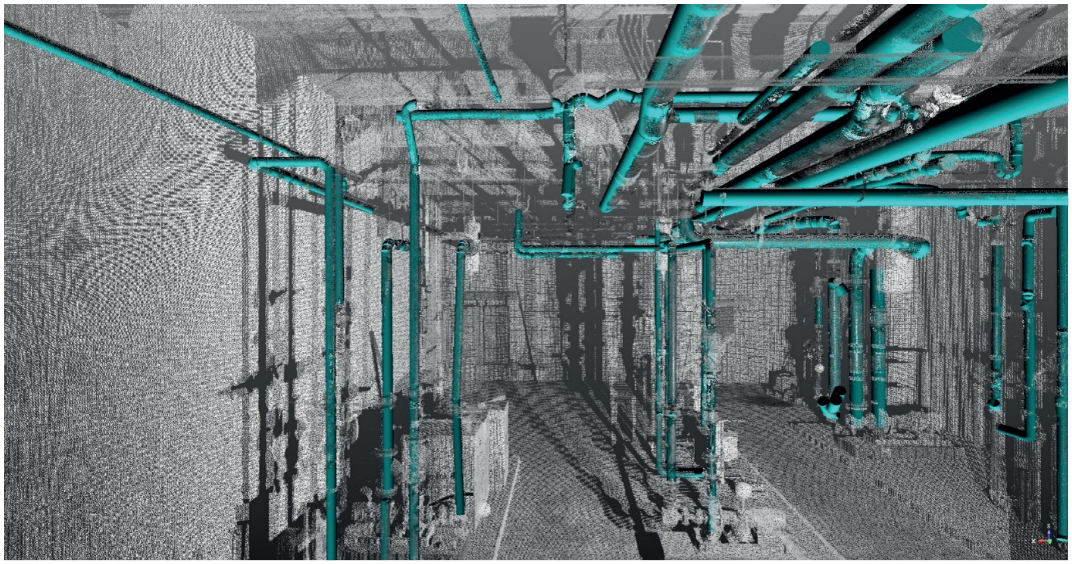
8 Information Science Research Program 2023-2027

CAMINO

Creating, Analyzing and Managing high-quality Information



Department of Information Science, Open Universiteit

8.1 Overview of the department

This strategic research plan of the Information Science (IS) Department in the Faculty of Science represents a next step in the evolution of information science practised by this research group. Besides some quite fundamental developments in the way in which individual researchers and research teams are being assessed, a much stronger focus on societal relevance next to scientific excellence characterises this update of our research plan (see version 1.0 [1]). In addition, first steps have been taken to map the rich variety in individual expertise in our group to take into account, both the scientific foundational domains as well the individual experience in various actual application areas.

Besides the continuous effort to further the academic IS domain, researchers in our IS department embrace their mission to "bridge" the gap between the academic IT community and the various stakeholders in practice. Therefore, much of our research takes place in a multi-disciplinary setting in which practitioners may participate actively to create relevant high impact research and to shorten the adoption time of scientific innovation.

In this document the various research lines, the structure, future developments and our ambitions will be explained.

8.1.1 History

The IS department has grown substantially in recent years. This growth necessitates a strong structured approach to organise our research capacity. As will be demonstrated in coming paragraphs, the research capacity is quite diverse, not just on the departmental level but also on an individual level. We hope and expect that this strategic plan will be equally interesting for academics and practitioners. In particular growth was made possible through a growing popularity of the "Business Process Management and IT" scientific master program.

Typically for the Open University, the vast majority of students are in the middle of their career tracks and have regular jobs in a broad variety of organisations, employed mostly in positions closely related with IT development in relation to business development. They seek further academic sophistication and professionalism in the emerging field of information science and become leaders in innovation. In a sense, this interest demonstrates the relevance of the departments knowledge and innovational prowess for actual IT business challenges many modern organisations have to deal with.

Being in the forefront of information science innovations necessitates a strong information science research effort to facilitate a quick and direct influx of new ideas, concepts, instruments and methods into our educational programs.

In our department we strongly believe that scientific excellence and societal relevance go hand in hand. It may come as no surprise then, that we not only have a strong following of master students but also a growing group of external PhD students, having

professional daytime jobs. At the time of this writing, the number of PhD students grew from a handful to over thirty in just a few years' time. Our success on the educational side very much motivates our staff to innovate further to invest in IS novel research and learning approaches to facilitate a quick adoption into practice.

8.1.2 Research focus of the department

The Information Science discipline can be considered a research domain which unites computer science (the enabling IT technology) and management science (users seeking effective and efficient application of IT technology). In a sense, the information Science (IS) discipline is a response to the inability on, both practical as well as on a scientific level, to realise the envisioned success of IT applications in a straightforward way. The inherent complexities of combining technological excellence with organisation design and governance is seen as a key problem area in the research efforts in our IS department. In addition, the many different application contexts in which IT technology can be studied are sheer endless. The Information Science Group has defined its mission as follows:

The mission of the IS group is to foster the co-evolution of the application of Information Systems in its environment to the greater benefit of the value creation of organisations, networks and society in general

The IS group is a young dynamic group of researchers with a wide interest in various aspects in information science. In our view, information science should aim to bridge the gap between rather generic information technology and its real world application to the benefit of individuals operating in various social settings and constructs such as organisations. To develop expertise in this particular area a researcher has to connect with traditional scientific disciplines such as computer science, economics and social sciences, etc. as well as the countless application areas in which real world information systems are being developed and used. In all, this requires a multidisciplinary mindset and a mental flexibility to team up and cooperate with various academic and non-academic groups. Our researchers combine solid scientific methodological research with situational awareness, sensibility and stakeholder requirements in real world situations in which productive, safe and sustainable information systems are paramount.

To summarise our expertise we decided to make use of a two-dimensional matrix (the IS expertise matrix in Figure 1) in which we categorise our more generic disciplinary knowledge on one hand, i.e. the classic research lines (i.e. the horizontal rows, the first axis), with our situational application knowledge component (i.e. the vertical columns, the second axis) on the other hand.

The researchers in Information Science are active in research projects on both axis simultaneously and in multiple cross-sections shown in Figure 1. E.g. a research project may concern the improvement of ethically sound business processes in a hospital environment in which data security is highly valued.

Because the diversity of expertise is rather large in the IS group, it is rather difficult

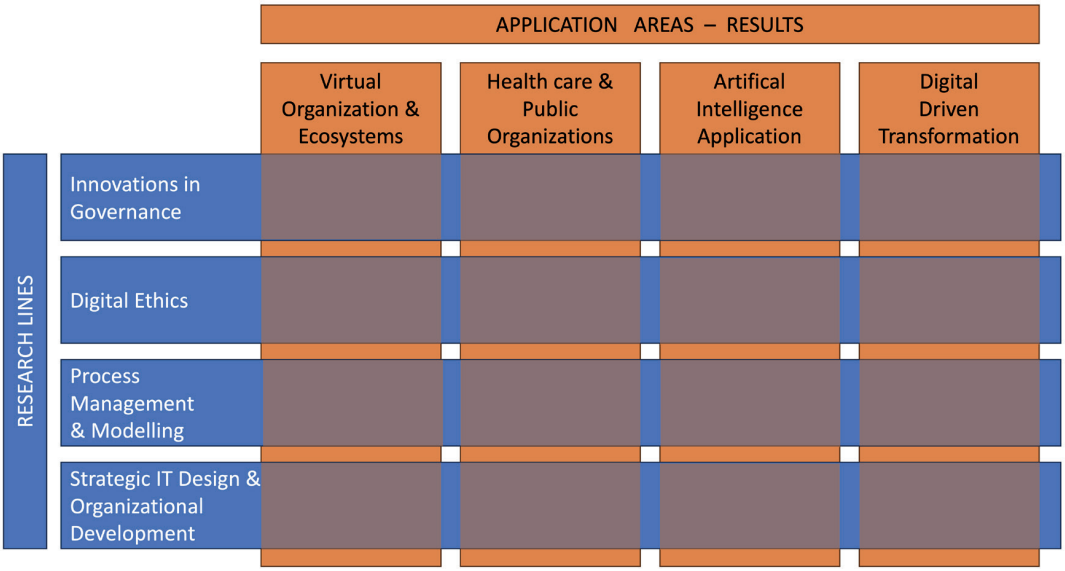


Figure 1: The IS expertise matrix

to position everyone's knowledge in a compact and insightful way on paper, a special experimental Web-application has been developed that provides an interactive and visual way to drill down from the global matrix axes, via the matrix cells down to the individual researchers (The link will be made available via the Information Science research portal, see contact section in this report). The various research lines and application areas will be explained below.

8.1.3 Size

The total capacity as per January 2024 is listed in table 1. The 4 research lines will be explained in the sections below.

Table 1: FTE in research lines

Research line	**Capacity**
Innovations in Governance	9,6
Digital Ethics	2,6
Process Management & Modelling	3,7
Strategic IT Design & Organisational Development	6,8
Total	**22,7**

8.1.4 Embedding in the landscape in the Netherlands

8.1.4.1 Research schools

From the three national computer science research schools (ASCI[1], IPA[2], SIKS[3]), the PhDs of the department IS are all member SIKS.

8.1.4.2 Sectorplannen Informatica

The sectorplannen, as discussed before also include key areas ('zwaartepunten') related to the IS department. Table 2 shows how the research lines in the information science research program at the OU correspond to the focus areas.

Table 2: Mapping of IS research lines on the Sectorplan focus areas

Focus area	**Program line**
Data modelling and analysis	Strategic IT design & organisational development
	Digital Ethics
Machine learning	Digital Ethics
Machine reasoning and interaction	-
Algorithmics	-
Software	Process Management & Modelling
	CS Education
Security and privacy	Innovations in Governance
	Digital Ethics
Networked computing and embedded systems	-

8.2 Research Line: Innovations in Governance

Nowadays, organisations heavily leverage digital technologies for strategic purposes, accompanied by fundamentally reshaped (digital) business strategies. This widespread adoption of information technology (IT) has resulted in organisational decision-makers encountering crucial IT-related decisions across operational, tactical, and strategic levels. Fields such as IT management, which focuses more on operational aspects, and IT governance, which concentrates more on strategic aspects, have emerged to support

[1] https://asci.tudelft.nl
[2] https://ipa.win.tue.nl/
[3] https://siks.nl

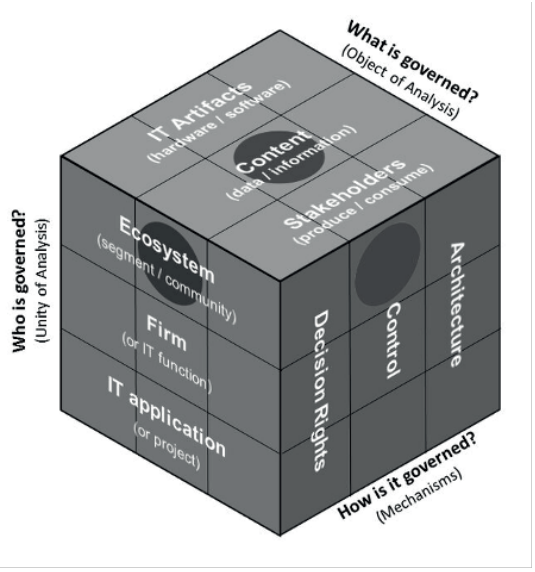


Figure 2: IT governance cube (Tiwana et al., 2013)

organisations in addressing these challenges and to ensure effective control over their current and future IT use.

It has been stressed many times that the achievement of IT business value relies heavily on good IT governance. As Weill & Ross (2004, pp. 3–4) already put it: *"[. . .] effective IT governance is the single most important predictor of the value an organization generates from IT."* Aside from the potential benefits of good IT governance, there are also potential risks of non-existent or inappropriate IT governance. For example, instances of IT governance failure have been linked to incidents such as information security breaches and inefficient allocation of IT resources. In summary, organisations have clear incentives to strive for effective IT governance, as this enables the creation and protection of IT business value.

The issues related to ensuring appropriate control over IT to enable the creation and protection of IT business value fall under the umbrella of the 'IT governance' concept, which can be defined as: *"[. . .] an integral part of corporate governance for which, as such, the board is accountable. It involves the definition and implementation of processes, structures, and relational mechanisms that enable both business and IT stakeholders to execute their responsibilities in support of business/IT alignment, and the creation and protection of IT business value."* (De Haes et al., 2020, p.3).

There are numerous ways to classify IT governance research. Initially, the focus was on two concurrent research pathways, which are considered foundational to subsequent IT governance studies (Brown & Grant, 2005). The first pathway delves into different forms

of IT governance (and is concerned with the locus of IT decision-making authority and the types of IT decisions), while the second pathway explores IT governance contingency analysis (and is concerned with understanding the factors that influence the choice for a structural form of IT governance). While these initial pathways remain relevant to this day, later research has converged and aggregated these two initial research streams, and tried to better connect to practice. In that regard, research focused on how IT governance can be implemented in practice (e.g., through structures, processes, and relational mechanisms), and on the organisational effects of effective IT governance.

Figure 2 presents the IT Governance Cube (Tiwana et al., 2013), providing a straightforward framework to classify IT governance research. It comprises three dimensions that delineate the scope of IT governance research. First, the 'Who is governed?' dimension signifies the breadth of governance and roughly maps to the unit of analysis. Second, the 'What is governed?' dimension concerns what is being governed. Third, the 'How is it governed?' dimension represents the mechanisms used to govern.

The research line on IT governance can be divided into four research sub-lines. These sub-lines can be related to the dimensions in the IT Governance cube in the following way:

IT Governance Dimension	**Research Sub-line**
Who is governed	1. Digital platform governance
What is governed	2. Information security governance
	3. Data governance
How is it governed	4. Agile and adaptive IT governance

In the following sections, each of the research sub-lines will be described briefly.

8.2.1 Digital platform governance

With the ongoing rise of digital platforms, it is becoming clear that traditional IT governance mechanisms used in an intra-corporate setting are challenged and may be less adequate in a platform setting. Consequently, governance frameworks must be redeveloped using the elements of existing frameworks centred around creating an agile governance structure where business and IT are operating closer than ever.

Slogan

Forging trust in digital frontiers: shaping governance for platform success

Specific projects within this topic focus on (1) governmental platforms for digital citizen services and (2) data-sharing platforms.

Governance models for governmental platforms for citizen services are needed for governments all around the world since are going digital and are using technology like the

Internet, AI, or social media to improve citizen services. Citizens are evolving into digital users and increasingly expect the same level of proactive and personalised services from governments like they enjoy in banking, financing, or shopping online.

Part of the challenge for governments to deliver on these digital expectations is how administrations operate, including political and legal constraints. For decades, citizens must request each service directly to the relevant administration, supply proof – often in paper form - and wait for approval. Governments have been experimenting with personal budgets that citizens that can use at their discretion. Using the platform approach, governments now take this one step further. Next to the personal budget, they provide a marketplace with a series of trusted providers where the personal allocated budget is to be spend. This approach is based on the business platform model. Many consumers are quite familiar with this approach, for example using Uber and/ or Airbnb to travel. The benefits for the providers are agility, efficiency, and increased service quality.

Platform models require agility from an organisation to engage successfully. Because many governments still operate in a decade old approach, traditional IT governance frameworks can be used and seem effective. But as we require more agility to operate a platform model, using traditional IT governance is not a recipe for success anymore. Therefore, the objective of this research is to design an IT governance framework for government organisations that want to embrace the platform model to improve citizen services and that allows governments to become agile in redesigning citizen services using the digital platform model and using an ecosystem of industry suppliers as partners to deliver the service directly to the citizen. With digital expectations from citizens rising, governments can no longer just wait and see how the platform economy will develop. As more and more bottom-up inspired government agencies start launching platform models without decent control mechanisms in place, there is a sense of urgency to define a new IT governance framework to manage government platform models and provide consistency and trust to all stakeholders involved.

Data-sharing platforms need governance: striking the balance between openness and control. In the increasingly pervasive landscape of data platforms, where business data is exchanged and monetised among various user groups like data providers and users, establishing a robust governance framework is paramount. These platforms essentially function as marketplaces facilitating data trading. However, ensuring the success of these platforms and their surrounding ecosystems presents challenges, particularly in the domain of governance.

Although governance is extensively studied in digital platform literature, existing governance frameworks cannot be directly applied due to unique characteristics such as data sovereignty loss and privacy concerns. Current research predominantly focuses on digital platform governance, neglecting the specific requirements of data platform ecosystems.

One significant challenge that data platform ecosystems encounter is the delicate balance between openness and control. Striking the right governance mechanisms to reconcile these tensions becomes imperative for their success.

Therefore, navigating the governance landscape of data platform ecosystems requires a tailored approach that addresses their specific needs and challenges, while effectively reconciling the tensions between openness and control.

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8.2.2 Information security governance

With increased reliance on digital technologies, businesses must develop and evolve digital strategies that closely integrate business and technology considerations. The digital strategy shows organisations' direction and tactics to achieve competitive advantages with technology. Using this direction and tactics will create new products or re imagine current organisational processes. With "digital" being put on the agendas of business strategies more frequently, organisations are required to be aware of the risks that come with embedding IT into the business. Decision makers within organisations need to take account of the increasingly sophisticated threat environment following this digital agenda. As such, the organisation must govern information security by implementing the required information security components from a holistic perspective to minimise the risks arising from the use of IT and digital assets.

The present research focuses on helping organisations prevent the materialisation of security risks by ensuring a sound information security governance and management approach.

Slogan

Steering trust in the digital age: empowering boards, empowering security

Due to the evolution in the deployment of information security and the role of every employee in every department in keeping the company secure, merely focusing on technical aspects does not work anymore, and shifting towards a holistic and multidisciplinary people-orientated and governance-orientated approach is required. Therefore, knowledge related to information science as well as an understanding of organisational behaviour theories, is necessary to enable a better understanding of the phenomenon.

The role of the board in security governance. In this era of increasingly complex and interconnected technologies, addressing InfoSec issues requires more senior management and board involvement. The ability of senior managers and boards to assess a company holistically and implement new processes in a timely manner has led academics to advocate that effective security policies should be developed at the top rather than by the Chief Information Security Officer (CISO). Although several papers argue for the importance of an InfoSec-minded board, little is known about its specific role in the available literature. It is not explicitly discussed how the board should act or what its role is. To understand the board's potential role in InfoSec holistically applying theoretical pluralism is necessary, as this role may span technology, human behaviour, legal and regulatory aspects, risk management, and more. In this project, we are defining the various roles board roles in the context of information security based on extant corporate governance literature, and empirically validating (1) the decision to be made, (2) the information required and (3) the availability of this information, within the context of each of these roles.

Counteracting biases in IT risk management communication. Even though cyber risk has been promoted as an important focus for IT governance, that should as such be on the radar of the board of directors, many boards are still not well-equipped to perform their strategic roles related to cyber risk. In order to be able to take responsibility for cyber risk in the boardroom and ask the right questions to the expert IT managers within the organisation (e.g., CIO, CISO, senior IT management), adequate measures of IT governance should be in place. This involves two pillars: (1) proper information about cyber risks coming from the organization and (2) board composition and expertise to be able to make an appropriate assessment of cyber risks.

Cyber risks are becoming increasingly complex and dynamic. While most research has focused on the technical aspects of cyber risks and security, a broader approach, including behavioral perspectives, would certainly be beneficial. This is because the course of risks is subject to our own behavior and how we personally assess risk. Risks can be captured less and less in "probability x impact",but are much more ambiguous. This raises the question of whether the current way of reporting cyber risks (in the form of traffic light reports) needs improvement.

In an ongoing PhD project, we focus on three objectives. Firstly, we examine biases in the use of traffic light reports (green – yellow- red) to communicate cyber risks. Secondly, we probe an enriched and refined language for communicating cyber risks by using metaphors that capture the dynamics of cyber risks and could serve as an instrument for communicating cyber risks between IT experts and C-level executives. Thirdly, we place these insights in the context of a move beyond 'traditional' cyber risk management towards cyber resilience to assess their relevance and implications.

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8.2.3 Data governance

Data governance research is part of the IT governance research line and focuses particularly on data assets. Due to heavily digitised processes, each organisation has become dependent on having timely and accurate data available for their business operations and as a result also generates huge amounts of data. Furthermore, more and more organisations realise that this data can also be analysed, with the use of machine learning and AI, to discover new insights to improve business processes and decision making. In the data governance research line, we address both aspects of the data asset. First, the management of the data asset, and second the analytical processes that transform data into valuable information and insights.

Slogan

Guiding data, empowering organisations: the path to insightful governance

In our research we aim to develop frameworks to better understand the structural, relational and procedural mechanisms that underpin good practices for data and analytical governance. Such frameworks are helpful for organisations to design their governance practices. To further enable organisations, we develop maturity models based on the frameworks. A maturity model considers several phases in which an organisation can develop their governance practices, i.e. going from basic to more advanced. Using a maturity model, an organisation can measure its current maturity and define the next steps to further advance it data and analytics governance practices. Besides research that summaries overall governance mechanisms for data and analytical processes, we also seek to understand how these mechanisms affect organisational members. Current research has shown that while big data is generally useful for innovative processes at the organisational level, it also prone organisational members to information overload and technological stress. We generally propose that strong data governance will allow organisations to select the right systems and approaches that are more likely to benefit employees by providing them with valuable business insights from massive data. In particular, our research delves into the interaction of various elements constituting big

data systems and employees. We aim to shed light on how the characteristics of big data systems might augment or limit employees' productivity and well-being, thereby informing governance researchers and practitioners on the role of governance in technological selection, adoption, and investment.

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8.2.4 Agile and adaptive IT governance

Extant research has recognized IT governance as a crucial factor in facilitating organizational performance by ensuring appropriate control over IT use. While many studies have surfaced over time that provided descriptive accounts of IT governance, the evolutionary dynamics of IT governance are largely neglected. However, given the fast-changing nature of IT and the way it is developed and adopted within organizations, these issues are undoubtedly relevant in practice. Indeed, organizations have to tailor their IT governance to their own specific context (which is shaped by several external and internal factors). Moreover, a change in this context (by virtue of these external and internal factors - e.g. threat landscape, compliance requirements, or the role of IT for the organization) might warrant a change to the organization's IT governance. In short, the evolutionary dynamics of an IT governance arrangement should be considered. This will ensure that the IT governance arrangement is able to control the (current and future) IT use effectively, i.e. that it has the capacity to continue creating and protecting IT business value, despite a changing environment.

Slogan

Navigating change, empowering success: agile IT givernance in action

Research in this sub-line can deal with a contingency view on IT governance. In other words, how does the context (which is shaped by several external and internal factors) influence (the design of) IT governance within organisations. As an example, we focus on how organisations combine different IT governance process capabilities to create and capture business value via strategic alignment, as well as how such combinations perform under internal and external contingency factors. As another example, we focus on how the increasing adoption of agile development practices influences program and portfolio management (which are IT governance processes) - i.e., scaled agile. Moreover, our

research focuses on the governance of elite members in the organisations to guide their behaviours toward effective IT use and subsequently business value creation. These governance mechanisms are often relational aspects, corresponding to power distribution and/or characteristics of elite members. For instance, we examine the relative power of IT executives in the top team as an effective governance mechanism for stimulating digital innovation. We also explore the characteristics of managers that influence how they adopt digital technologies, thereby informing organisations to select change agents when attempting digitalisation.

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8.3 Research Line: Digital Ethics

Development of Information Systems & Information Technology (IS/IT) should not be executed by technology-push only. Derived from the Resource-Based View economics theory, research studies have indicated that organisational and digital (dynamic) capabilities (Wernerfelt, 1984; Barney, 1991; Teece et al., 1997; Teece, 2007; Van de Wetering et al., 2022) are essential for organisations to succeed in their markets. However, successful and sustainable IS/IT development requires more than this: it needs to be done responsibly for all stakeholders involved and affected. Digital innovation can go easily wrong if it takes place without adequate moral considerations, illustrated by e.g. the Volkswagen Diesel Scandal, the Dutch 'Toeslagenaffaire' and Roermond's Sensing-project. Personal data can be easily misused, even unintentionally. The need for trustworthy and responsible digital solutions becomes even more apparent in the age of AI and large language models, as human values are often affected by the application of these new technologies (Dignum, 2020).

Slogan

Empowering responsible digital futures: ethical horizons in technology

Arising from the research field of user experience (UX), the Value Sensitive Design (VSD) approach deals with responsible IS/IT development. Notably, Friedman has provided a research legacy for VSD (Friedman & Hendry, 2019). The approach stimulates a responsible way of decision-making in not only the design, but also the situational

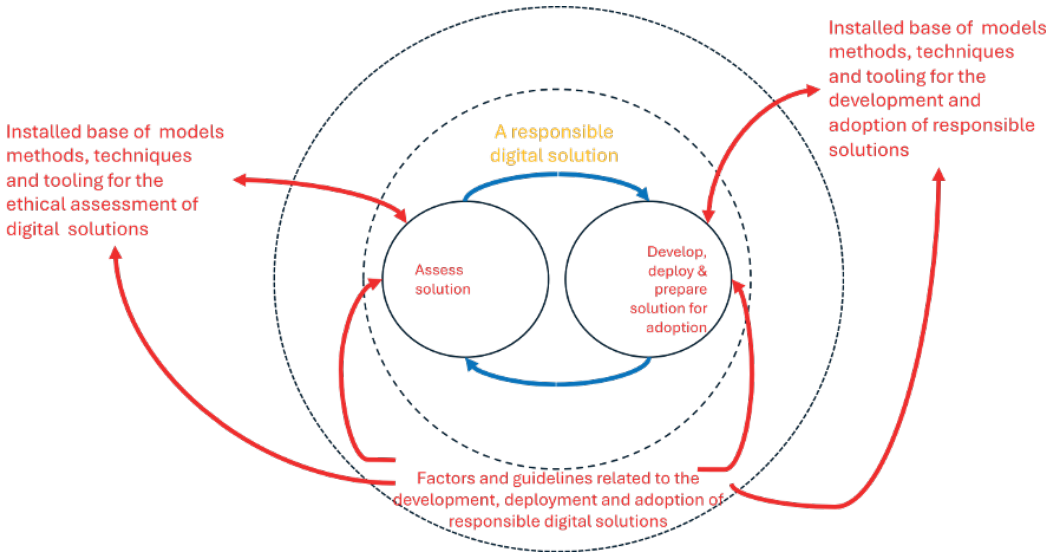

Figure 3: Context of the research of the Digital Ethics research line

implementation, deployment and further up-scaling of digital technologies. But still a number of research gaps exist in value sensitive design:

- Scarcity of standardised and reproducible methods for conducting VSD;
- Application of VSD in an agile way is not obvious;
- Dealing with value tensions (like privacy and transparency at the same time) is underexposed;
- Limited attention to the technical phase (defining requirements),
- Empirical proof of the effectiveness of applying VSD, and,
- Lack of support for professional practice.

At the same time increasing research efforts are being put on the ethical assessment of digital solutions. This comes to no surprise as one sees new laws coming from the EU, national governments, as well as codes of conduct, etc. More specifically, nationally and internationally, ethical considerations are increasingly paid attention to in the digital innovation and coincides with the development of EU regulations (e.g. GDPR and the AI Act of the European Union). We see the methodological development and – validation, as well as the deployment in practice of such assessment models as a primary focus of our research. It is in this context that the research of the research line Digital Ethics is situated (see Figure 3).

Responsible digital solutions can be developed, deployed, prepared for their adoption and assessed, as depicted in the centre of the figure. Our research contributes specifically to

the red-texted and -arrowed parts of the figure. This implies that in the Digital Ethics research line three types of research are executed:

- Research related to the development, deployment and adoption of digital solutions in any kind of context (e.g. within an organisation, in a network or ecosystem, or for society). Here, particularly methods like VSD and ethical guidelines are leveraged for our research, but also extended (in case we contribute to theory and practice): the bi-directional red arrow on the top right depicts this.
- Research related to the assessment of existing digital solutions, or digital solutions in development, deployment and/or adoption. Here, e.g. the socio-technical method of the Trustworthy AI-lab will be leveraged, legislation can be used, etc. Also the existing body of knowledge on assessing existing digital solutions from an ethical perspective can be extended by our research, in which case we contribute to theory and practice (the bi-directional arrow on the left depicts this). Note that assessment can take place during development (& deployment & adoption) as well assessment (see the text "Assess during development").
- Research related to the identification of barriers, impediments, determinants, success factors and situational factors that contribute to the success of the development, deployment, adoption and assessment of responsible digital solutions. For both the development, deployment, adoption, and assessment research of a descriptive or explanatory nature is necessary. Through this type of research new knowledge can be brought into the installed bases of models as well as the responsible development (& deployment & adoption) and the assessment of responsible digital solutions.

Many digital ethics research gaps exist in the domain of AI solutions. Therefore we explicitly address AI-based solutions, generative AI and large language models in an organisational context. Among others risk management and impact management are subject of our research.

AI risk management and impact assessment. The rapid advancement and widespread adoption of Artificial Intelligence (AI) technologies introduces substantial challenges and risks. These challenges encompass both technical issues, such as a lack of transparency, and explain ability, as well as non-technical risks, including the potential violation of human rights and ethical concerns. In response, effective risk management strategies are imperative, aimed at identifying, analysing, and mitigating AI-related risks.

In addition, to navigate this complex landscape, organisations increasingly rely on AI impact assessments as a complementary approach to risk management, aiming to ensure trustworthy AI development and deployment. Various AI impact assessment frameworks, including AI ethical guidelines, have been proposed. Despite the growing recognition of their importance, there remains a lack of consensus on the essential components and assessment methods for AI impact assessments. Additionally, the practical application of these assessments is challenging, particularly under new regulatory frameworks like the EU AI Act.

As such there arises a pressing need to delve into the intricacies of AI risk management and impact assessment, seeking to address both technical and non-technical concerns while advancing the responsible development and deployment of AI technologies. Anticipatory practices are typically put in place to assess future risks.

Organisational readiness for AI adoption. Despite the widespread uptake of AI in practice and the prospective benefits it offers to organisations, many organisations still struggle to create business value from AI initiatives. To fully harness the benefits of AI, organisational readiness for AI adoption is a prerequisite. Therefore identifying organisational AI readiness factors, the common challenges encountered by organisations when adopting AI, and their mitigation strategies becomes imperative for their successful adoption and use to create value for organisations.

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8.4 Research Line: Process Management & Modelling

Work is done in processes. So here the actual added value provided by IT is realized. This explains the focus we place in our research on the process aspect.

Slogan

Empowering business through process excellence: leading the wat in process management & modelling

IT, as a fast-changing basic production technology, is impacting business process on a continuous basis. At a strategic level this impact is looked at in the previous research lines. At a more operational design level, this issue is researched here. For this, three perspectives are explored. The first takes a model view and explores relevant modelling approaches. The second explores Business Process Management, gaining a deeper understanding of how processes are designed, how they are executed and the difference between the two. The final perspective focuses on the application of technology to support these processes operationally, for instance hyper-automation and robotic process automation, to name just two. In all three views, we decide to focus on the human perspective: developing human-centric business information technology, tools and techniques to support design, analysis, execution, and innovation of business processes, driven by challenges from practice.

Enterprise and process modelling.– The often-heard creed "Our business is IT and our IT is the business" captures precisely what we see happening in our field. Developments in Artificial Intelligence, Machine Learning, Semantic Technologies, Cloud Software Engineering (to name just a few) are taking away the focus from alignment, because the difference between business and IT is felt much less in our heavily digitalised society. To manage businesses from an information perspective, we develop and apply modelling techniques to enable the creation of value in today's enterprises by applying IT inside business processes.

Enterprise Modelling is oriented towards the systematic analysis and modelling of strategies, business models, processes, business policies and rules, information systems and any other relevant business perspective. Within this domain, process modelling can be situated on the operational layer of the organization, with the aim of analyzing and communicating about internal activities. Enterprise modelling efforts are particularly useful to analyze the current and desired future state of enterprises, which enables them to faster react on external changes and developments.

Business Process Management.– Business process management (BPM) is the art and science of overseeing how work is performed in an organisation to ensure consistent outcomes and to take advantage of improvement opportunities (Dumas et al, 2018). It studies business processes from a holistic point of view involving the people, organisations, applications, documents and other sources of information, to produce business outcomes in support of a business strategy (Gartner, 2020). Various methods, tools and techniques are used to elicit, discover, model, analyse, measure, improve and optimise business processes. The focus in this research theme puts special attention on human aspects of BPM.

More specifically, the research addresses process model quality, focusing on how the structure and aesthetics of a model influence its understandability. The theme also explores ontology design patterns for legal concepts and aims to extend these patterns beyond law, emphasising constraints over data models. Another topic is the process of process modelling, which involves understanding how modellers create models, their common mistakes, and methods for better training. Continuous process improvement

methods are also discussed, alongside advancements in task/resource allocation in BPM systems and the application of BPM technology in various domains. Lastly, data analytics for BPM is explored, focusing on applying analytics to create and evaluate new process analysis and improvement methods.

Process supporting technologies. – Both (enterprise) process modelling and business process management are well recognized scientific domain, with their own body of knowledge, conferences, journals etc. In the third perspective, we focus on the range of technologies that have been developed or adopted to facilitate business process management. In industry, the term "hyperautomation" has been coined by Gartner Consulting in 2019, referring to the "the orchestrated use of multiple technologies, tools or platforms, including: artificial intelligence (AI), machine learning, event-driven software architecture, robotic process automation (RPA), business process management (BPM) and intelligent business process management suites (iBPMS), integration platform as a service (iPaaS), low-code/no-code tools, packaged software, and other types of decision, process and task automation tools."

Across the application areas in our "matrix", we can identify relevant challenges for the organizations involved and solutions offered by science; our interest in this perspective is the translation process into working solutions in practice. We aim to intensify our applied research in this field by investigating the critical success factors and identifying best practices for achieving the organizational goals of process automation through the application of such technologies.

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8.5 Research Line: Strategic IT design & organisational development

In the rapidly evolving business ecosystem and technology landscape, digital transformation has emerged as a pivotal concept, reshaping modern industries and societies worldwide (Vial, 2019). Global technology trends like big data, the Internet of Things, and the rise of artificial intelligence are making firms' ability to change and adapt their organisations' structure, architecture, and people as crucial as their competitive strategy. In this day and age, firms, therefore, need to embrace the digital transformation journey to become top performers in the digital economy. Hence, they can leverage new IT resources and innovations, (data and IT-driven) organisational capabilities, business

models, and value networks to facilitate new, better, and more effective ways of working, enhance service delivery to customers (and patients), and reduce cost. The key to success is the seamless interaction between IT systems and humans, aka the work system, and to do this securely. In essence, digital transformation involves the integration of digital technologies and innovation into diverse aspects and dimensions of business models and the organisation's operations. It fuels organisational growth, efficiency, and competitiveness (Kraus et al., 2022; Vial, 2019). While digital transformation has been a driving force in information science research, the accelerating pace of change and the emergence of unforeseen disruptions necessitate a more dynamic and responsive approach.

Slogan

Empowering organisational evolution: strategic IT design for dynamic growth.

We defined four core research focuses that particularly apply as well within the application areas Digital-Driven Transformation (see Figure 4).

The first area, *enterprise architecture*, concerns the blueprint of an organisation's structure and operations (Grave, van de Wetering, & Kusters, 2021). We examine how a well-defined enterprise architecture can serve as the backbone for digital transformation, enabling flexibility and providing a framework to integrate new technologies seamlessly into existing business models.

Dynamic capabilities form our second area of focus. These are the skills, processes, and routines that enable organisations to adapt and thrive amidst market and technological changes (D. Teece, Peteraf, & Leih, 2016; van de Wetering, de Weerd-Nederhof, Bagheri, & Bons, 2023; Rogier van de Wetering & Johan Versendaal, 2021). Our research delves into how organisations can cultivate these capabilities to not only react to changes but also anticipate and shape them. Also, we concentrate on the business value of digital innovations. This encompasses assessing how digital advancements can be translated into tangible business outcomes, such as revenue growth, increased efficiency, and enhanced competitiveness. We explore how digital innovations can be leveraged to catalyse organisational development, transform business practices, and drive sustained value creation.

The last two focus areas, work towards the understanding the *business value* of virtual organisations as integral part of the *collaborative ecosystem* in times of AI and digital transformation.

Together, these four areas form our core focus of research that aims to empower organisations with the insights and tools necessary to navigate and capitalise on the digital landscape. Through this comprehensive approach, this research line aims to contribute to a deeper understanding of how digital transformation can be a leveraged asset for strategic advantage in a rapidly evolving world. We will describe each in more details in the next sections.

Figure 4: Research agenda overview

8.5.1 Enterprise architecture

Enterprise architecture (EA) is a family of guidelines and artifacts (concepts, models, policies, principles, rules, patterns, interfaces, and standards) to build organizational capabilities (Foorthuis, Van Steenbergen, Brinkkemper, & Bruls, 2016; Gong & Janssen, 2019; Grave et al., 2021; Kotusev, 2019). As a result, EA is a practice that, on an ongoing basis, fosters business/IT-alignment, and creates value for key stakeholders (Hinkelmann et al., 2016; Pattij, van de Wetering, & Kusters, 2022; Szabó & Öri, 2017; van de Wetering, 2021). EA is a valuable research discipline for effectively navigating digital and adaptive transformations (Bocken & Geradts, 2020; Pattij et al., 2022; Van de Wetering, 2022b; Vial, 2019). It provides a strategic lens, aligning strategies, business objectives, and IT landscape, organisations can leverage EA to orchestrate their information technology (IT) portfolio and business landscape, including processes, (big) data, information, systems, resources, and capabilities. In other words, EA is crucial for the organisation's design and the process of orchestrating and restructuring the organisation's resources when needed. However, the extant literature does not provide convincing evidence on how EA contributes to this, leaving a critical knowledge gap in understanding the concrete ways EA creates a road-map for the digital journey, fosters agility, innovation, and continuous improvement (Korhonen & Molnar, 2014; Shanks, Gloet, Someh, Frampton, & Tamm, 2018; Van de Wetering, 2019). Thus, we will explore and advance our understanding of how organisations can effectively deploy EA artefacts and EA modelling practices. Research in this area can help uncover best practices, case studies, and methodologies that effectively leverage EA for successful digital and adaptive transformations.

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8.5.2 Dynamic capabilities and organizational development

The second key area of this research line concerns dynamic capabilities and organisational development. Modern organisations must be agile, responsive, and capable of adapting to new challenges, opportunities, and demands of the business environment (Abou-Foul, Ruiz-Alba, & López-Tenorio, 2023; D. J. Teece, 2007), which is characterised by predictable patterns or 'waves,' as Pavlou and El Sawy call them (2010). Dynamic capabilities broadly reflect the organisation's ability to orchestrate and renew internal and external resources and competencies to address rapidly changing conditions and business environments (Felin & Powell, 2016; Kay, Leih, & Teece, 2018; Mikalef, Pateli, & van de Wetering, 2020; Van de Wetering, 2022b; Wang & Ahmed, 2007). Digital innovations (e.g., digital platforms, the Internet of Things, data analytics, and AI) play an instrumental role in developing and enhancing an organization's dynamic capabilities (Mikalef et al., 2020; van de Wetering, Mikalef, & Dennehy, 2022; Warner & Wäger, 2019). For instance, they can have a monumental impact on how organisations respond to changes in the marketplace and customer needs, wishes, and preferences using real-time customer data. Also, they can facilitate flexible allocation and reconfiguration of resources. However, many questions still remain. By examining the concept of digital-driven dynamic capabilities, we can contribute to a better understanding of how organisations can cultivate different capabilities not only to survive but thrive in rapidly evolving industries, identify business opportunities and transform digital disruptions into competitive advantages and ensure long-term resilience. Also, the Chair and his team will investigate how these capabilities depend on the combination of digital assets and resources, activities, and people, connecting a firm's day-to-day activities with its

strategic ambitions (Canhoto, Quinton, Pera, Molinillo, & Simkin, 2021; Puliga & Ponta, 2022; Van de Wetering, 2022b; Van de Wetering, Roelens, & de Langen, 2023). This is particularly relevant in knowledge intense industries like healthcare, where the ability to anticipate patient demands and needs, i.e., patient agility, is crucial (Broekharst, van de Wetering, Ooms, Helms, & Roijakkers, 2023; Kraus, Schiavone, Pluzhnikova, & Invernizzi, 2021; Rogier Van de Wetering & J Versendaal, 2021). Collaborating with industry partners and academia, the Chair can contribute to the collective understanding of digital-driven dynamic capabilities' impact on organisations, ultimately fostering a more informed approach to adaptive and digital transformations in the modern era.

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8.5.3 Collaborative Ecosystems

The evolution of collaborative patterns within diverse sectors of industry reflects a significant shift from fleeting trends to enduring structures. Departing from internal innovation confined to large enterprises, the paradigm now embraces open innovation with external partners. Over the decades, collaborations have transitioned from ephemeral alliances in the 1980s to more strategic and structured alliances in the 1990s. A pivotal moment in collaboration occurred with the introduction of alliance portfolio management, expanding collaborations to include diverse partners such as universities and startups. This development coincided with the formation of dense networks, giving rise to ecosystems characterised by self-governance and sustained collaboration aimed at addressing societal challenges.

Simultaneously, the concept of the "virtual organisation" encapsulates the evolving perception of traditional workplaces. Information Technology's transformative impact facilitates close collaboration without rigid physical proximity requirements, fostering in-

novative working conditions. In its extreme form, an organisation may fully transition into a virtual entity, enhancing mobility and flexibility while potentially affecting social connections and loyalty. This virtualisation dimension mirrors the ecosystem model. Another facet of virtualisation arises from increased organisational specialisation, where entities extensively depend on other organisations' structural contributions. This trend fosters agility, innovation within ecosystems, and reduced financial investments, aligning with the augmented reliance on advanced information systems. However, similar to the ecosystem model, the cross-border flow of information in this virtualisation dimension carries inherent risks related to information security.

Slogan

Synergies unleashed: transforming collaborative ecosystems and virtual organizations

The parallels between these dimensions underscore intricate organizational evolution dynamics, emphasizing the necessity for comprehensive research exploring intersections and synergies between collaborative ecosystems and virtual organizational transformations. Recognizing virtual organizations as integral to the ecosystem model provides a holistic understanding of the evolving collaborative landscape:

- At a comprehensive level, research at the level of ecosystems centres on generating societal value and health through collaborative and innovative efforts, emphasising the creation of knowledge-oriented jobs. Ecosystems actively leverage voluntary knowledge sources, addressing challenges with intensive interactions and long-term commitment. The dynamics of internal and external connections are crucial for shaping enduring functionality. In this digitally interconnected landscape, the integration of information security becomes paramount. Researchers focus on measuring societal value, considering socio-cultural, sustainability, and environmental aspects. Studies explore the influence of real-time governance dashboards, collaborative platforms, and knowledge-sharing systems on ecosystem health, with a parallel emphasis on implementing robust information security measures. The inclusion of information security safeguards helps protect sensitive data, mitigate cyber risks, and build trust among ecosystem participants. This comprehensive research provides valuable insights for facilitators, guiding partners toward shared goals in the evolving virtual landscape, underscoring the integral role of technology, including information security, in optimising collaborative innovation efforts and navigating the complexities of the digital era.
- Within technology-driven innovation ecosystems, a diverse array of organisations actively engages, highlighting the role of information science in fostering preparedness for meaningful involvement. This readiness sparks transformative structural changes, shaping organisations into nimble, virtual entities. Leveraging cross-functional teams equipped with digital collaboration tools, these entities refine core competencies while seamlessly engaging with others for non-core resources.

Cultural shifts prioritise values like trust, innovativeness, open communication, risk tolerance, inclusivity, customer orientation, and a dedicated commitment to collective goals. This cultural evolution harmonises with the adoption of agile and asynchronous work practices, seamlessly facilitated by information technologies. Simultaneously, ecosystem preparedness requires a refinement of processes related to knowledge management, learning, agility, collaboration, and intrapreneurship. In this paradigm shift, performance measurement takes centre stage, employing analytics, data measurement tools, and dashboards to focus on innovation, ecosystem contribution, and learning. Research underlines the significance of diverse ecosystem partners, each offering varied insights. Scientists explore the intricate relationship between unique partner characteristics and the internal organisational changes essential for effective ecosystem engagement. They delve into the dynamic roles of ecosystem facilitators, subtly emphasising the need for adaptability in fostering collaborative innovation. Research consistently underscores the importance of maintaining diversity for adaptability and resilience, particularly during challenging situations, with a dedicated focus on the facilitator's role. Critical questions emerge, subtly probing into aspects such as skills, role evolution, and the delicate balance between guidance and allowing for self-direction.

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8.5.4 Business value of digital innovations

The business value of digital innovation, particularly AI, has garnered considerable attention due to its transformative potential. AI, or the 'next era of analytics', as Davenport denotes it (Davenport, 2018, p. 74), is not just a technology but a foundational element that enables firms to carve out new value paths and evaluate perspectives from a competitive stance. AI is a broad term encompassing various advanced analyses, applications, and logic-based techniques that mimic human behavior, decision-making, learning, and

problem-solving (Brynjolfsson & Mcafee, 2017). AI can bring substantial benefits to firms. However, when a major transformation is required, firms must articulate a compelling shared vision to adopt AI and enable a high impact that does not derail all the investments and effort (Dwivedi et al., 2019; Haefner, Wincent, Parida, & Gassmann, 2021; Wamba-Taguimdje, Wamba, Kamdjoug, & Wanko, 2020a). Moreover, firms must leverage innovative and distinctive technologies like AI to develop dynamic capabilities to drive innovation, improve service levels and customer experiences, and foster competitive performance (Davenport, 2018; Haefner et al., 2021; Majhi, Mukherjee, & Anand, 2021; Van de Wetering, 2022a; Wamba-Taguimdje, Wamba, Kamdjoug, & Wanko, 2020b). Also, while AI's capability to imitate human cognition in decision-making, learning, and problem-solving paves the way for operational and strategic advantages, currently, little is known about the innovative and routine deployment and use of AI (AI ambidexterity) in firms and how this supports dynamic capabilities and an organisation's strategic flexibility (Van de Wetering, 2022a), triggering how an organisation determines the most effective way to execute its strategy through its people and other business and IT resources (Miroshnychenko, Strobl, Matzler, & De Massis, 2021). To harness AI's full potential, organisations must traverse beyond mere adoption to a state where AI is deeply embedded in the business fabric, driving the evolution of value chains and customer interactions. Therefore, we demystify the operationalization of AI ambidexterity within firms, revealing how it contributes to business agility and the execution of strategy in the digital age. Such insights will be invaluable for organisations looking to navigate the complexities of digital innovation. We can play a pivotal role in contributing to this research area using a business value lens. The business value of digital innovations lies in their transformative potential to redefine how organisations operate and compete. Therefore, the process of capturing this particular value requires an approach that encompasses not just the adoption of technology, but also the cultivation of an ecosystem conducive to innovation. Evaluating the impact of digital innovations involves not only assessing their direct contributions to efficiency and performance but also understanding their role in empowering human capital, driving customer satisfaction, and creating new market opportunities. This research is, especially relevant in healthcare, where, for instance, the rapid spread of AI is seen as a means to support faster and improved decision-making processes, reshape the patient experience, and deliver value-based care. However, its specific contributions and role in shaping healthcare business ecosystems, especially within and between hospitals, remain unclear, leading to an incomprehensive view (Chen & Decary, 2020).

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8.6 Impact

8.6.1 Introduction

An important dimension in IS research concerns the situational expertise (i.e. depicted as the Application Areas in the IS expertise matrix in Figure 1) in which the generic traditional research lines, described in the previous sections, can be studied and applied. Situational expertise is essential in bridging the gap between science and actual systems in which practitioners have learned with guidance and sometimes through active research participation to quickly adopt new insights. Both, academics and practitioners can learn in their own way by careful observation of current practices, by testing new approaches and by creating new working systems. Recognition of this second perspective also facilitates a strong potential for impactful cooperation, co-development with various external parties. Also, a rich variety of research methodologies and approaches such as action research, design science and citizen science to name a few, are being used. As such, the second axis can be seen as a necessary precursor to the build-up of generic knowledge in the first axis. Although, the list is open-ended, we will focus here on the more prevalent topics.

8.6.2 Application Area: Virtual Organisation & Ecosystems

The term “virtual organisation” refers here to the increasingly blurred perception of the classic “brick-and-mortar” organisation, where employees go to work to each day. Information technology has revolutionised communication and in many situations people can work closely without the strict need to be physically together. This physical

independence has led to the emergence of new types of organisations (e.g. platform organisations) or ways to organise work (e.g. crowd science), and to the creation of new working environments and conditions for employees (e.g. telework). Virtual organising increases our mobility and overall flexibility, encourages the development of new working and learning modes that need to be facilitated and it also poses challenges on the social interaction.

A different form of virtualisation is driven by the increased specialisation of organisations. To function as "complete" organisations, they become increasingly dependent on the structural contribution of other organisations offering complementary services. Organisations increasingly source essential parts of their operations in- and out in order to increase their agility, to bolster innovation (in innovation ecosystems) and to lessen financial investments. Depending on the tightness of integration of operations a higher reliance on advanced information systems is to be expected. Naturally, a "cross-border" information flow also imposes risks in terms of information security. Since a few years, the IS department is closely connected with Sourcing Nederland, an independent association whose members include all parties involved in IT sourcing activities. This association aims at sharing sourcing knowledge in order to realise better practices. Currently a research project on IT sourcing is envisioned in which members of Sourcing Nederland as sourcing actors will actively participate.

8.6.3 Application Area: Health Care & Public Organisations

In particular, the healthcare sector suffers from a workforce drain and steady cost increases, making it increasingly difficult to provide the much-desired high-quality health services. Whilst various reasons attribute to the problems in this sector, a consensus exists in that the health sector is lagging in the transformation of their business processes and the information systems that go with it. Similar problems exist in other public sectors due to limited budgets, slow decision-making structures, strict requirements regarding data privacy and security, and political and regulatory challenges. Addressing these challenges requires an approach that involves strategic planning, stakeholder engagement, investment in information technology and infrastructure, and a commitment to fostering a culture of digital innovation and continuous improvement. Currently, research projects are running in collaboration with the national tax, justice, defence and police departments, a waste processing company, and an electricity grid operator.

8.6.4 Application Area: Artificial Intelligence Application

Research on artificial intelligence in the Information Science department is mainly focused on the effective and trustworthy development of actual operational systems, whereas the foundational research line is placed in the computer science department. All four research lines in our department have to play a role in this application area, as the application of AI impacts governance, process and organisational strategy, while ensuring

that ethical concerns are met, preferably by design. So typically, the AI systems we are interested in support humans in performing their jobs more intelligently, effectively, with more confidence, less error-prone, faster. Needless to say, that to develop such AI tooling, intricate situational knowledge of the actual processes and (stakeholder) requirements is essential besides a sound basis of foundational AI research.

As such, the societal impact we expect from our research is a combination of realising the transfer of our research into applied AI technologies in practice, as well as assistance in the verification of the trustworthiness of AI in specific practical contexts, both within a single company or in entire ecosystems. In this section, we focus on two specific types of examples the department is involved in.

The first initiative is in the application area of "affective computing". If AI is to be continuously aligned with human values, empathy becomes a crucial element of it. We engage in the development of systems that can recognise, interpret, and simulate human emotions, feelings and mood. Together with partners from the Brightlands ecosystem, as well as other national and international partners, we focus on facial emotion recognition, speech-emotion recognition and their multimodal combinations. Projects, in which we play a leading role, include the MAI-HOME project (Interreg Flanders-Netherlands) on the application of AI to reduce "energy poverty" and CO2 emissions. Another example is the GO-KIT project, funded by several regional entities, which also looks at the application of AI combined with domestic sensoring to make homes smarter and reduce energy consumption with minimal impact on the people living there.

The second initiative we want to highlight here is our participation in the Z-Inspection initiative and the network of "trustworthy AI labs", as mentioned in our presentation of the digital ethics research line. To cope with the ethical assessment challenge, the Open University has become a member of the Z-inspection® Trustworthy AI Labs community. The mission of the Trustworthy AI Lab at the Open University is to bring together a community of experts to promote AI research, education, and policy development. We aim to support society by establishing and sharing best practices in the design, implementation, and oversight of ethical, responsible, thoughtful, sustainable, and reliable AI applications.

The lab is located in the Faculty of Science but has an interdisciplinary focus, including computer science, information science, law, cultural studies, business administration, and psychology. Multiple international researchers from various disciplines are involved, providing a forum for academic and industrial research and applications. We collaborate closely with national and international networks, such as the Brightlands AI Hub.

Z-Inspection[4] is a holistic process used to empirically evaluate the reliability of AI-based technologies at various stages of the AI lifecycle. It focuses particularly on identifying and discussing ethical issues and tensions by developing socio-technical scenarios. It adheres to the general guidelines for trustworthy AI from the High-Level Expert Group of the European Union (EU HLEG). Z-Inspection® is distributed under the terms of the

[4] https://z-inspection.org/

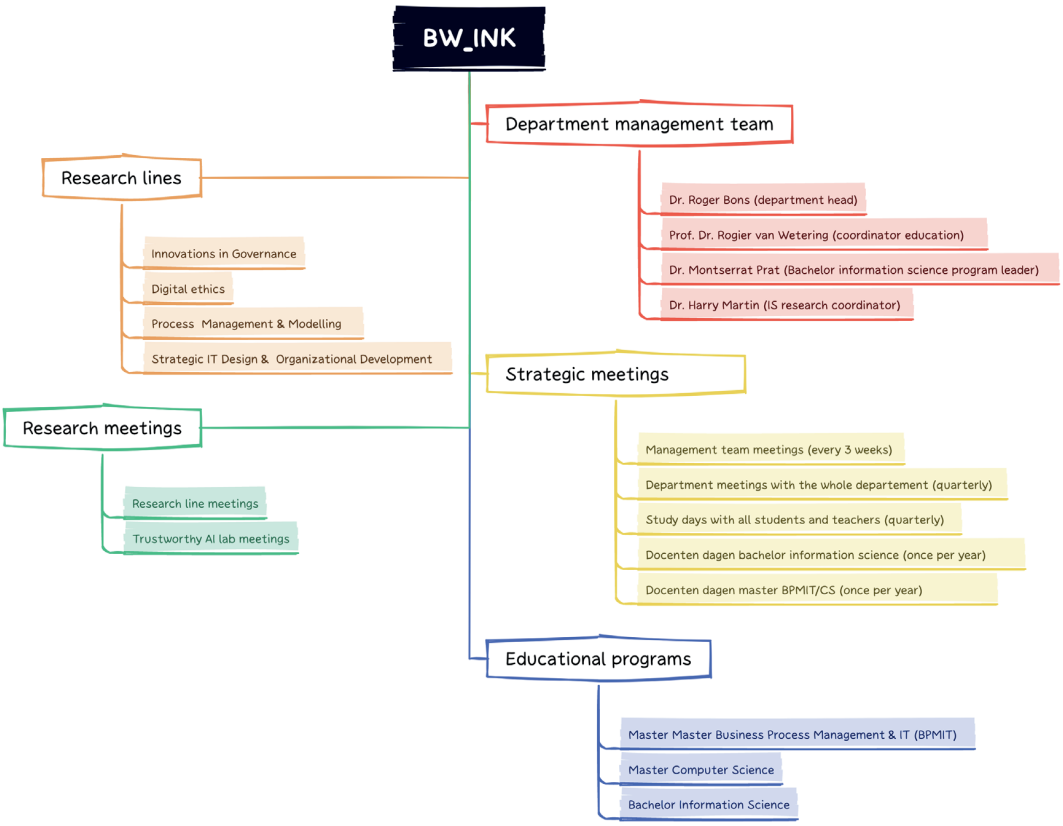
Not only do we need to gain experience with Z-Inspection®, but also we can leverage other, empirical and conceptual evaluation methods.

8.6.5 Application Area: Digital Driven Transformation

Many organizations struggle with the adoption of new (information) technologies, which potentially could boost their organizational performance in almost every aspect. For most organizations information technology is not an integral part of their primary business function (at least not momentarily) and may represent a blank page in their knowledge arsenal. Such organizations can be easily overwhelmed by the choices they have to make and dealing with the associated risks. Where and how to begin? Which organizational capabilities can to be developed, and how? What is the role of digital innovation (e.g., AI, analytics, platforms) in this context? Which other organizational factors and contingency factors play a key role in digital-driven transformation? What is the best path towards maturity? These and other related questions are very situation-specific. Digital-Driven Transformation embraces the idea that simply adopting and using digital technologies is insufficient to stay competitive. Rather, this concept provides a strategic framework for integrating digital technologies and innovations with organizational structures, processes, and capabilities and could offer organizations a practical toolbox to identify and capitalize upon market and technology opportunities effectively. Modern organizations must be agile, responsive, and capable of adapting to new challenges, opportunities, and demands of the business environment. Contemporary society demands the urge for sociotechnical transformations of organizations and anticipatory practices are proliferating as enablers of such transformations in various industrial sectors and for different goals (environmental and social sustainability e.g., energy transition, climate change, inclusion, social equality and diversity).

The application contexts described here, are not mutually exclusive, but just characterize well-recognizable actual points of interest in practice our research group has been active in recent years. E.g. hospitals may strive for the application of artificial intelligence to understand patient needs better as a part of their journey in the digital-driven transformation.

8.7 Organisation of the department and meetings



8.8 Scientific and societal partners and collaborations

It goes without saying that due to the large diversity in academic expertise and a strong orientation with actual societal challenges, the IS group is well connected and has many active relationships with institutions in various sectors, academic and non-academic, governmental and commercial, etc.. Partly, these relationships occur more or less naturally since e.g. our master students already have daytime jobs in regular organizations and very often use their connections within their own employer to facilitate their master thesis projects under close guidance of our research staff. Up to some extent this is also the case with (external) PhD students. Although most of these relationships are fleeting, still, the student-employer relationships have proven to be very valuable for our research in providing a basis for data collection and analysis, validation and testing and implicitly demonstrates the commitment and confidence several hundreds of organizations have in our research. This close interaction between science and practice, in essence, can significantly boost the adoption of newly discovered scientific insights with the involved

organizations.

Relations/affiliations with scientific institutes:

1. Katholiek Universiteit Leuven, Afdeling Industrieel Beleid/Verkeer Infrastructuur, Belgium
2. Utrecht University, Department of Information and Computing Sciences
3. Utrecht University of Applied science, Digital Smart Services
4. Universiteit Utrecht, department for Social and Economic History, Institutions for Collective Action
5. Maastricht University, School of Business and Economics, dep. Organisation, Strategy and Entrepreneurship (OSE)
6. Maastricht University, Department of Accounting and Information Management
7. The University of Melbourne, Computing and Information Systems, Melbourne School of Engineering
8. National Research University Higher School of Economics, Moscow, Russia
9. Norwegian University of Science and Technology, Department of Computer Science
10. Radboud University, Social Cultural Research
11. NIVEL, Netherlands Institute for Health Services Research
12. Erasmus University, Erasmus School of Accounting and Assurance
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