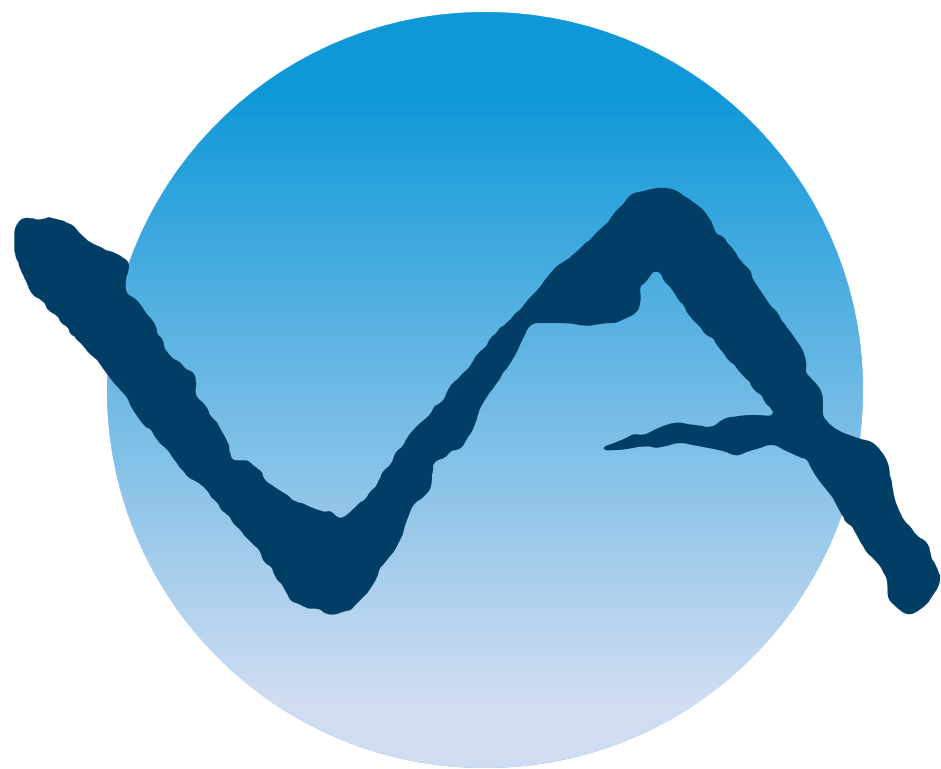






Digital Countdown

A Study of Lifespans in Digital Investment Projects

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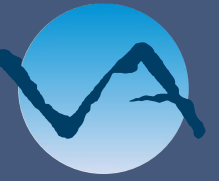
Agenda

1. Introduction
2. Concepts
3. Data and methods
4. Findings: Lifespans
5. Findings: Life cycle
6. Conclusions



Introduction

Research questions



1. Which **lifespans** are assumed for, and realised by, different types of digital investment projects?
 - a. Which lifespans are considered realistic in appraisals and by experts?
 - b. What do the research literature and guidance documents say about lifespans?
 - c. Which lifespan assumptions follow from macro statistics and accounting rules?

2. How does the **life cycle** of digital investment projects unfold?
 - a. How do lifespans change over time?
 - b. How does the capital stock depreciate over time?
 - c. What role do reinvestments and internal and external factors play?
 - d. How are lifespans related to the probability of project failure?
 - e. (How do lifespans of public digital investment projects differ from each other and from other investment projects?)

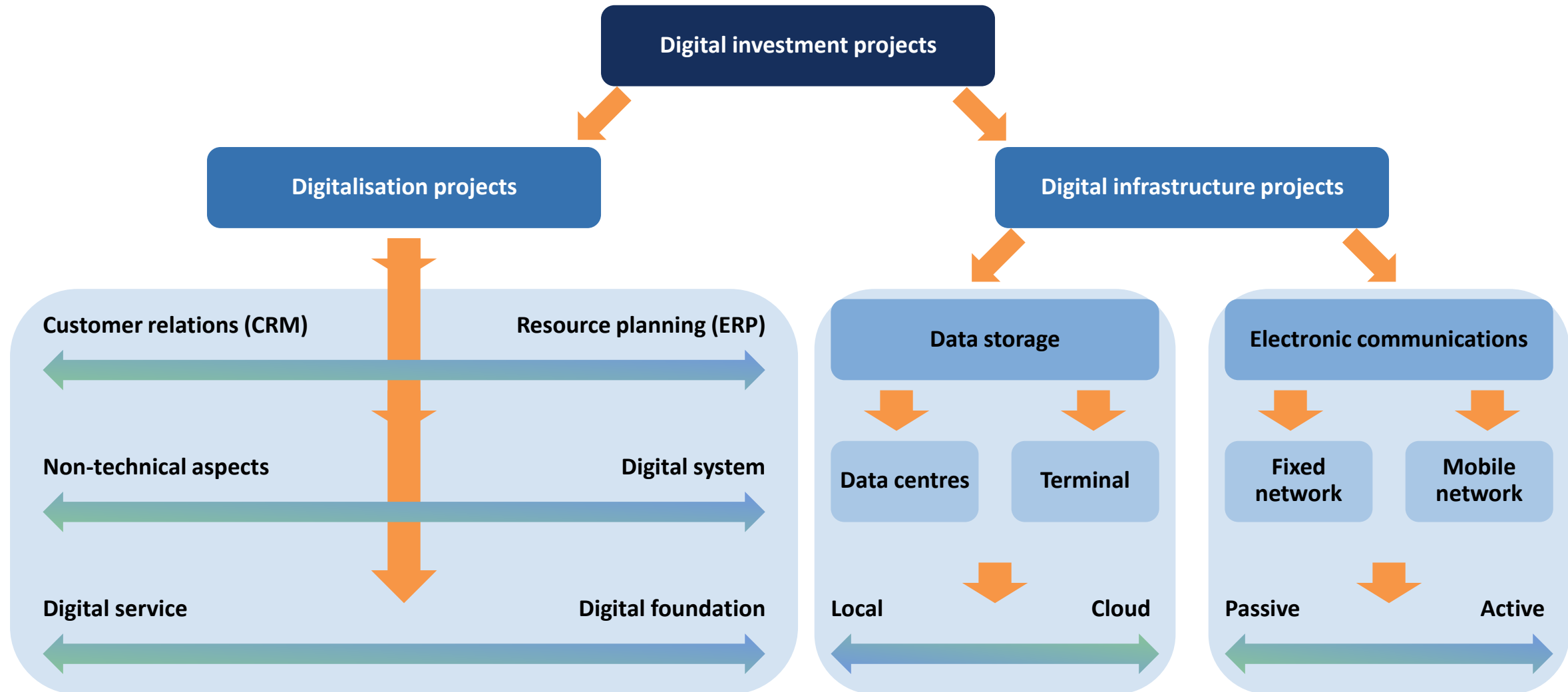
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4. Findings: Lifespans
5. Findings: Life cycle
6. Conclusions



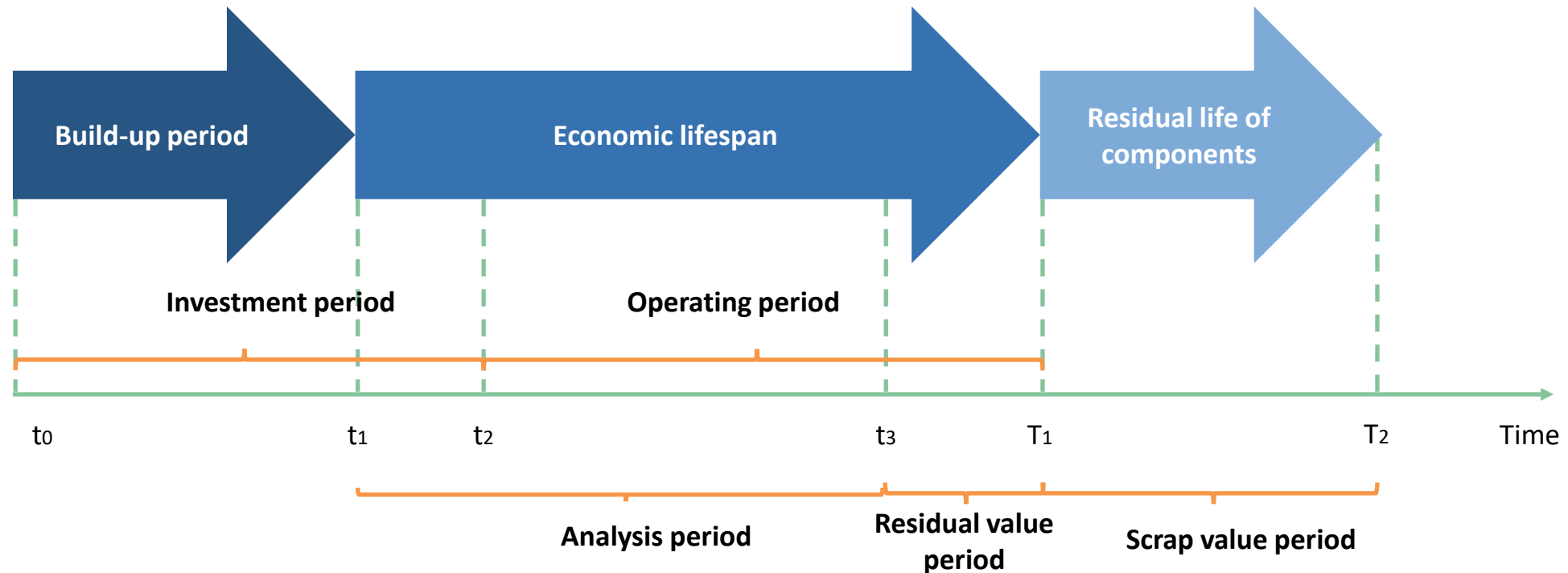
Literature and concepts

A typology of digital investment projects



Literature and concepts

The lifespan concept



Literature and concepts

Drivers of lifespans



Dimensions:

Asset type
Industry
Institutional sector
Investment timing

Project management:
Planning
Risk management



Internal drivers:
Flexibility
Organisation



Reinvestments:
Maintenance
Further development



Probability of becoming
operational

Depreciation path

Final
lifespan

External drivers:
New user needs
New technology
Regulations
Resource availability



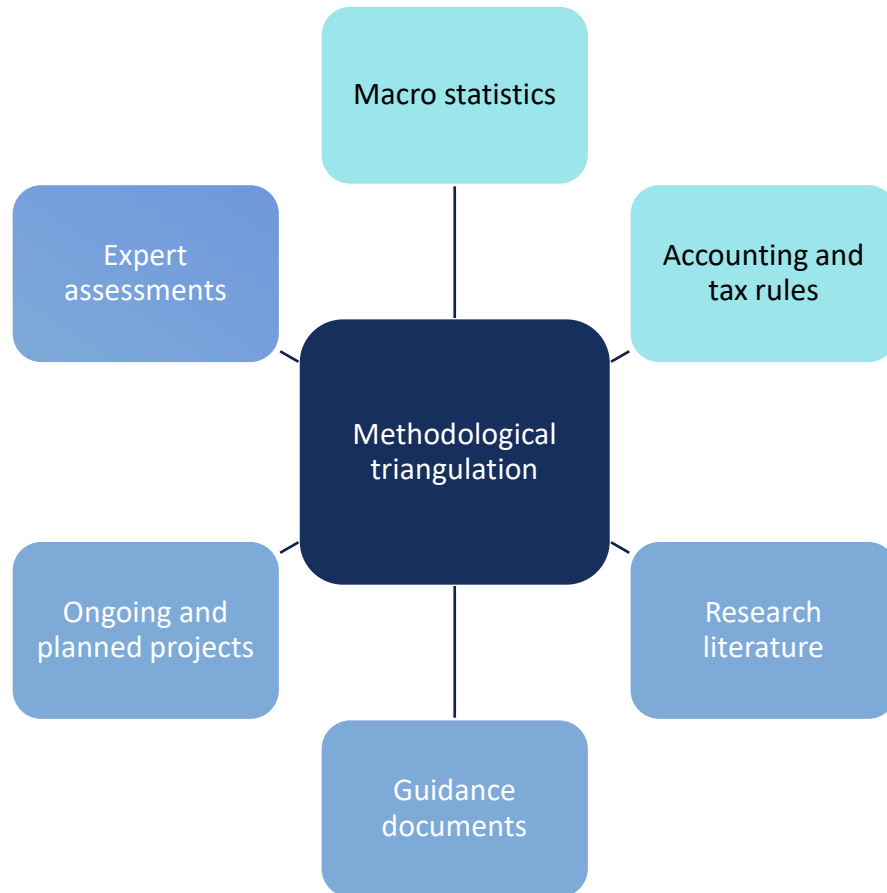
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Data and methods

Methodological triangulation



**National
accounts
tradition**

Primary data

- 20 semi-structured interviews, 30 informants, 20 organisations
- Project database: 31 planned and 47 realised projects

Secondary data

- International research literature (meta-analysis)
- Statistics Norway national accounts
- Tax and government accounting rules
- Norwegian and international appraisal guidance

**Project
appraisal
tradition**

Data and methods

Informants



Informant group	Organisation
Managers of digitalisation projects	Norwegian Courts Administration
	Ministry of Finance
	Norwegian Police Service
	Norwegian Tax Administration
	Norwegian Public Service Pension Fund
	Norwegian immigration authorities
Managers of infrastructure projects	Bane NOR (rail infrastructure)
	Norwegian Communications Authority
	Sikt
	Telenor
Subject-matter experts	Swedish Transport Administration
	Norwegian Digitalisation Agency
	Norwegian Agency for Public and Financial Management
	BI Norwegian Business School
	SimulaMet
	Statistics Norway
External developers	Aarhus University, Denmark
	Computas
	Promis
	Scienta

Agenda

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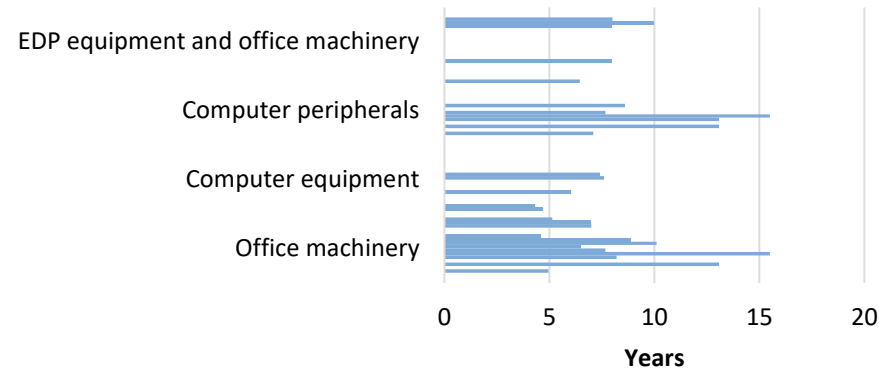


Lifespans

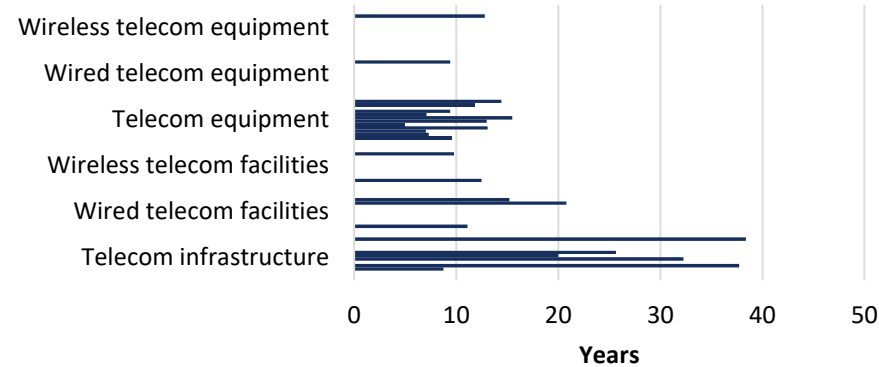
Research literature

- The research literature on ICT capital lifespans mainly serves as input to national and business accounts.
- Component lifespans:
 - Components of **digitalisation projects** typically last less than ten years (software, computer equipment).
 - **Electronic communications infrastructure** also includes components lasting up to 40 years, clustered around 15 years.

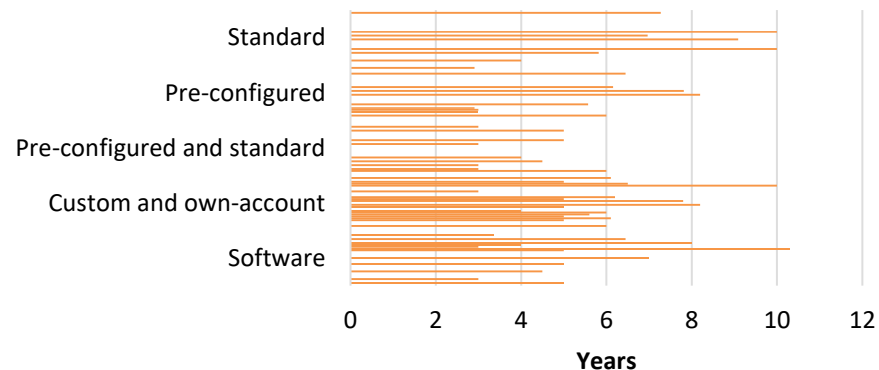
Office machinery



Electronic communications capital



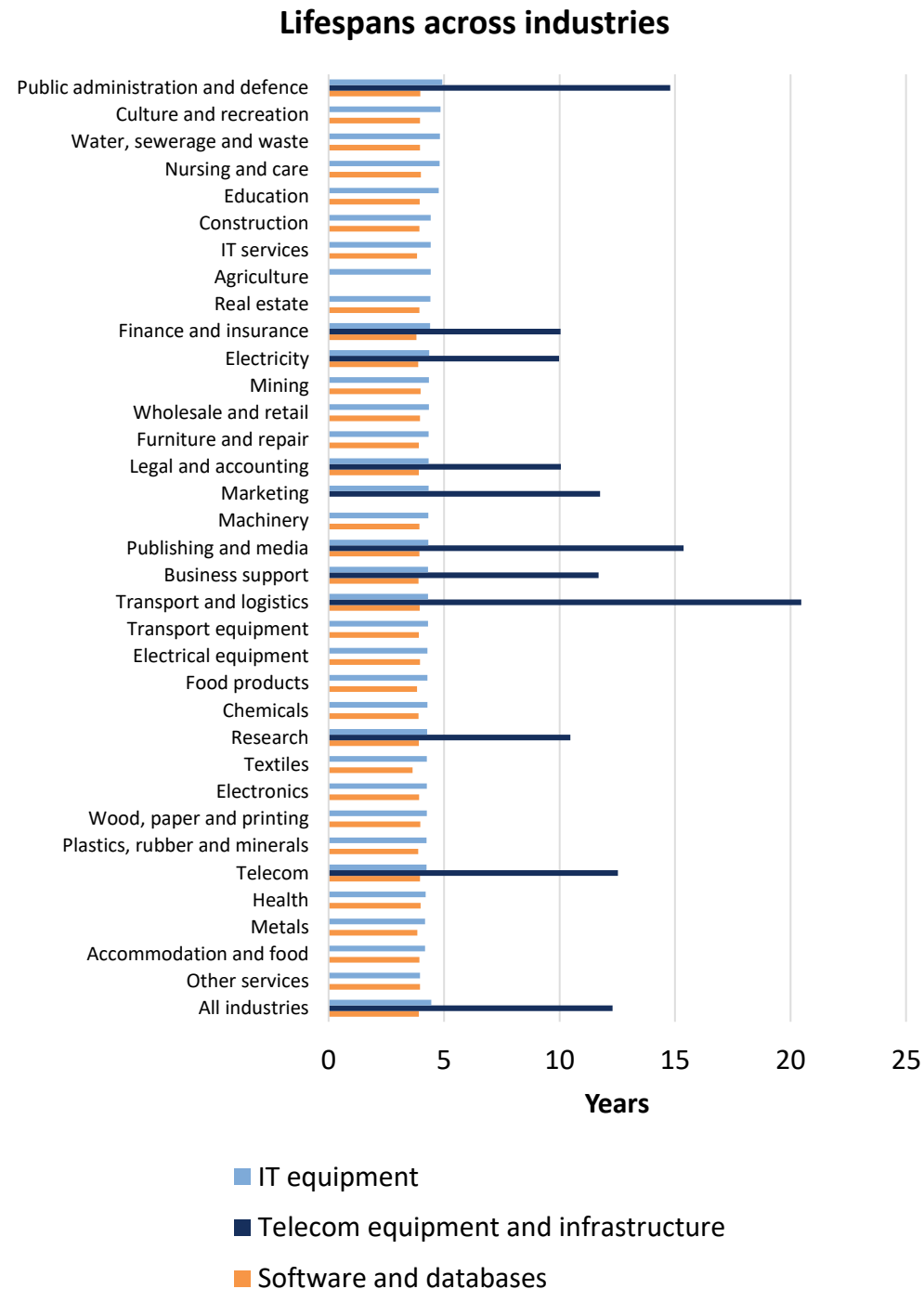
Software



Lifespans

Macro statistics

- Component lifespans:
 - The national accounts imply lifespans below 5 years for **IT equipment** and for **software** and databases, with little variation across industries.
 - For **telecom equipment and infrastructure**, lifespans are 10–20 years, with large variation across industries.

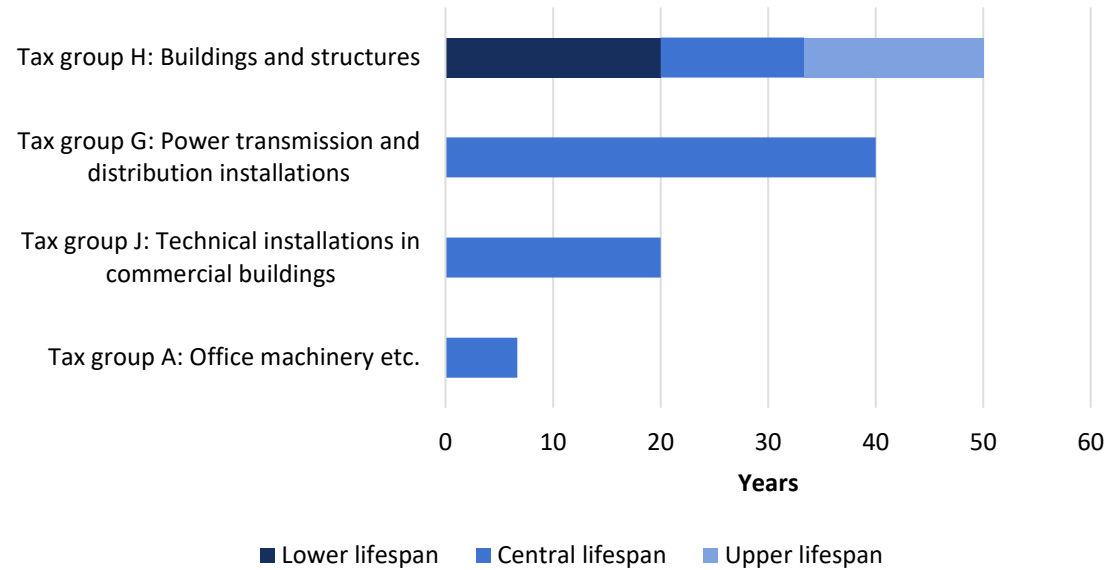


Lifespans

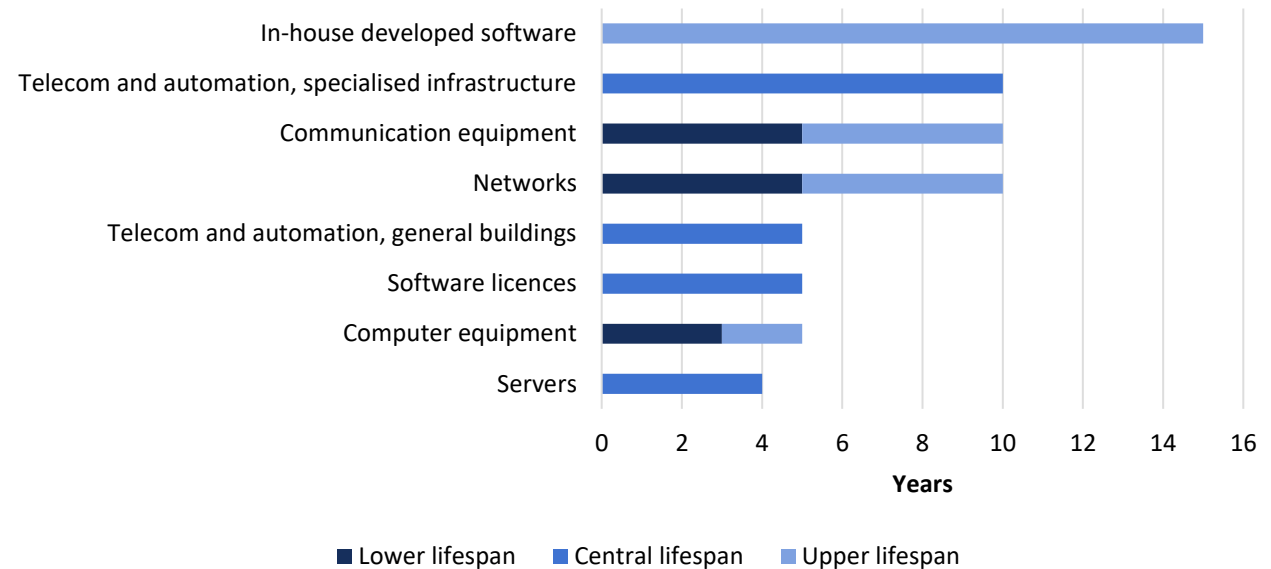
Accounting rules

- Rules for agencies' and firms' financial and tax accounts imply different lifespans.
- Implied lifespans:
 - 3–5 years for **software**
 - 4–7 years for **IT equipment**
 - 5–10 years for **telecom equipment**
 - 20–50 years for **supporting infrastructure**

Tax accounts



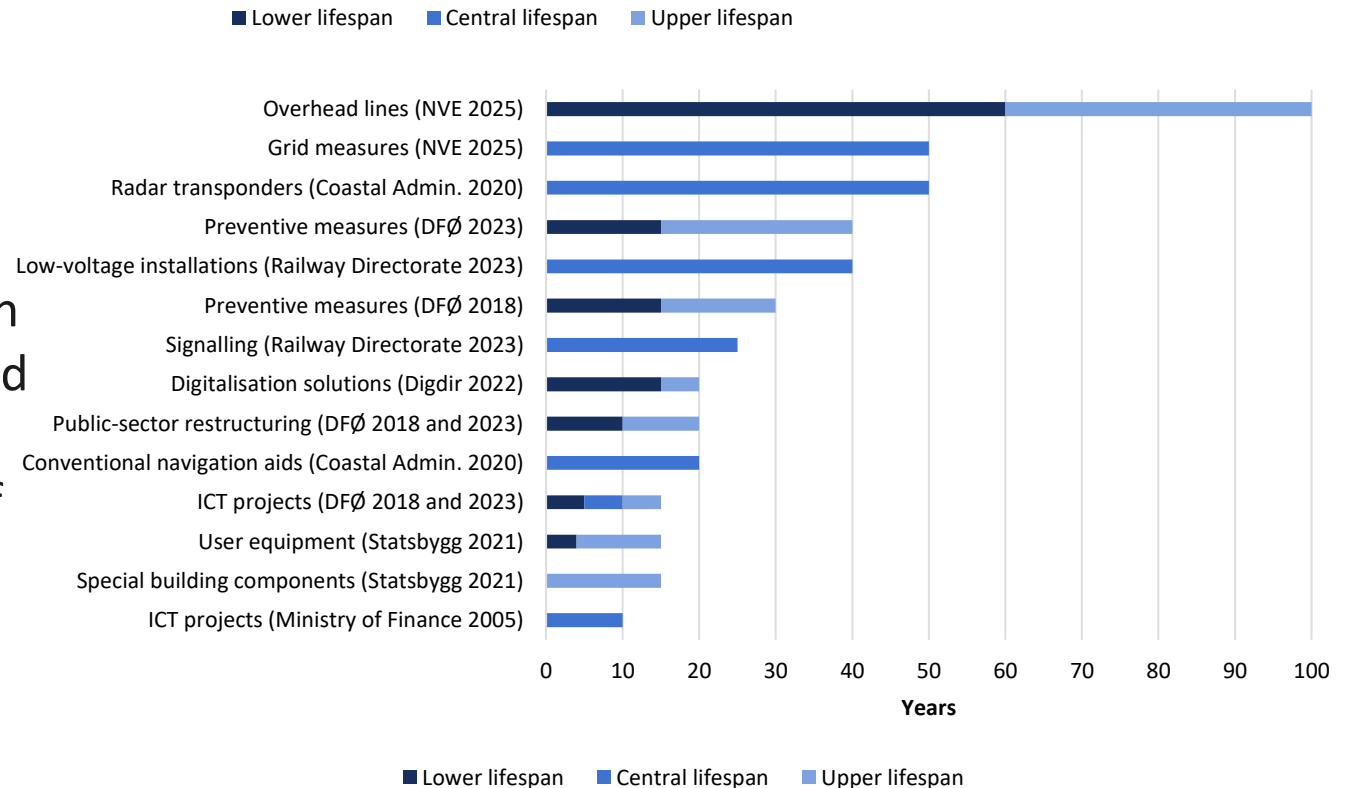
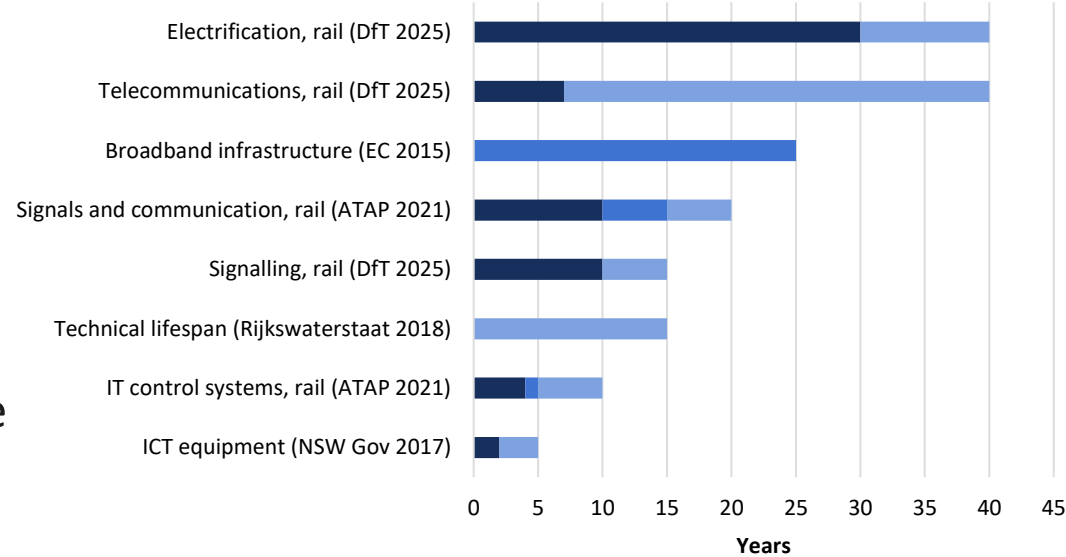
Government accounting standards (SRS) and practice



Lifespans

Public guidance documents

- User-facing parts of digital investment projects have shorter lifespans than the underlying infrastructure.
- The Agency for Public and Financial Management (DFØ 2023) and the Digitalisation Agency (Digdir 2022) recommend 5–15 and 15–20 years, respectively, for digitalisation projects.
- Guidance from the Coastal Administration (2021), the Railway Directorate (2024) and the Water Resources and Energy Directorate (NVE 2025) gives examples of digital infrastructure lasting 20–50 years.

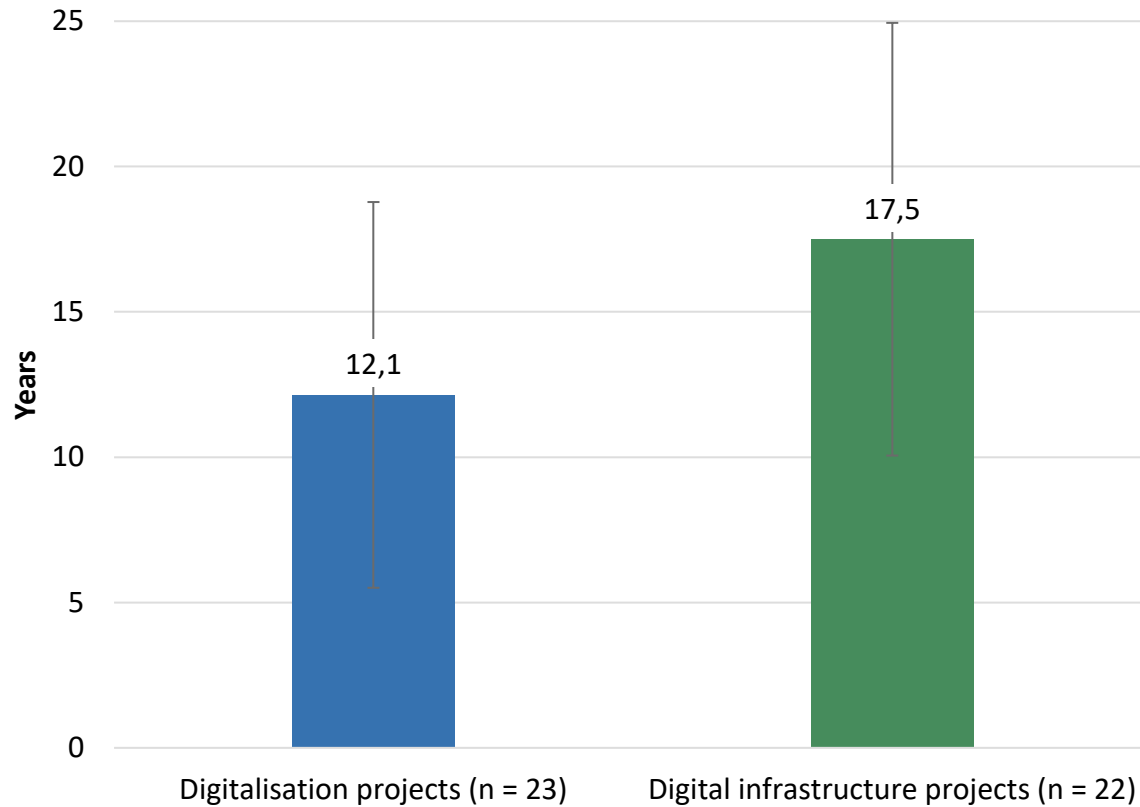


Lifespans

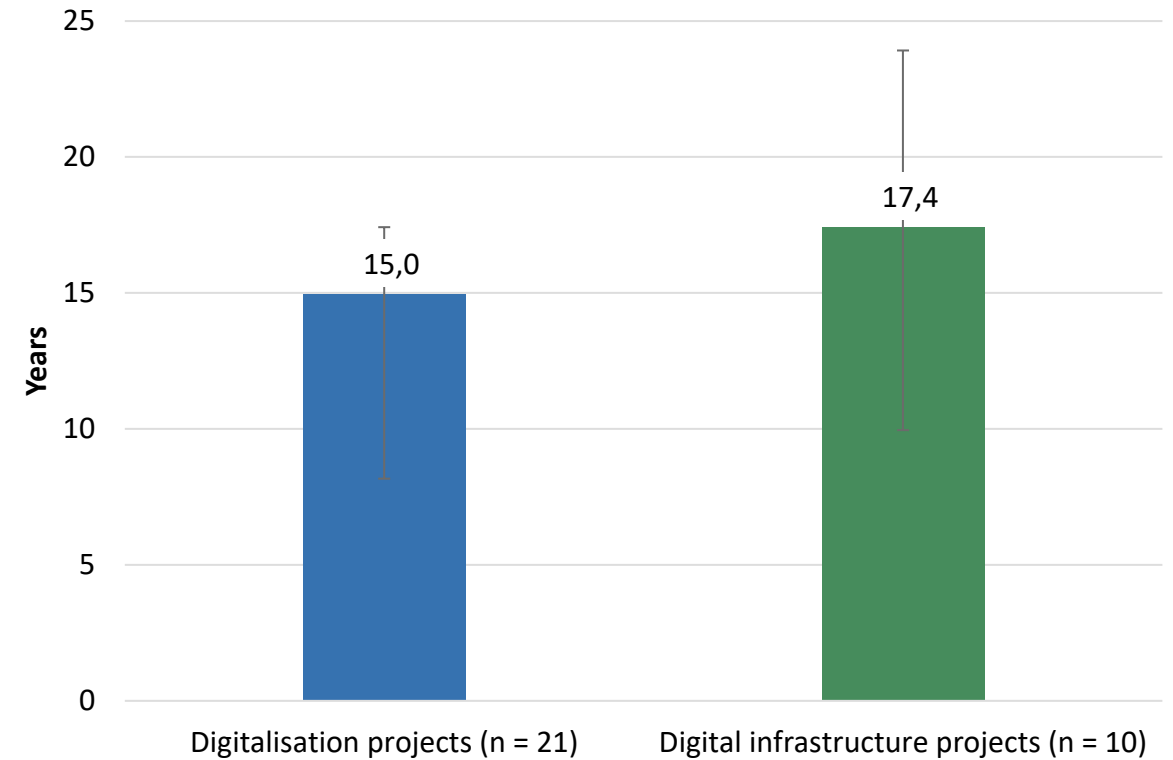
Ongoing and planned projects



Ongoing projects (lifespan to date)



Assumed in quality assurance and concept appraisals (lifespan)



Lifespans

Expert assessments

- Experts' expectations (30 informants):
 - **Digitalisation projects** normally last 10–15 years, and 5–20 years in special cases.
 - Lifespans of 15–30 years normally, and 10–40 years in special cases, for **digital infrastructure projects**.



Agenda

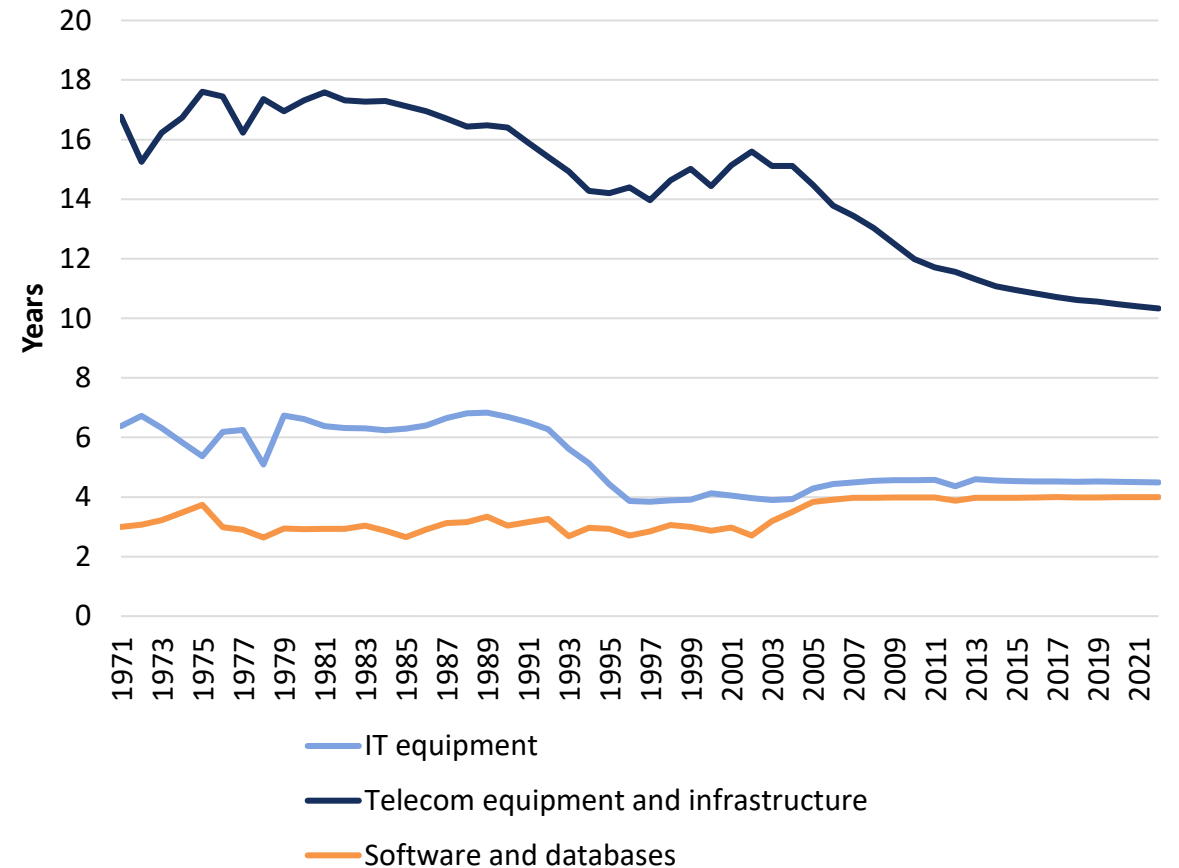
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2. Concepts
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Life cycle

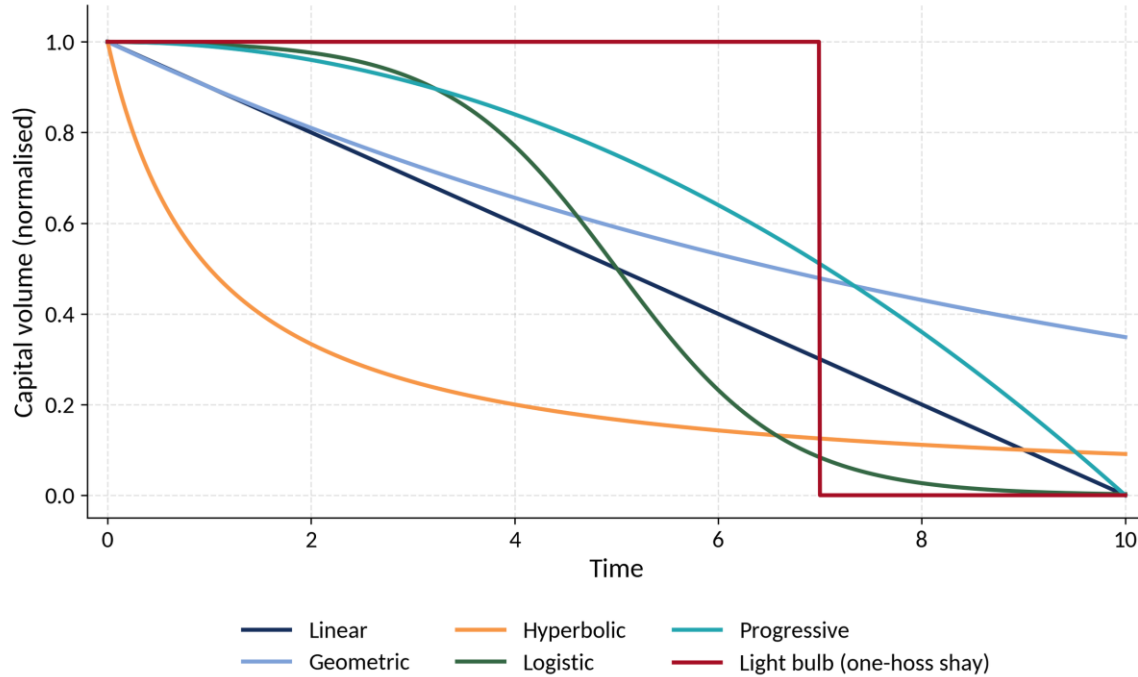
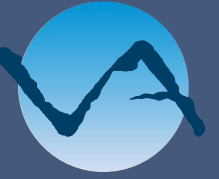
Trends in lifespans

- The national accounts and the research literature mainly indicate that lifespans of several ICT components have declined slightly over time.
- Most of our informants' arguments point in the same direction.
 - **Digitalisation projects:** faster technological change, increased market and regulatory requirements, and the shift from silo thinking to more dynamic, modular solutions.
 - **Digital infrastructure projects:** opposing forces – rapid technological development, stricter security requirements and new functionality shorten lifespans, while quality improvements, more robust and energy-efficient components, standardisation and international harmonisation extend them.

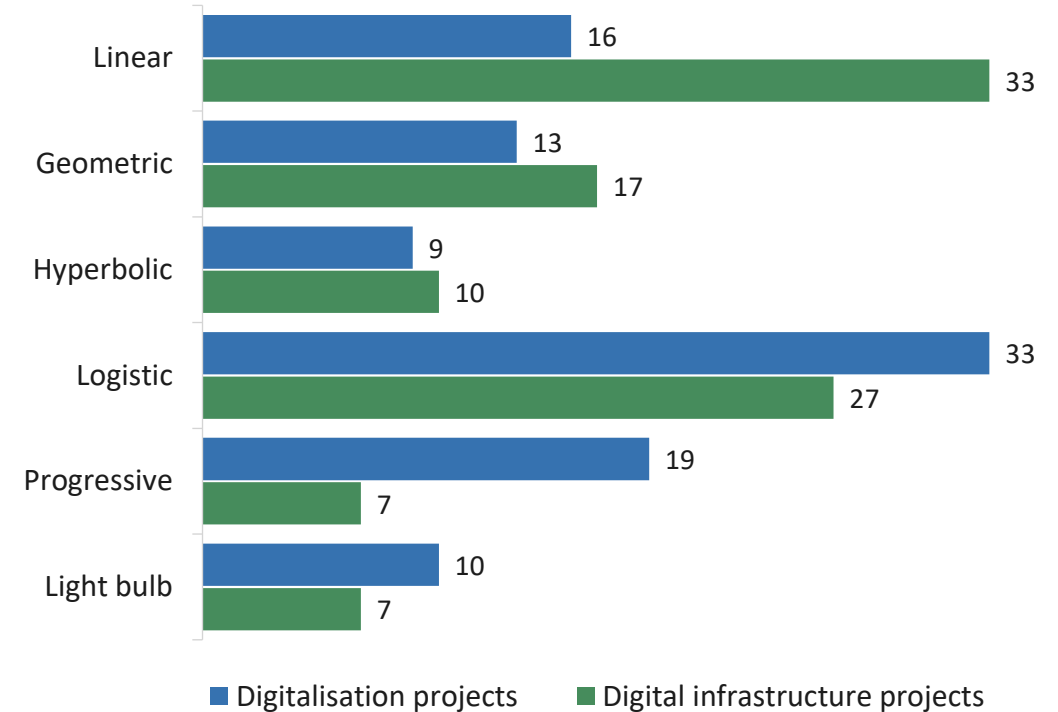


Life cycle

Realistic depreciation paths

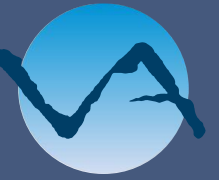


Most realistic path according to informants (% of answers)



Life cycle

Reinvestments

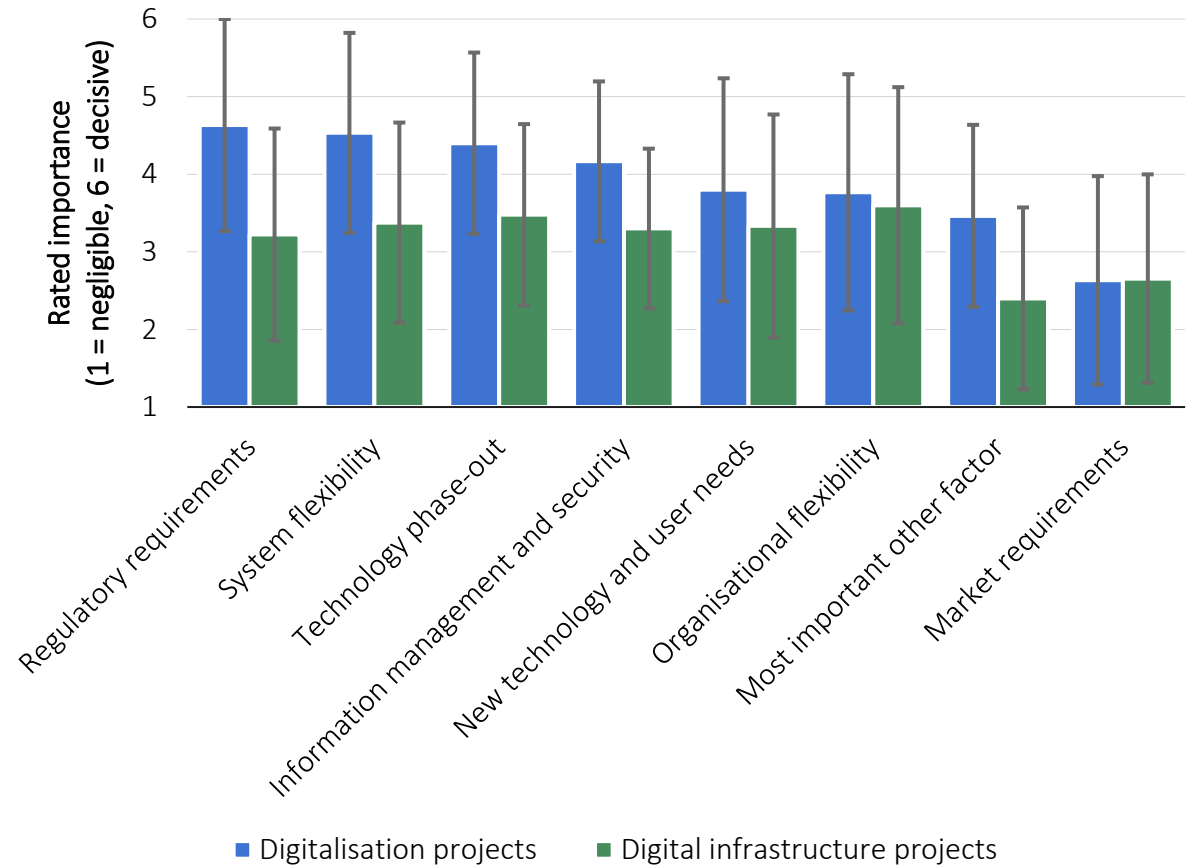


- A project's **optimal lifespan** is the one that maximises its net present value.
 - In practice, reinvestments can both **raise product quality** within a given lifespan and **extend the lifespan**.
 - At the same time, managers may find it optimal to terminate projects while they are still technically viable.
- Differences between project types:
 - For **digitalisation projects**, modularisation, cloud services and service-based models provide **greater flexibility**, but new requirements and technological change can still trigger a **need for major replacements**.
 - For **digital infrastructure**, robust original design combined with maintenance is key to optimising the lifespan, while active equipment is more subject to market-driven replacement.

Life cycle

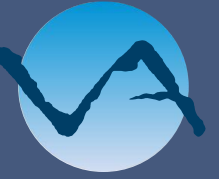
Factors affecting lifespans

- **Digitalisation projects:** Regulatory requirements, system flexibility, technology phase-out, and information management and security rank highest.
- **Digital infrastructure projects:** Lifespans are seen as less sensitive, and no single factor stands out as clearly more important than the others.



Life cycle

Probability of project failure



- **Two definitions of failure:**
 - Abandonment – cancelled or decommissioned early (*narrow definition*)
 - Negative net benefits over the life cycle (*broad definition*)
- Informants' probabilities are best guesses – indicative rather than precise estimates.
- Our informants on **digitalisation projects:**
 - Probability of negative net benefits: 30–60 per cent (mean 46 per cent, six estimates).
 - Probability of abandonment: 10–25 per cent (mean 16 per cent, seven estimates), versus 10–20 per cent in the literature.
- Our informants on **digital infrastructure projects:**
 - The probability of abandonment is considered negligible.
 - The probability of negative net benefits is also considered low.
 - Most abandoned infrastructure projects we identified were due to insufficient market demand or technological challenges.

Life cycle

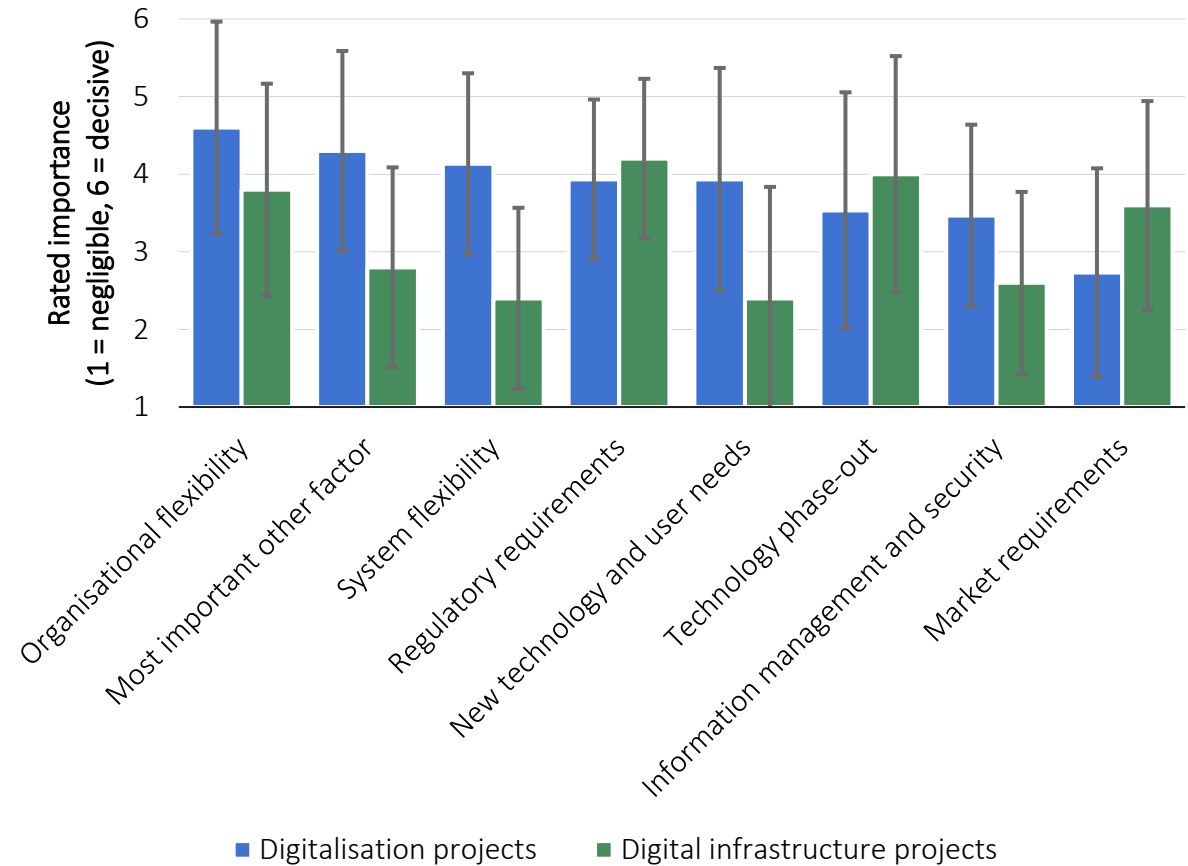
Factors behind project abandonment

- **The literature:**

- Complexity and size are highlighted as risk factors for failure of digitalisation projects.
- Success factors include technical and organisational flexibility and appropriate project set-up.

- Our informants highlight these drivers of abandonment:

- Organisational flexibility
- System flexibility
- Regulatory requirements
- New technology and user needs
- A clear and realistic project plan
- Competence
- Delivery capacity
- Supplier dependence



Agenda

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Conclusions

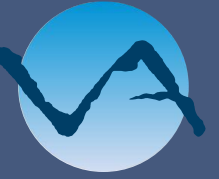
Recommendations for appraisal practice



1. **Starting point:** The lifespan should be counted from when the project is ready for use in production or consumption.
2. **Bimodal distribution:** The ex-ante expected lifespan accounts for the risk of abandonment and is therefore shorter than the peak of the bell curve.
3. **Digitalisation projects:** We recommend an expected lifespan of normally 10–20 years, depending on available information (default without specific information: 15 years).
4. **Digital infrastructure projects:** We recommend an expected lifespan of normally 15–40 years (default: 20 years).
5. **Component reference values:** The report provides reference lifespans for relevant components to inform component-level assessments.
6. **Uncertainty analysis:** Given the uncertainty in lifespans, we recommend considering a larger role for uncertainty analysis over time in the State Project Model, for digitalisation projects and possibly digital infrastructure projects.

Conclusions

Directions for further research



1. **Blurred line between investment and operation:** how could the State Project Model accommodate more continuous and agile funding of digital investment projects – and would that be a fruitful path?
2. **Optimal lifespans and reinvestment levels:** more research is needed on actual versus optimal lifespans of digital investment projects and their components, including reinvestment timing and termination.
3. **Determinants of lifespans and project failure:** we see a need for systematic, dedicated research on which factors and interventions affect lifespans and the probability of failure.

Thank you for the attention!

Discussion and questions



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See the report for full reference list and country-level sources for the component charts.



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