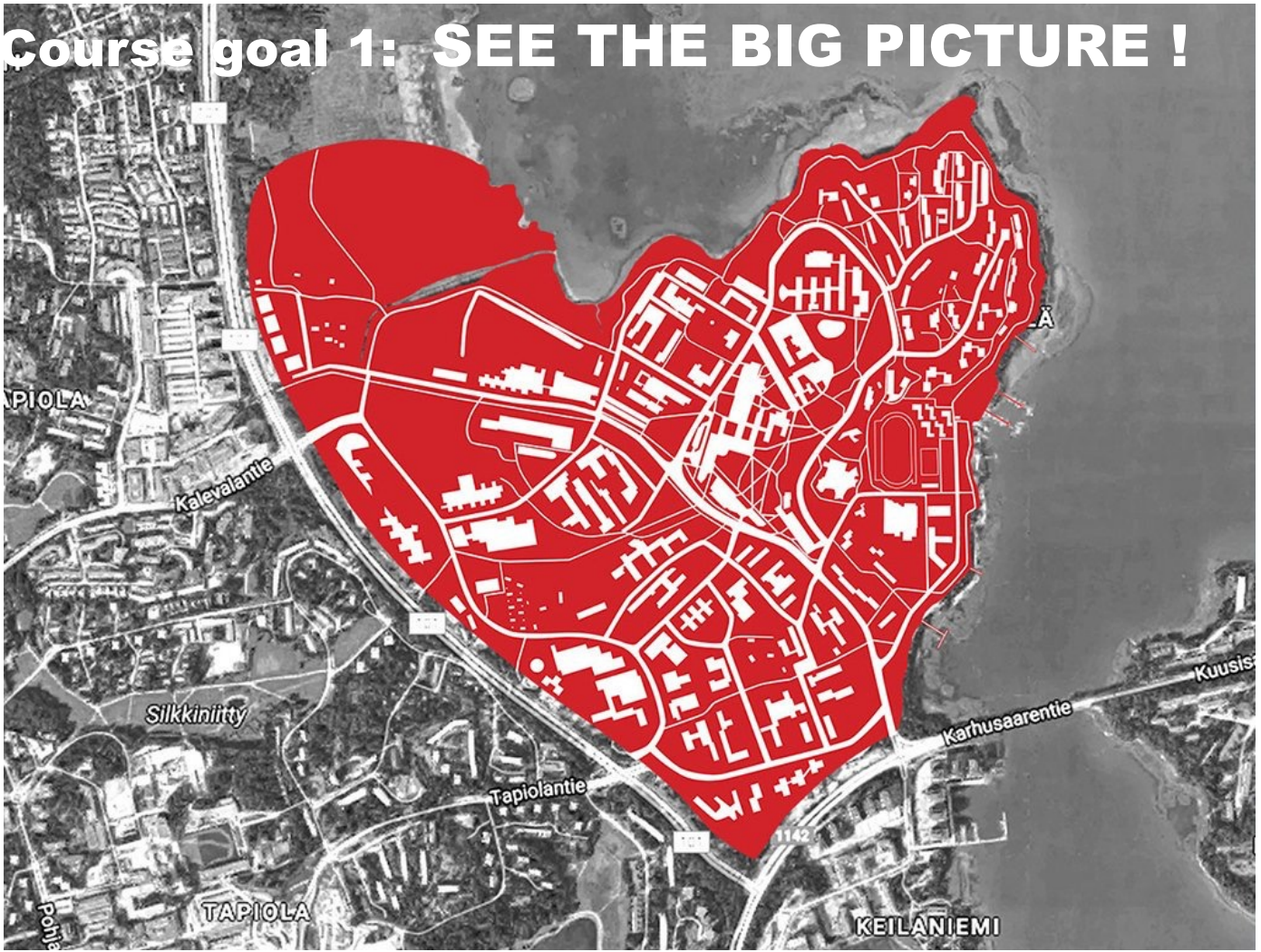
Updating skills regularly is a must in the current digital environment!



Besides learning the basics of several business technologies in this course – you have learnt several ways how to self-study them! ☺

Source: Kane et al. (2018), "Coming of age digitally", *MIT Sloan Management Review* with Deloitte Digital

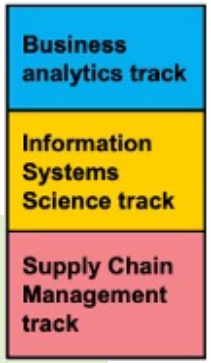
Hopefully the MIS course has been able to provide you the **BIG picture of using IS & IT in organizations**, and also to get you interested in studying them in more detail and aiming at an impact in future!



Choose the digital branch(es) you are most interested in and develop deep skills in that!

Further learning options

Further learning options at our department of Information and Service Management (ISM)



Many issues dealt briefly in this broad introductory course can be studied more thoroughly in our dedicated courses:

e.g. **Programming I, IS Development, MySQL for Data Analytics, Business Intelligence, Strategic IT Management, Information Economy, Data Science for Business I & II, Project Management and Consulting Practice, Information Security Management, Ethics in Digital Innovation, Introduction to Digital Service Design, Digital Service Product Management, Analytics for Sustainability, etc.**

See the renewed course offerings at our ISM Bachelor and MSc programs on the next two slides for 2022-2024, and on Aalto website at:

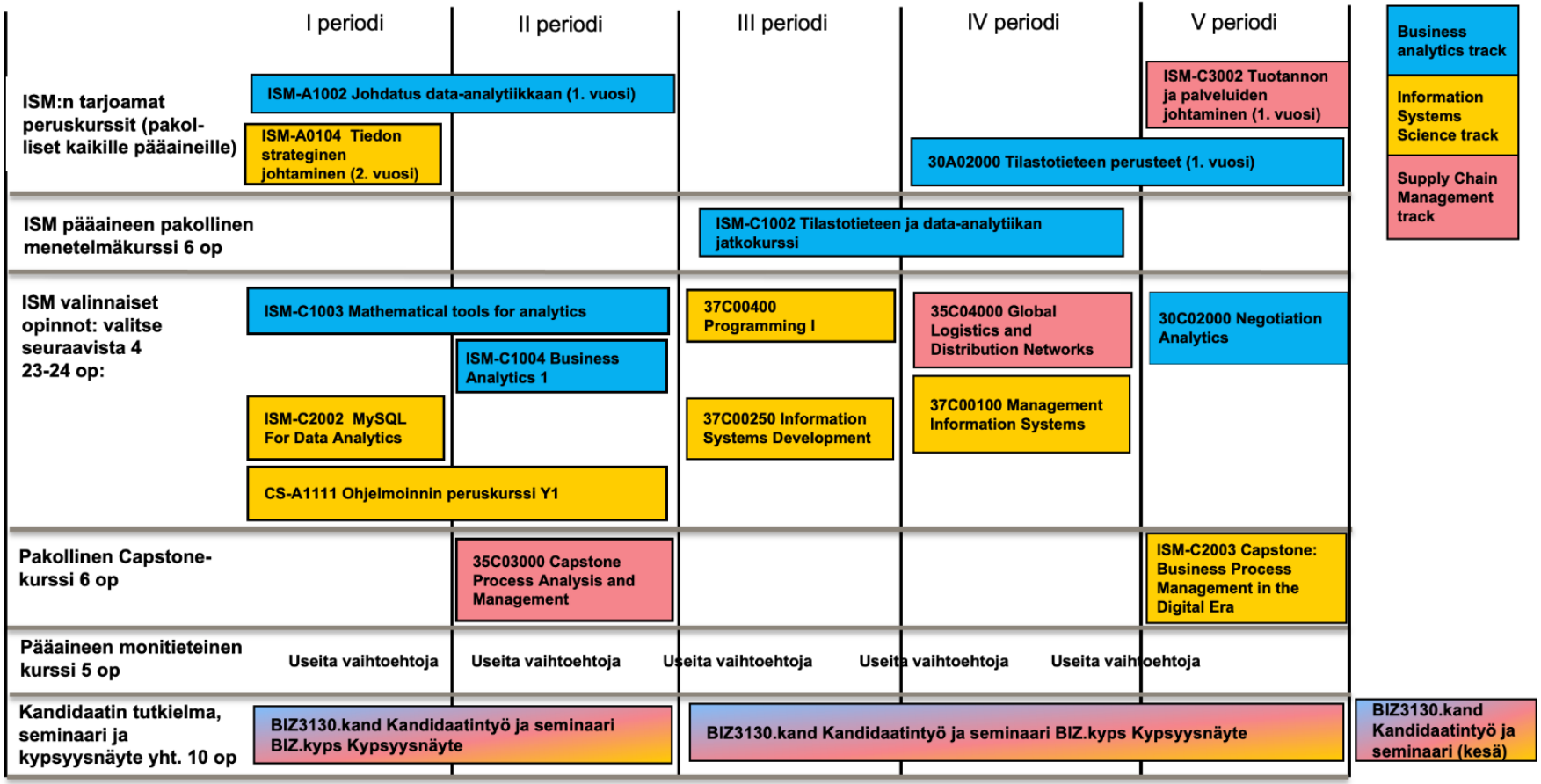
https://www.aalto.fi/fi/ohjelmat/kauppatieteiden-kandidaattiohjelma/opetussuunnitelma-2024-2026

https://www.aalto.fi/en/programmes/masters-programme-in-information-and-service-management/curriculum-2024-2026

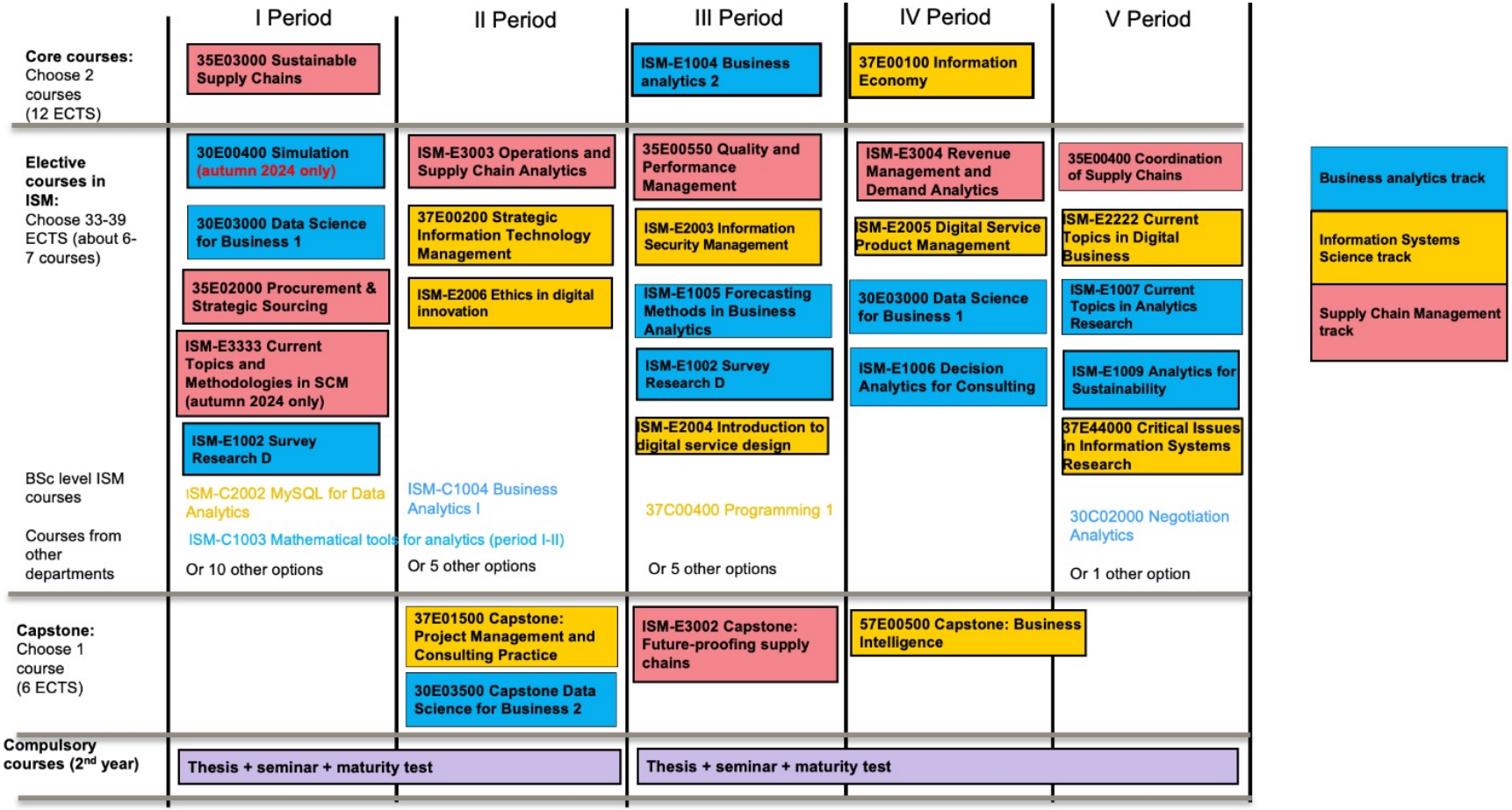
Search courses in: https://courses.aalto.fi/s/account/0013X00002ub8INQAQ/dept-of-inf-and-service-mgmgt?language=en_US

Information and Service Management (ISM), BSc programme 2024-2026

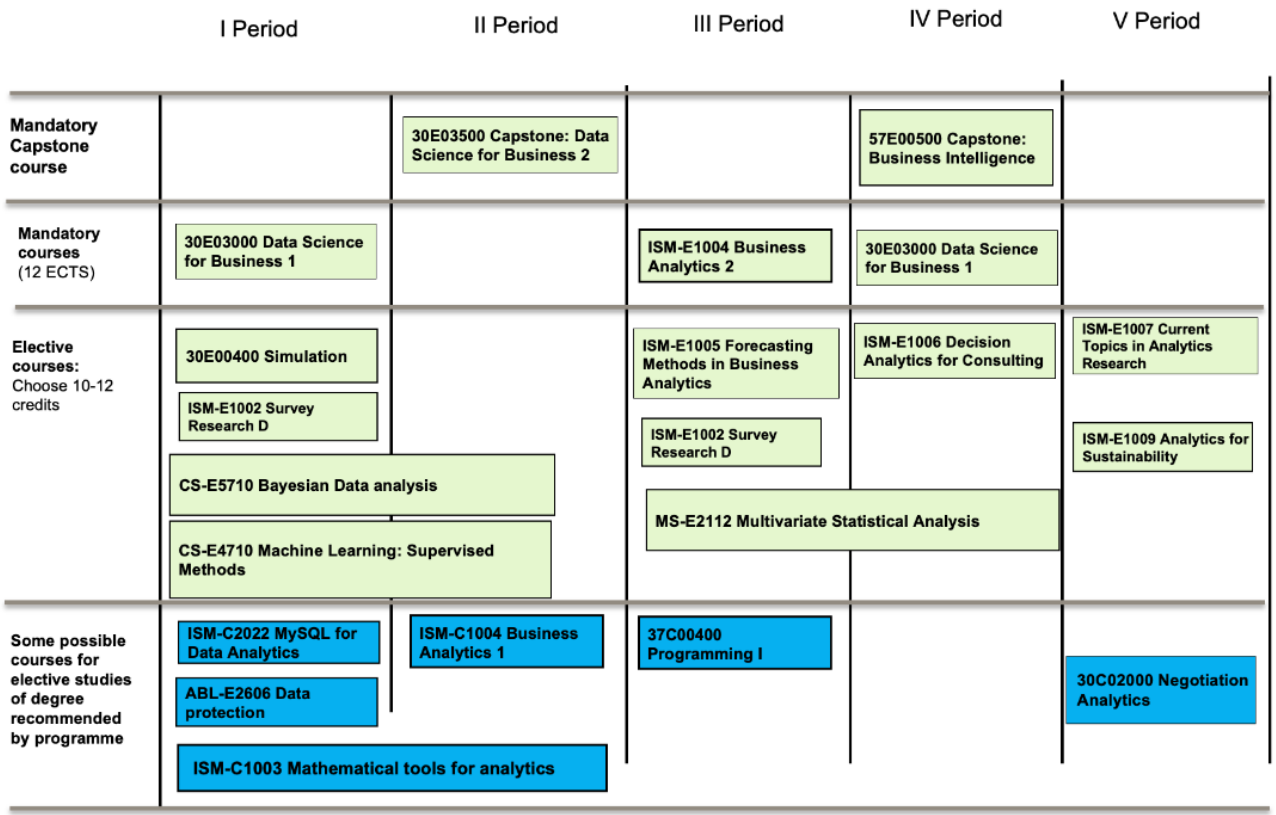
Studies in Major



Information and Service Management (ISM), Master's programme 2024-2026



ISM department's Business Analytics MSc programme 2024-26



+ MSc thesis 30 cr, thesis seminar, maturity test
+ 24 credits of specialization studies

Study focus on SCM, Marketing or Accounting Analytics

Aalto's Analytics and Data Science minor for MSc students!

The goal of ADS is to educate students on how to become proficient in making sense of big data, and how to apply data analysis skills on their domain of expertise.

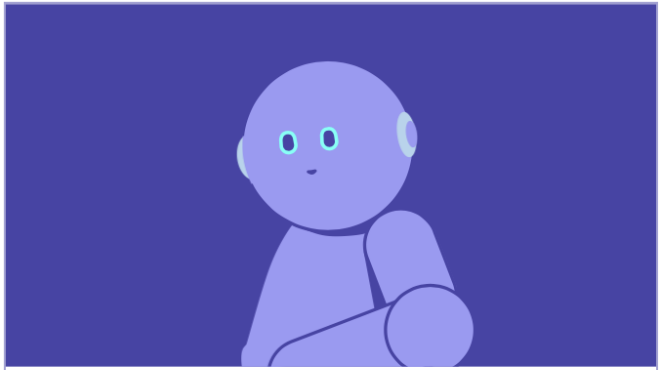
See https://www.aalto.fi/en/minors/analytics-and-data-science-minor

Code	Course name	ECTS
Choose at least one (1) course from the Statistical Foundations subarea		
CS-E5710	Bayesian Data Analysis D	5
MS-C1620	Statistical Inference	5
MS-C2128	Prediction and Time Series Analysis	5
MS-E2112	Multivariate Statistical Analysis D	5
Choose at least one (1) course from the Computational Methods subarea		
CS-E4715	Supervised Machine Learning	5
CS-E4650	Methods of Data Mining D	5
CS-E4840	Information Visualization D	5
CS-E4190	Cloud Software and Systems D	5
CS-E4580	Programming Parallel Computers D	5
CS-E4800	Artificial Intelligence D	5
ELEC-E5431	Large Scale Data Analysis D	5
Choose at least one (1) course from Business Analytics and Applications		
BA subarea		
MS-E2135	Decision Analysis D	5
MARK-E0047	Digital Marketing	6
30E03000	Data Science for Business I D	6
ISM-C2002	MySQL for Data Analytics	6
57E00500	Capstone: Business Intelligence	6
31E40100	History of Economic Growth and Crises D	6
AP subarea		
CS-E5740	Complex Networks D	5
MS-E2177	Seminar on Case Studies in Operations Research (V) D (in Finnish only)	5
ELEC-E5510	Speech Recognition D	5
ELEC-E5550	Statistical Natural Language Processing D	5
30E03500	Data Science for Business II D	6
ELEC-E5410	Signal Processing for Communication	5
ELEC-E5440	Statistical Signal Processing D	5
AP/BA subarea		
31E00910	Applied Microeconometrics I D	6
ECON-E0710	Labor Economics I	6
31E16000	Development Economics II	6

Recommended for further studying ISM topics on AI: Elements of AI

Can be included e.g. in voluntary degree studies by ISM students

(apply credits in Sisu, see https://www.aalto.fi/en/applications-instructions-and-guidelines/credit-transfer)



Part 1

Introduction to AI

An Introduction to AI is a free online course for everyone interested in learning what AI is, what is possible (and not possible) with AI, and how it affects our lives – with no complicated math or programming required.

Start the course →

Part 2

Building AI

Building AI is a free online course where you'll learn about the actual algorithms that make creating AI methods possible. Some basic Python programming skills are recommended to get the most out of the course.

Start the course →

http://www.elementsofai.com

Check also the courses offered via FITech.io Network University!

FITech offers selected studies from all technical universities in Finland. Update your digital and other skills free of charge.

Courses are open and available for everyone from high school students to adults in working life.

https://fitech.io/en/studies/?fit_course_types=upcoming&orderby=start_date

University of Turku — Individual course

Tekoälyn perusteet

AI and machine learning

Adult learner, Degree student | Blended | Intermediate | 2 ECTS |

Course period: Until 31.7.2024
Application deadline: 8.4.2024

Price: 0 €

Aalto University — Individual course

Cybersecurity

5G technology, Cybersecurity, Information security, Internet technology

Adult learner, Degree student | Online | Beginner | 5 ECTS |

Course period: 23.4.–28.5.2024
Application deadline: 9.4.2024

Price: 0 €

Aalto University — Individual course

Performance analysis

5G technology, Mathematics

Adult learner, Degree student | Contact | Advanced | 5 ECTS |

Course period: 23.4.–5.6.2024
Application deadline: 9.4.2024

Price: 0 €

Aalto University — Individual course

Facilitating change

Leadership

Adult learner, Degree student | Online | Advanced | 3 ECTS |

Course period: 24.4.–5.6.2024
Application deadline: 10.4.2024

Price: 0 €

LUT University — Individual course

5G - A friendly introduction

5G technology, Communications ecosystems, Smart systems, Wireless technology

Adult learner, Degree student | Online | Beginner | 1 ECTS |

Course period: Continuously on-going
Application deadline: Continuously on-going

Price: 0 €

Tampere University — Individual course

Accessibility and user experience

Accessibility, Digitalisation, User interfaces and usability

Adult learner, Degree student | Online | Intermediate | 1 ECTS |

Course period: Continuously on-going
Application deadline: Continuously on-going

Price: 0 €

Tampere University — Individual course

Accessible AI

Accessibility, AI and machine learning, Digitalisation

Adult learner, Degree student | Online | Intermediate | 1 ECTS |

Course period: Continuously on-going
Application deadline: Continuously on-going

Price: 0 €

Tampere University — Individual course

Accessible documents

Accessibility, Digitalisation

Adult learner, Degree student | Online | Intermediate | 1 ECTS |

Course period: Continuously on-going
Application deadline: Continuously on-going

Price: 0 €

Useful & Recommended BIZ course (BDAA):
Big data analysis in Accounting (ABL-E1300)

The course is intended to provide the student with the basics of applying data analytics in accounting. After completing the course, students will be able to:

- Gain a managerial overview of the potential uses of data analytics in accounting contexts
- Extract, cleanse, and transform heterogeneous data into machine-readable form
- Analyze data to generate information for strategic and operational decision-making
- Understand the potential and pitfalls of machine learning techniques
- Use Python programming language and implement Python modules for data analysis

https://mycourses.aalto.fi/course/view.php?id=41135 / Teacher Assistant prof. Jukka Sihvonen

Info on exam and bonus points

About points and grading

A minimum of 50% from the exam (max 40p) and the assignments (max 60p)* is required to pass the course, i.e. at the minimum 20 + 30 = 50 points. The bonus points (max 8) from presences in guest lectures can be used on top of the minimum requirements (e.g. 20 + 30 + 8 = 58, but not 16 + 34 + 8 = fail).

Grade 5 = 90 points and over

Grade 4 = 80-89 points

Grade 3 = 70-79 points

Grade 2 = 60-69 points

Grade 1 = 50-59 points

Note that the teacher checks all grades that are close to the next one (e.g. a 4 with 88-89 points, to see if the grade can be upgraded to 5) – especially if the assignment points are excellent, i.e. 54-60.

Fail = under 50 points - or less than the 50% minimum in either part

***REMINDER: Assignment 1 is the only compulsory assignment in this course – complete it by April 18 if you have not done it yet!**

Format of the exam (18.4. and 5.6.)

- Multiple-option questionnaire (40 points)
  - Questions in the exam are **both** from the lectures and the book (not Chapters 7, 9 and 10). The questions are drawn systematically but randomly from a 400-question question bank.
    There are separate question sets (quizzes) for both versions of the course book (version 5 and version 4 – select either one - the lecture questions in these two quiz versions are drawn from the same lecture question set).
  - No deductions from wrong answers

  - *Question examples are presented today via Presemo*

Contents of the course book

PART I: FOUNDATIONS

Ch. 1 : Information Systems (IS) and the Role of General and Functional Managers

Ch. 2 : IS Defined

Ch. 3 : Organizational IS and Their Impact

PART II: COMPETING IN THE DIGITAL AGE

Ch. 4 : Digital Disruption and the Competitive Environment

Ch. 5 : Digital Transformation, Innovation, and Entrepreneurship

PART III: THE STRATEGIC USE OF IS

Ch. 6 : Strategic IS Planning

(Ch. 7 : Value Creation & Strategic IS) – *no questions in exam*

Ch. 8 : Digital Value Creation

(Ch. 9 : Digital Value Capture) – *no questions in exam*

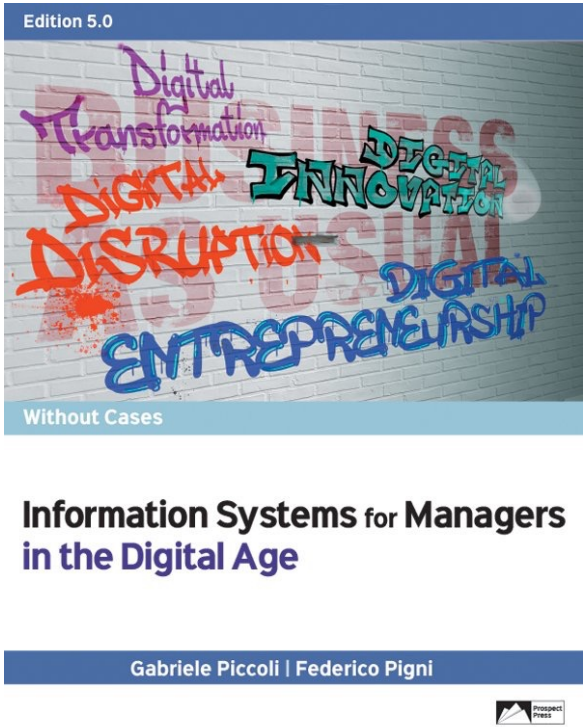
PART IV: GETTING IT DONE

(Ch. 10 : Managing IS) – *no questions in exam*

Ch. 11 : Creating IS in the Digital Age

Ch. 12 : IS Trends

Ch. 13 : Cybersecurity, Privacy & Ethics



https://www.prospectpressvt.com/textbooks/piccoli-information-systems-for-managers-5-0

Remaining deadlines: summary

The deadline for reporting the guest lecture presences (MyCourses main page) is April 11 (up to +8 bonus points).

The deadline for the last Assignment is on April 12 (+ 2 day extension, -1p)

The course exam is open on Thursday April 18 at 9-12 in MyCourses (re-take in June 5), but the duration of the exam is 2 hours.

The deadline for answering the course feedback survey is April 25 (+2 points*). You should have received the link to the survey today.

* When the survey has been closed, the system will send a separate email to the teacher with a list of student names who have answered the survey using their personal link (the names are in random order, and the answers remain anonymous).


Thank you for your interest towards MIS
and good luck for the exam and your future studies!
Next to Presemo to rehearse the exam questions!
J. Bragge 2017