



Governance and Digitalization in Program and Portfolio Management

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Agenda

- Multi-level governance
- AI applications in project/ program/portfolio management (PPM)
- Governance dimensions for AI in PPM
- Suggested way forward



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Multi-level governance

Multi-level governance:

- The way governance is 'spread' horizontally between organizations and their entities, and vertically among hierarchical or networked levels and actors.



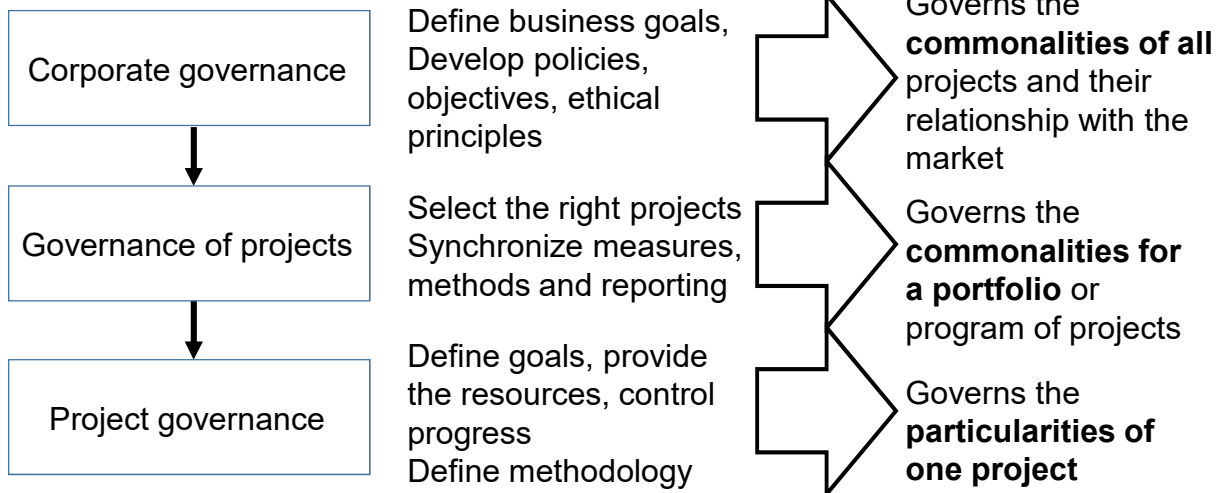
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Intra-organizational governance layers

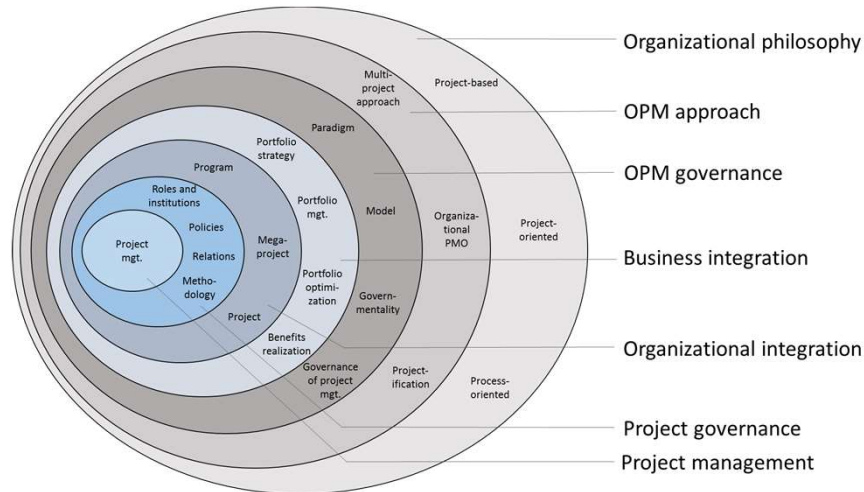


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(Müller 2017)

Governance of organizational project management



Müller et al., 2019



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AI in project governance

- AI = machine learning, block chain, automated decision-making
- Governance = the framework for managers to do their task
- Management = planning, controlling, reporting etc.
- Most AI applications support management functions, not governance
- However, governance must steer the beneficial development, implementation, use and maintenance of AI in management



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Summary of AI applications in project management

Overall:	SW improvements (Niederman, 2021) Large impact on 10 KAs (Holzman et al., 2022)
Stakeholder management:	From control to value provision through digital tools (Kier & Huemann, 2022)
Risk management:	ML for risk allocation in PPP (Jin & Zhang, 2011) Risk mitigation in e-governance through BC and AI (EI Khatib et al., 2022)
Decision making:	AI for tactical decisions (Hoang et al., 2019), ML for decisions and machine-human interaction (Rasmus & Tømte, 2022)
Forecasting:	ML for outcome prediction (Natarajan, 2022) Tools and files for duration forecasting (Wauters et al., 2016)
Megaproject forecasting:	Predictive AI for preventing safety failure (Greiman, 2020) Digitalization options (Wijayasekera et al., 2022)
Portfolio management:	Prediction of megaprojects using ML and cash flow (CEMP, 2022) Scenarios for governing infrastructure projects (Naumova et al., 2020)



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Summary of AI applications in project management

Inter-organizational relations:	Adjusting structure, transparency and responsibility (Braun & Sydow, 2019) Suppliers and contractors align capabilities (Lobo & Whyte, 2017) Importance of digital workflow (Whyte, 2019)
Technology:	AI techniques used in construction: ML, BC, contract, health, safety analytics, ethics (Abioye et al., 2021)
Organization:	Reorganization of organization structures from hierarchical to network team-based flexible structures (Stonehouse & Konina, 2020)
Ethics:	Need for transparency and machine-human interaction ((Rasmus & Tømte, 2022)
Governance of project management:	PMS taken over by AI (Wang & Stewart, 2022)



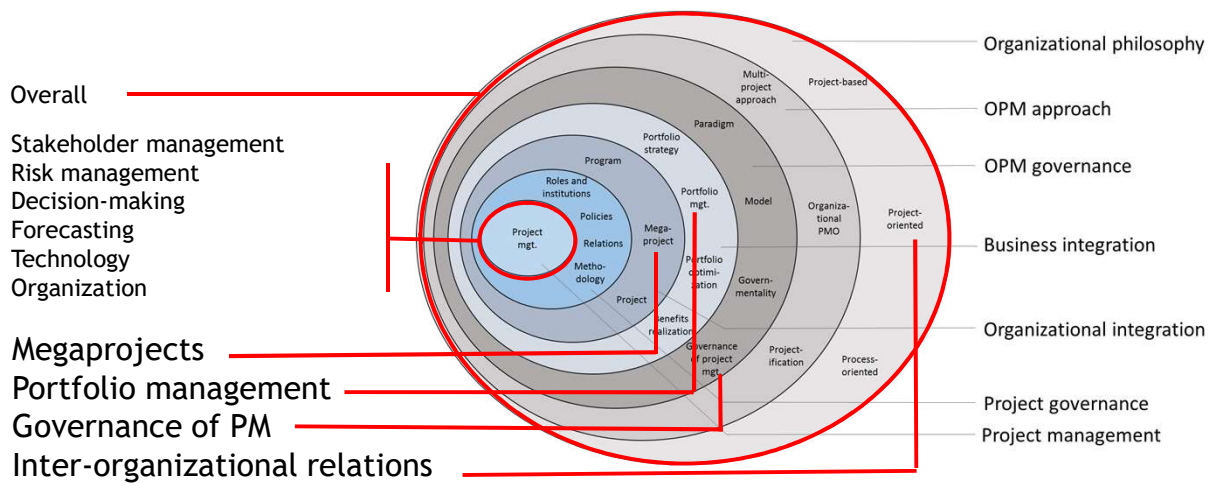
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Mapping to intra-organizational governance of projects



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Müller et al., 2019

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Dimensions of AI in project management in need of governance

Dimensions	Examples of focus areas for governance
Strategy	Development of AI strategies and roadmaps for implementation
Technology	Integration of existing islands of digital solutions
Socio-technical interface	Human-machine interface design Managers to engage and adapt their leadership Transparency in algorithms, human control, and broad review
Management	Beneficial use of AI in management Ambidextrous application of AI Train project managers and team members in digital supporting tools
Organization	Restructure to more democratic organizations Cross-organizational alignment of digital capabilities for related business processes



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Strategy

Marginal impact through existing SW solution (Niederman 2021)



AI strategy
 Benchmarks for
 - data collection
 - Data structuring
 - Source/data credibility
 - Data quantity
 - Data legitimacy and authenticity
 (Greiman 2020)

Impacting almost all tasks of PMs (Holzman et al 2022)



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Technology

- Integration of existing islands of AI
- Governed as either narrow, general, or leading edge implementation of AI (Abioye et al. 2021)
- Balance between off-the shelf and self-developed solution
- Capabilities for inter-organizational linkages with project partners is a selection criteria for project partners (also in supply chains) (Lobo & Whyte 2017)
- Conformance with conventions, de-facto and upcoming standards for scalability and cross-organizational networking (Whyte 2019)
- Project execution models are impacted by data types and availability, they challenge governance to determine analysis levels and prediction quality/credibility



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Socio-technological dimension

- Acceptability: Human-machine interface designed by users, not IT developers (Pasmore et al. 2019, Bednar & Welch 2020)
- Ethics:
 - Values (human or machine decisions? Which decision to be automated?) (Rasmus & Tømte 2022)
 - Status (will highly educated team members accept that their boss is an algorithm?)
 - Deontological or teleological algorithms (Molloy 2021)
 - Biased algorithms, error correction, probabilities for correct decisions, privacy, overall risk, review methods etc. (Greiman 2020)
- Democratic leadership approaches, like balanced and horizontal leadership with temporary empowerment of AI supported roles (Müller et al. 2021)



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Management

- (Project) managers as users instead of victims of AI (Wang & Stewart 2022)
- Potential that AI impacts tasks requiring hard skills (planning, controlling, report generation etc.)
- Less likely to impact soft skills, principles and values of project management
- Management has a key role in ensuring project managers and team members are trained early on in digital supporting tools
- Suggested to combine existing tools/techniques, such as Monte Carlo Analysis, with new, AI based, tools (Ong & Uddin 2020)
- **Overall the literature suggests an ambidextrous application of AI (exploiting existing applications and exploring new avenues simultaneously)**



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Organization

- Adjust organizational structures to the more democratic leadership approaches and cultures required in AI driven settings (Stonehouse & Konina 2020)
 - From hierarchical to networked decision making
 - Often done giving wider latitude to team's autonomy, decision-making authority, flatten hierarchies and appreciate the employee as a whole, with his/her creativity and self-management capabilities
 - Linking the social identity of the employee with the corporate culture (Dupret & Pultz 2022)
- Cross-organizational alignment of digital capabilities for related business processes (Lobo & Whyte 2017)
 - Covering from one-on-one collaborations to project ecologies of a particular market



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Overall summary

AI is a function, useful mainly for management

- Models are increasing in predictability and provide class 1 estimates, especially in risk, cost, time, contract, safety, cash flow estimates
- Criticality of input data is an issue

AI's indirect impacts for governance

- Higher transparency and accuracy of information and with it decision quality

AI's direct implications for governance

- Most appropriate for large/complex projects and problem finding
- Requires restructuring organizations, processes and training
- Need for providing transparency of what AI does, control through H-M interface



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Overall summary

AI's implications for inter-organizational settings

- Align digitalization capabilities across organizations
- Adjust IT, roles, processes

AI's implications for ethics

- Need to provide transparency of algorithms and steady control through humans



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The way forward

Reconcile the dimensions of strategy, technology, socio-technical interface, management, and organization through a **digitalization strategy**

- Determine the level of AI 'maturity' needed to stay competitive in the marketplace
- Determine the ambition level for AI, and AI's link to the organization's strategic objectives
- Do an inventory of current practices, processes, tools, etc. that exist in using AI and traditional techniques
- Develop an approach to migrate existing levels of AI and traditional practices to desired future levels
- Identify practices to 'start small and scale fast' for economically implementing AI
- **Develop an AI governance strategy from the above**



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Thank you



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