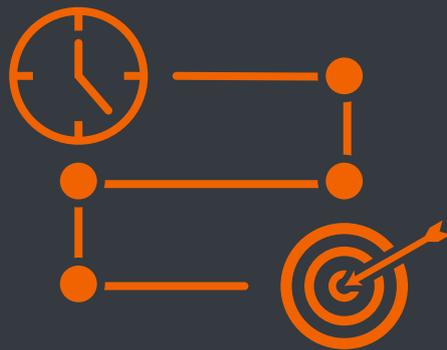


Ensuring Success of Complex Projects

An Inclusive Approach to Risk Management



An ebook for project and risk management professionals by Inklus Ltd

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Executive Summary

Managing risks in complex projects comes down to managing risks between people working together: Different interests, resources, time schedules, cultures, and financial stakes should be matched together for a joint goal: A successfully conducted project.

Enabling dialogue and interaction between stakeholders is a key factor in successful project risk management. Many traditional risk management methods and processes lag behind especially on the engagement front: Stakeholders with different backgrounds, communication styles, levels of knowledge, and workloads contribute to assessing the project's risks each from their own perspective, and without proper dialogue, many important aspects may remain hidden.

The hidden risks in complex projects are most likely to materialize at points of discontinuity, where the project is moving from one phase to another. By engaging the project's stakeholders in risk management from early on and throughout the project's lifecycle, risks can be proactively mitigated.

Managing risks is a dynamic process. It is a common perception that it's overly time and effort consuming. Yet when risk management tools and processes become part of the daily work routines as they should, managing and mitigating risks becomes a natural part of the overall project management process.

One important way of cementing risk management as part of the daily project management routines is to emphasize not only the negative side of risks, but also the potential opportunities.

For one thing, proper identification and assessment of risks at the outset of a complex project may reveal sizable cost saving opportunities. Also, knowing how costly the potential conflicts between stakeholders may be, should they end up in court, identifying and preventing them from happening in the first place presents itself as a great learning and cost saving opportunity.

In summary, great project risk management is a team sport, and the team(s) should be brought together with dedicated software tools and well thought-out, inclusive processes that facilitate dialogue and help align the interests of all stakeholders.

Having first described some of the most common types of complex projects and the risks involved in them, in Chapters 2 and 3, we will present and discuss best practices that we have discovered in inclusive risk management in complex projects in Chapter 4.

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Part I

Introduction

Introduction



Risk management is a critical aspect of any project, yet it becomes even more important in complex projects where the stakes are high and the potential for failure is significant.

Inclusive risk management is a methodology that takes into account the perspectives and needs of all stakeholders, rather than just focusing on the traditional methods of project management. This approach is particularly important in complex projects, where the diverse and dynamic nature of the project requires a more comprehensive approach to risk management.

Unfortunately, many projects fail to effectively manage risk, resulting in significant financial and reputational losses. For example, a study by the Project Management Institute in 2017 found that organizations experience an average of \$97 million in losses for every \$1 billion invested in a project.

The Project Management Institute's 'Pulse of the Profession 2021' study, in turn found that

- 28 % Of projects did not meet their original goals
- 38 % Of projects exceeded the budget
- 45 % Of projects exceeded their deadline
- 35 % Of failed projects lost the budget

In addition to the financial consequences, poor risk management can also lead to negative impacts on the communities and individuals involved in the project. For example, the failure of the Oroville Dam spillway in California in 2017 resulted in the evacuation of nearly 200,000 people and significant damage to the local ecosystem.



So why do projects fail?

- Some typical reasons include increasing complexity in terms of either duration, scope, or the stakeholders of the project – or all of them.
- Communication issues are an obvious risk whenever different people with different interests and from different cultures work together.
- The speed of change may also be ‘too much to handle’ in some projects.
- The unique nature of projects presents a significant risk as well: In some projects, there simply aren’t any best practices existing, or they may not be available since the accumulated knowledge from the previous project of similar nature was never shared.

These examples highlight the importance of effective risk management in complex projects, and the need for an inclusive approach that takes into account the perspectives and needs of all stakeholders.

Understanding and systematically mitigating risks from a diverse range of viewpoints can improve the chances of project success. Through a collaborative risk management process, organizations can also build greater resilience in handling potential surprises that have not been identified earlier.

This e-book provides project leaders, risk management professionals, architects, engineers, investors, and other stakeholders involved in complex, large scale projects with an understanding of the merits of inclusive risk management and the strategies needed to effectively navigate risks in complex projects.

With real-life examples and practical tools, it provides actionable insights to help you and your organization improve risk management processes, build resilience, and achieve successful outcomes.

“Uniqueness always comes with high levels of uncertainty, hence the high levels of risk in project businesses”

The Critical Difference: How is Project Business Different from Product Business?

Before delving into the topic of risk management in complex projects, let us first spend a moment underlining the specificity of project business in many ways.

In a product business, a company designs, manufactures, and sells a physical product or a software product to customers. The idea is to sell more or less the same product multiple times to multiple customers.

In contrast, a project business is focused on delivering a unique solution or service to a specific customer or set of customers. The goal of a project is to deliver specific outcomes, on a specific timeline and within a specific budget.

The unique nature of projects is the single biggest differentiator between project businesses and product businesses. Uniqueness always comes with high levels of uncertainty, hence the high levels of risk in project businesses.

Overall, project businesses have their own unique set of challenges, and managing the risks of complex projects is therefore oftentimes way more demanding than managing the risks of product businesses. This is quite central to understand for both project managers and risk managers.

In addition, some key differences between product and project businesses include:

- Product businesses can often be more easily scaled, as they can increase production and distribution to meet demand, whereas scaling a project business can be more challenging, as each project is unique.
- Product businesses can also be more easily automated, while projects have more variables that can be hard to predict and require more human involvement.
- Product businesses often have more predictable revenues, as they can manufacture and sell the same product multiple times, whereas project revenues are typically dependent on winning new business.
- Product businesses focus on creating a profitable product, while project businesses focus on delivering a profitable project.

Defining ‘Complex Projects’ and their Risk Management

‘Complexity’ in projects comes in different shapes and sizes. Common to all factors adding to a project’s complexity is that they all add to the general risk level of the project. The more variables, the greater risks.

Complex projects are characterized by a number of different factors, including

- **High level of uncertainty:** Complex projects are often characterized by a high level of uncertainty in terms of goals, requirements, and outcomes.
- **Interdependencies:** Complex projects often involve a high degree of interdependencies between different tasks and activities, which can make it difficult to manage and control the project effectively.
- **Dynamic and changing environment:** Complex projects take place in a dynamic and constantly changing environment, which can make it difficult to predict or manage the project’s progress.
- **Multiple stakeholders:** Complex projects often involve a large number of stakeholders with different needs, expectations, and goals, which can make it difficult to manage and meet their expectations.
- **Large-scale and long-term:** Complex projects are often large in scale and may take several years to complete, which can make it difficult to plan and execute the project effectively.
- **Requires high level of expertise and experience:** Complex projects requires a high level of expertise and experience to be successfully completed.
- **The quality of risk management tools varies:** Many software tools exist that are used for managing projects and the risks that they involve. Selecting the software tool itself may end up being a project risk. Depending on the specific nature of the project, some tools are a better fit than others.

“Common to all factors adding to a project’s complexity is that they all add to the general risk level of the project ”

Overall, managing a complex project requires a high level of planning, coordination, and collaboration, as well as flexibility and adaptability in order to navigate the uncertainties and challenges that may arise.

Looking at the Bright Side: Risk Management is also Opportunity Management

As discussed above, complex projects typically involve a high degree of uncertainty that is often associated with negative risks. Yet by definition, 'risks' can also be seen as positive scenarios, in other words opportunities for the project team in a number of ways.

- **Innovation:** Risks can open up the possibility for creative problem solving and the development of new processes, methods or even products.
- **Improved performance:** By addressing risks, the project team can improve overall performance, which can result in better quality, cost, and schedule outcomes.
- **Competitive advantage:** Mitigating and addressing risks can also provide a competitive edge by setting the project team apart from others and making them more efficient and reliable.
- **Cost savings:** Identifying risks early on in the project can help avoid or minimize potential cost overruns and delays, resulting in cost savings.
- **Learning and growth:** Addressing and mitigating risks can provide valuable learning experiences for the project team members, that can be carried over to future projects, as well as developing new skills.
- **Having a solid process for risk management:** Sometimes, even the most robustly managed projects face risks that materialize. Yet when the stakeholders feel that all meaningfully possible precautions have been taken, through a high quality risk management process, it is easier to accept what happened and not spend time afterwards on pointing fingers. This often paves way for solid risk management in the future as well.

Importantly, risks can only be seen as opportunities if the project team works together to proactively identify, assess, and manage risks throughout the project lifecycle. This mindset and approach can bring benefits and added value to the project.

“Risks can only be seen as opportunities if the project team works together to proactively identify, assess, and manage risks throughout the project lifecycle“

Part II

Challenges of Complex Projects Risk Management

Challenges of Complex Projects

Risk Management

There are many risks that can arise in complex projects involving a lot of stakeholders. By identifying and managing these types of risks, project managers can help to ensure that complex projects are successful and achieve their desired outcome

Some examples of risks that may be particularly relevant in these types of projects include:

- **Communication risks:** Complex projects often involve a large number of stakeholders, which can make communication and coordination challenging. This can lead to misunderstandings, miscommunication, or a lack of clarity around project goals, expectations, and roles and responsibilities.
- **Risks of conflict:** Different stakeholders may have competing interests, values, or priorities, which can lead to conflicts or disputes within the project. These conflicts can disrupt progress and impact the overall success of the project.
- **Dependency risks:** Complex projects often involve dependencies on external factors or stakeholders, which can create risks if those dependencies are not managed effectively. For example, if a project is dependent on the delivery of a key component from an external supplier, there may be risks if the supplier is unable to deliver on time or to the required quality standards.
- **Resource risks:** Complex projects typically require significant resources, and a lack of sufficient resources can create risks for the project. This might include a lack of funding, personnel, or equipment.
- **Change management risks:** Complex projects may involve significant changes to processes, systems, or structures, and managing these changes effectively can be challenging. There may be risks associated with implementing these changes, such as disruption to business as usual, difficulty in gaining stakeholder buy-in, or a lack of readiness for the changes.

“Complex projects often involve a large number of stakeholders, which can make communication and coordination challenging. This can lead to misunderstandings, miscommunication, or a lack of clarity around project goals, expectations, and roles and responsibilities”

Risks and Opportunities Related to Cost

Costs can be a significant challenge in complex projects due to a number of factors. One major factor is the difficulty in accurately estimating costs at the beginning of a project.

Most risks related to costs tend to be negative in nature. Before going deeper into specifics on the negative risks side, let us remember that cost-related risks may also present themselves as opportunities: Robust risk management tools will help organizations to recognize opportunities to save costs and drive budget savings.

Because complex projects often involve a high degree of uncertainty, it can be difficult to predict exactly how much resources (e.g. materials, labor, equipment) will be needed, and what the costs associated with those resources will be. Additionally, projects can experience unexpected events, such as delays or changes in scope, that can increase costs.

The costs of a project can also evolve over time and become a risk. For example, if costs begin to exceed the budget, it can put the project at risk of being cancelled or scaled back. Additionally, if costs are not closely monitored and controlled, they can spiral out of control, putting the project's success at risk.

To mitigate cost risk, there are a number of strategies that can be used. One is to carefully plan and budget for the project at the beginning, taking into account a wide range of potential costs and contingencies. This can help to ensure that the project has a solid financial foundation and is less likely to experience cost overruns.

Another strategy is to closely monitor and control costs throughout the project. This can be done by establishing cost baselines, regularly tracking actual costs against those baselines, and taking corrective action when necessary. It is also important to conduct regular reviews of the project's budget and schedule, so any cost-related issues can be identified and addressed as quickly as possible.



Additionally, having a robust project management system and a strong project team in place can help to ensure that costs are kept under control. Project managers and team members should be trained in effective cost management techniques and should have the necessary tools and resources to effectively monitor and control costs.

Other mitigation strategies include building in contingencies, change management plans, implementing Earned Value Management (EVM) to track the performance of the project, and regular communication with stakeholders.

Finally, it is important to have a risk management plan in place to help identify and manage potential cost risks.

For cost impact assessment particularly, one should rely on the best data and experts and tools available. Monte Carlo simulations are an important method to increase the reliability of cost assessments.

Risks Related to Time

The project time schedule can be difficult to accurately estimate how long different tasks will take, and how they will be coordinated with one another. Complex projects often involve a high degree of uncertainty, and unexpected events (such as delays or changes in scope) can cause the timeline to evolve and become a risk.

When the project schedule slips, it can put the project at risk of not being completed on time. This can lead to increased costs (e.g. due to delays in the completion of the project) and can also cause issues with stakeholders, who may have their own timelines that are dependent on the completion of the project.

To mitigate schedule risk, there are a number of strategies that can be used. One key strategy is to carefully plan and schedule the project at the beginning, taking into account a wide range of potential contingencies and risks. This can help to ensure that the project has a solid schedule and is less likely to experience delays.

“A robust project management system and a strong project team in place can also help to ensure that the project schedule is kept on track”

Another strategy is to closely monitor and control the schedule throughout the project. This can be done by establishing a schedule baseline, regularly tracking actual progress against the schedule, and taking corrective action when necessary.

A robust project management system and a strong project team in place can also help to ensure that the project schedule is kept on track. Project managers and team members should be trained in effective schedule management techniques and should have the necessary tools and resources to effectively monitor and control the schedule.

Project managers should use robust scheduling tools and should have the knowledge of critical path method, project crashing and schedule compression to ensure they manage the schedule effectively. Understanding the interdependencies of the project's outputs is key for managing its schedule. Moreover, one specific criterion for assessing the risks in a project may be their potential impact on schedule.

“To mitigate schedule risk, there are a number of strategies that can be used. One key strategy is to carefully plan and schedule the project at the beginning, taking into account a wide range of potential contingencies and risks”

Risks Related to Quality

Quality issues can evolve in a number of ways in complex projects. For example, changes in scope, budget or schedule constraints can lead to shortcuts being taken, which can negatively impact the quality of the final product or service. Additionally, if quality assurance processes are not properly implemented or followed, it can lead to defects or problems with the final product.

Quality issues can also be caused by poor communication or coordination among team members, which can lead to inconsistencies in the way that work is being done.

Quality issues can pose a risk to the success of the project. They can lead to delays, rework, and additional costs. They also can lead to problems with stakeholders, who may be disappointed with the final product or service. Furthermore, if the project is not meeting the required quality standards, it can lead to safety hazards, or regulatory non-compliance issues.

To mitigate quality risks, it's important to have a robust quality management plan in place. This plan should outline the quality standards that are expected, and the processes and procedures that will be used to ensure that these standards are met. The plan should be reviewed and updated regularly, and should be used as a tool for proactively identifying and addressing potential quality risks.

A robust quality management system should be in place, the project team should be aware of the processes, and the tools and resources for monitoring and controlling the quality.

Additionally, it's important to have a dedicated quality team, or at least a quality representative, in charge of monitoring and enforcing quality assurance processes throughout the project. The team should have the necessary tools and resources to effectively monitor and control the quality.

“if the project is not meeting the required quality standards, it can lead to safety hazards, or regulatory non-compliance

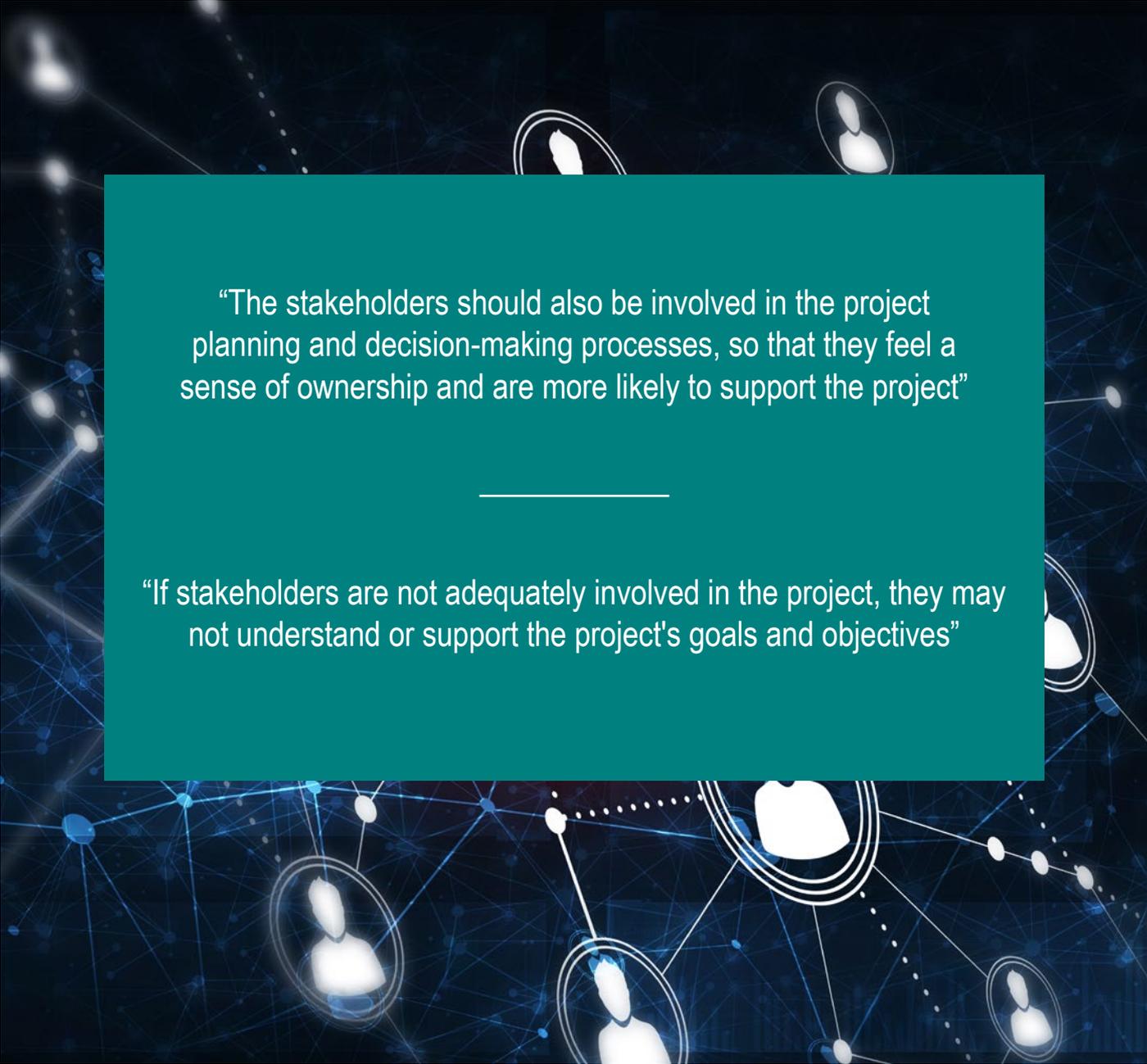


Risks Related to Stakeholders

In complex projects, project stakeholders – the people involved - can pose a number of challenges to the project's success.

Some examples include:

- **Changing expectations:** Stakeholders may have different and changing expectations for the project, which can make it difficult for the project team to meet their needs and maintain their support.
- **Lack of involvement:** If stakeholders are not adequately involved in the project, they may not understand or support the project's goals and objectives.
- **Conflicting interests:** Different stakeholders may have conflicting interests or priorities, which can make it difficult to achieve consensus and make decisions.
- **Communication challenges:** Poor communication or a lack of communication between the project team and stakeholders can lead to misunderstandings and lack of trust.
- **Resistance to change:** Some stakeholders may be resistant to changes that the project is proposing, which can make it difficult to implement the project and achieve its objectives.
- **Limited resources:** Stakeholders may not have the necessary resources to support the project, which can lead to delays, rework, and additional costs.
- **Time constraints:** Some stakeholders may have limited time or competing priorities, which can make it difficult to secure their engagement and support for the project.
- **Political issues:** Complex projects often involve multiple stakeholders with different agendas and political objectives, which can cause conflicts and delays.



“The stakeholders should also be involved in the project planning and decision-making processes, so that they feel a sense of ownership and are more likely to support the project”

“If stakeholders are not adequately involved in the project, they may not understand or support the project's goals and objectives”

It's important to have an effective stakeholder management plan in place. This plan should identify the key stakeholders, their interests, and the roles and responsibilities of the project team in working with them. The plan should be regularly reviewed and updated throughout the project, and should be used as a tool for proactively identifying and addressing potential stakeholder-related risks.

Effective communication and collaboration with stakeholders, throughout the project lifecycle, is crucial in understanding their needs, expectations and keeping them informed of the project progress and any changes.

The stakeholders should also be involved in the project planning and decision-making processes, so that they feel a sense of ownership and are more likely to support the project. This can be achieved through suitable software tools, regular meetings, workshops and surveys.

Additionally, involving stakeholders in testing and validation activities will help ensure that the project outcomes are meeting their requirements and will increase their satisfaction and support for the project.

Other Challenges

There can be a wide range of other challenges that can arise in complex projects, in addition to those related to costs, time schedule, quality, or stakeholders.

Some examples include:

- **Risk management:** Complex projects often involve a high degree of uncertainty, which can make it difficult to identify and manage risks effectively. This can lead to unexpected problems and delays.
- **Scope management:** Complex projects often involve a high degree of complexity in terms of the scope of work, and it can be difficult to manage and control the scope of the project effectively.
- **Human resources management:** Complex projects often involve a large number of people, with different roles and responsibilities, and it can be difficult to manage and coordinate their efforts effectively.
- **Communications management:** Complex projects often involve a large number of stakeholders with different levels of involvement, and it can be difficult to keep everyone informed and engaged throughout the project.
- **Technology:** Complex projects can include using new, untested, or rapidly evolving technologies which may pose technical challenges, risks and uncertainty.
- **Organizational structure:** Complex projects often span multiple organizational units, and it can be difficult to align the project with the overall goals and objectives of the organization.
- **Regulatory compliance:** Complex projects may be subject to multiple regulations, standards, and laws, and it can be challenging to ensure compliance throughout the project.
- **Procurement:** Complex projects may require procuring goods and services from a large number of suppliers, and managing these relationships effectively can be challenging.
- **Integrated project delivery:** Complex projects often involve multiple teams working together, which can be challenging and require effective collaboration and coordination.

Regularly monitoring and controlling the project and its performance is important to identify problems early and take corrective action as necessary. This can be done through Key Performance Indicators (KPIs), Earned Value Management (EVM), and other performance management techniques.

Effective risk management is crucial to identify potential problems, and taking preventive or corrective actions early in the project, to prevent the risks from becoming critical. Additionally, clear communication, stakeholder engagement and collaboration, along with using appropriate project management tools and methodologies, can help to mitigate these challenges.

Part III

Types of Complex Projects

Construction Including Housebuilding and Infrastructure Projects

Construction projects, particularly large-scale building construction and infrastructure projects, can be quite complex due to a number of factors.

Some of the typical complexities include:

1. **Site conditions:** Construction projects often take place in challenging and dynamic environments, such as mountainous or urban areas, and require a high degree of flexibility and adaptability to work around unique site conditions.
2. **Technical complexity:** Construction projects often require a high degree of technical expertise and knowledge, particularly in the areas of engineering, architecture, and construction. This can make it difficult to manage and coordinate the work of different teams, and to ensure that the final product meets the required standards.
3. **Stakeholder management:** Construction projects often involve a large number of stakeholders, including the owner, contractors, engineers, architects, and regulatory agencies, and require effective stakeholder management to keep everyone informed and engaged throughout the project.
4. **Logistics and supply chain:** Construction projects require coordination and management of a large number of resources, including materials, equipment, and labor, and often require coordination and management of logistics and supply chain to ensure timely availability and delivery of materials and equipment.
5. **Health and safety:** Construction projects can be hazardous environments, and require strict compliance with health and safety regulations to ensure that the project is carried out safely.
6. **Environmental impact:** Construction projects can have significant environmental impacts and are subject to a wide range of regulations related to protecting natural resources and the environment. It's important to consider and comply with these regulations, while also ensuring project feasibility.
7. **Schedule and budget:** Construction projects have tight schedules and budgets, delays and cost overruns are common and must be closely managed and controlled to ensure that the project is completed on time and within budget.
8. **Quality control:** Construction projects require ensuring that the final product is of high quality and complies with the relevant standards, codes, and regulations. Quality control and compliance must be carefully managed and monitored throughout the project.

To effectively manage these complexities, construction projects require a robust project management system, a strong project team with the necessary skills, experience, and tools, and effective communication and collaboration among all stakeholders.

Regular monitoring and controlling of the project's performance, and implementing risk management processes, can also help to mitigate potential problems and ensure the project's success.





Industrial Investment Projects

Industrial investment projects can take many different forms and vary depending on the industry, company, and location. Common to all sizable industrial investment projects is that they tend to involve complexities and hence, risks, that are best managed and mitigated with robust tools and processes.

Some typical examples of industrial investment projects include:

- Construction of a new manufacturing plant
- Upgrade or expansion of an existing facility
- Acquisition of new equipment or technology to improve operations
- Development of a new product or service line
- Implementation of new processes or systems to increase efficiency
- Investment in renewable energy or other sustainable technologies
- Infrastructure projects such as ports, pipelines, or transportation networks
- Industrial real estate development projects such as warehouses or distribution centers
- Exploration and development of natural resources such as mining or oil and gas extraction
- Investment in research and development to develop new technologies, products, or processes.

Some common risks involved in industrial investment projects include:

1. **Market Risk:** Changes in market conditions, such as competition, consumer demand, and economic conditions, can impact the success of strategic business projects.
2. **Financial Risk:** Insufficient funding or budget overruns can impact the delivery of strategic business projects.
3. **Schedule Risk:** Delays in the implementation can result in increased costs, reduced benefits, and decreased stakeholder confidence.
4. **Technical Risk:** Technical challenges, such as outdated technology or insufficient technical expertise, can impact the delivery of strategic business projects.
5. **Compliance Risk:** Failure to comply with regulations or standards can result in legal penalties and negative public perception.
6. **Performance Risk:** Failure to meet performance objectives, such as project timelines or product quality targets, can impact the success of strategic business projects.
7. **Human Resource Risk:** Challenges in attracting, retaining, and motivating key personnel can impact the delivery of strategic business projects.



Geotechnical Engineering Projects

Geotechnical engineering projects, typically mining fields, are inherently complex by nature due to a number of factors:

- 1. Ground conditions:** The ground conditions can be highly variable and complex, with different types of soil and rock, and different levels of compressibility, permeability, and stability. This can make it difficult to predict the behavior of the ground and design projects that will be stable and safe over time.
- 2. Site conditions:** Geotechnical projects often take place in challenging and dynamic environments, such as mountainous areas, coastal zones, or areas with difficult access. These site conditions can make it difficult to conduct investigations and collect data, and can also make it difficult to design and construct projects that are stable and safe.
- 3. Underground features:** Geotechnical projects often involve working in proximity to underground features such as utilities, sewers, and other structures. These features can make it difficult to conduct investigations and collect data, and can also make it difficult to design and construct projects that are stable and safe.
- 4. Environmental concerns:** Geotechnical projects often require careful consideration of environmental concerns, such as protecting natural resources, preserving cultural heritage, and reducing the impact of the project on the surrounding environment.
- 5. Regulatory compliance:** Geotechnical projects are subject to a wide range of regulations and codes, such as building codes, safety standards, and environmental regulations. Ensuring compliance with these regulations can be challenging, particularly in cases where the project involves working in hazardous or remote environments.
- 6. Time constraints:** Geotechnical projects often have tight time constraints, which can make it difficult to conduct investigations, collect data, and design and construct projects in a timely manner.

It's important to have a thorough understanding of the site conditions, subsurface conditions and the characteristics of soil, rock and other geologic materials at the site, to be able to make informed decisions.

It's also important to conduct thorough investigations, including soil and rock sampling, boreholes, in-situ testing, and laboratory testing, to gather detailed information about the subsurface conditions and provide the basis for designing stable and safe projects.



Complex Manufacturing Projects

Complex manufacturing projects, such as ship building, aircraft manufacturing, and steam boiler manufacturing, can also be challenging due to a number of factors. Some examples include:

- 1. Technical complexity:** These projects often involve the production of highly complex and customized products, requiring a high degree of technical expertise and knowledge in areas such as engineering, design, and materials science. This can make it difficult to manage and coordinate the work of different teams, and to ensure that the final product meets the required standards.
- 2. Logistics and supply chain:** Complex manufacturing projects require coordination and management of a large number of resources, including materials, equipment, and labor, and often require coordination and management of logistics and supply chain to ensure timely availability and delivery of materials and equipment.
- 3. Quality control:** These projects require ensuring that the final product is of high quality and meets all the requirements, such as safety, regulatory compliance, and performance. Quality control and compliance must be carefully managed and monitored throughout the project.
- 4. Time and budget constraints:** These projects typically have tight schedules and budgets and require precise coordination and management of all the resources and activities, to ensure that the project is completed on time and within budget.
- 5. Health and safety:** Manufacturing projects can be hazardous environments and require strict compliance with health and safety regulations to ensure that the project is carried out safely.
- 6. Environmental impact:** Manufacturing projects can have significant environmental impacts and are subject to a wide range of regulations related to protecting natural resources and the environment. It's important to consider and comply with these regulations, while also ensuring project feasibility.
- 7. Customization:** In some cases, like in the ship building and aircraft manufacturing, the products are highly customized and tailor-made to the client's requirements and preferences, which can increase the complexity of the project.

To effectively manage these complexities, manufacturing projects require a robust project management system, a strong project team with the necessary skills, experience, and tools, and effective communication and collaboration among all stakeholders.

Regular monitoring and controlling of the project's performance, and implementing risk management processes, can also help to mitigate potential problems and ensure successful project outcomes.



IT Projects

IT projects involve the development, implementation, and maintenance of software, databases, and other information systems. They often involve a high degree of technical complexity, and require a high degree of collaboration and coordination among different teams. There are several risks related to complex IT projects, including:

- 1. Schedule delays and cost overruns:** IT projects tend to be almost famous for this. Complex projects often take longer to complete and cost more than originally planned.
- 2. Scope creep:** The scope of the project may change as requirements evolve, leading to additional costs and delays.
- 3. Dependencies and interdependencies:** Complex projects often have multiple components that must be completed in a specific order, which can lead to delays if one component is not completed on time.
- 4. Quality control:** Complex projects may require extensive testing and quality assurance to ensure that they are working correctly, which can add to the project's costs and timeline.
- 5. Lack of clear ownership:** Complex projects often involve many stakeholders and contributors, which can make it difficult to assign responsibility for different aspects of the project.
- 6. Technology and vendor risk:** Complex projects often rely on new or untested technology, which can introduce additional risks such as vendor lock-in, vendor dependency, and integration issues.
- 7. Cybersecurity risks:** Complex projects often require integrating multiple systems and networks, which can create new vulnerabilities and increase cybersecurity risks.

Development Cooperation Projects

Development cooperation projects are international projects designed to support the social, economic, and environmental development of a country or region. Again, since these projects typically involve a wide range of stakeholders and interest groups, including directly political parties, project risks are imminent.

Some typical examples of development cooperation projects include:

- **Infrastructure development:** construction of roads, bridges, ports, and airports to improve transportation and connectivity.
- **Education and skills development:** providing funding and support for education and training programs to improve literacy rates, access to quality education, and the development of skills needed for the workforce.
- **Health and sanitation:** supporting initiatives to improve access to healthcare, clean water, and sanitation facilities to reduce disease and improve public health.
- **Agriculture and rural development:** providing support for small-scale farmers, improving food security, and promoting sustainable agricultural practices.
- **Gender equality and women's empowerment:** supporting initiatives to promote women's rights, increase access to education and job opportunities, and reduce gender-based violence and discrimination.
- **Environmental sustainability:** supporting initiatives to promote sustainable development, protect natural resources, and address climate change.
- **Governance and democracy:** supporting initiatives to strengthen democratic institutions, promote human rights, and improve public administration.
- **Emergency response and humanitarian assistance:** providing support for emergency relief efforts and responding to natural disasters or other humanitarian crises.

Development Cooperation Projects can face a variety of risks due to their complex nature, multi-stakeholder involvement, and often challenging environments. Typical risks include:

1. Political instability and insecurity in the project area
2. Inadequate or unpredictable funding from donor agencies
3. Corruption or fraud in project implementation
4. Mismanagement of project resources, including financial resources and project assets
5. Lack of stakeholder participation or insufficient community engagement
6. Insufficient local capacity or inadequate infrastructure for project implementation
7. Natural disasters, climate change, and other environmental risks
8. Technological challenges, such as a lack of appropriate technology or insufficient data systems.
9. Difficulties in coordinating with local governments or other implementing partners.
10. Cultural misunderstandings or lack of cultural sensitivity can lead to social or political tensions.

Public Administration Projects

Public Administration Projects refer to initiatives and programs implemented by government agencies aimed at improving the delivery of public services and the implementation of public policy. These projects can range from large-scale transformation projects to national risk analyses or legislation projects. Some of the common risks that are involved in public administration are presented below.

1. **Political Risk:** Changes in political leadership or shifts in government priorities can impact the direction or funding of public administration projects.
2. **Stakeholder Risk:** Conflicts between stakeholders, such as government agencies, citizens, and interest groups, can impact the success of public administration projects.
3. **Budget Risk:** Insufficient funding or budget overruns can impact the delivery of public administration projects.
4. **Schedule Risk:** Delays in the implementation of public administration projects can result in increased costs, reduced benefits, and decreased stakeholder confidence.
5. **Technical Risk:** Technical challenges, such as outdated technology or insufficient technical expertise, can impact the delivery of public administration projects.
6. **Compliance Risk:** Failure to comply with regulations or standards can result in legal penalties and negative public perception.
7. **Performance Risk:** Failure to meet performance objectives, such as project timelines or service delivery targets, can impact the success of public administration projects.



Part IV

The Power of Inclusion in Project Risk Management

The Power of Inclusion in Project Risk Management

Typically, complex projects involve people with very different backgrounds, values hierarchy, personalities, and educational background. To further complicate matters, when kicking off the project some of the stakeholders may have their plates full of other work competing for their attention, some cannot make it all to inaugural project meetings, while some try to pay attention and actually concentrate on the matters at hand.

In brief, how people contribute to assessing a project that's launching differs greatly based on their backgrounds and the then-current situation and attention span.

Complex and lengthy projects, the types of which have been discussed above, bear similarities to conflict management where several different stakeholders are involved with their different goals and interests.

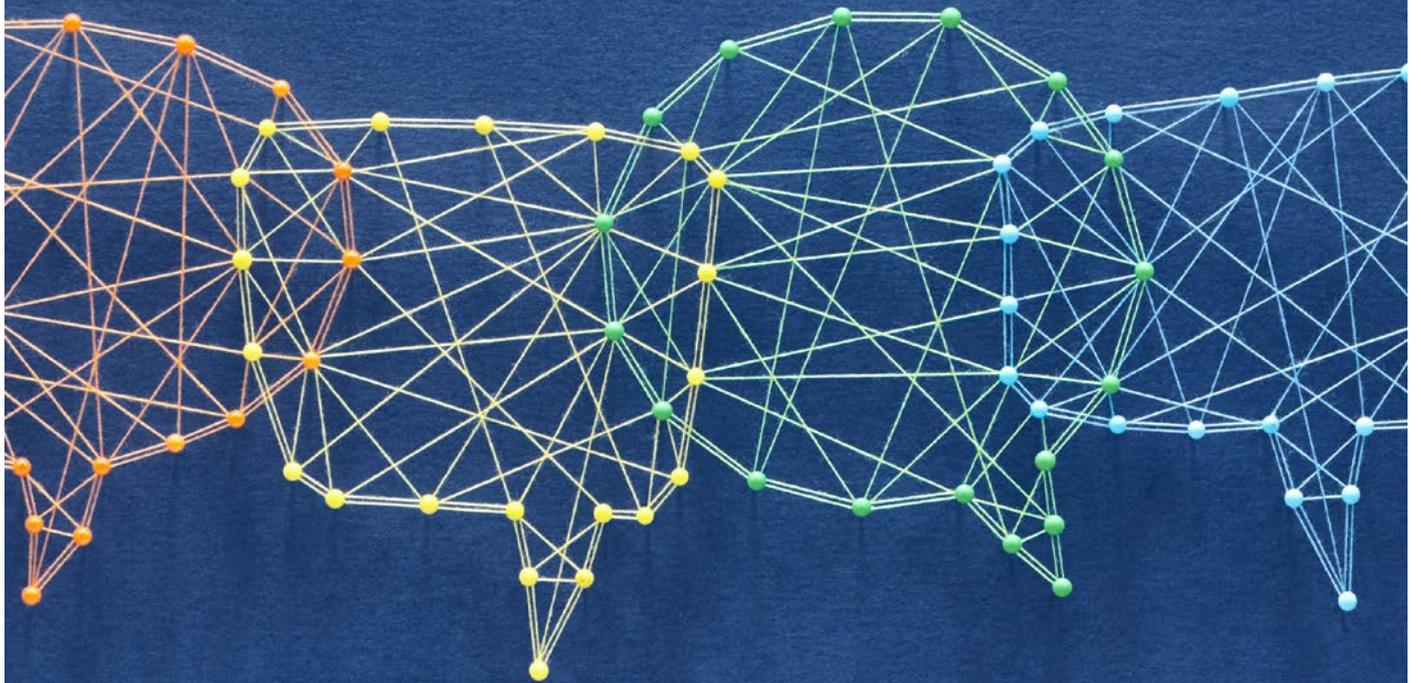
Indeed the roots of Inlus lie in international conflict management initiatives. The software and the related processes have originally been used in bringing together people with different political and other interests and trying to form a shared vision between parties that everyone can commit to and work towards.

Up front, conflict management and project risk management as concepts may sound remote. Yet scratching the surface, the similarities become rather obvious. The common denominator are people, of course. Be it international conflicts or complex projects, they involve (typically lots of) people, and whenever lots of people from different backgrounds and entities are involved, conflicting interests are bound to arise.

Since the founding of Inlus in 2016, we have witnessed it time and again how inclusivity in managing risks adds value and increases the chances of success in any complex projects. Dialogue, interaction, stakeholder involvement, awareness of risks and interests, and taking ownership can, and should, be facilitated with tools and processes that bring forward and make visible a shared goal among all stakeholders in the project. In our experience, people buy into what they feel they 'own'.

To rely not only on our own empirical experiences, we will discuss some academic research findings on the topic of inclusivity in the following. We will then move on to discussing the risk management capability in complex projects, and illustrating the topic of flexibility and benefits of inclusive risk management. Finally, we will introduce Inlus' own approach to inclusivity in managing risks in complex projects: The best practices that we have discovered in involving project stakeholders for the best outcomes of even the most complex projects.

“Complex and lengthy projects, the types of which have been discussed above, bear similarities to conflict management where several different stakeholders are involved with their different goals and interests”





Project Risk Management, Co-design, and Collaboration

A recent study published by the Cambridge University Press ('Managing Risk at the Fuzzy Front-End of Construction Project Design', May 2022) looked into the management of risk at the early design stage, in other words the 'fuzzy front-end' of construction projects design.

The aim of the research was to bridge design and project management research and to provide a 'proof of concept' for customizing risk management procedures in the fuzzy front-end of construction project design by utilizing co-design methodology.

It's acknowledged in the research paper that the early stage is crucial for project risk management and success, yet the traditional risk management approaches tend to focus on operational risk in later design stages.

Instead, this action research study leverages the co-design methodology and the actuality perspective of project management to tailor a risk management process for the fuzzy front-end of construction projects in a large organization. It was concluded that the co-design process, involving the project's stakeholders early on, helped enhance stakeholder value perception of the designed solution.

At the heart of the research was the finding that when the connection between organizational structures and procedures and actual action that the stakeholders take (the so called 'actuality perspective') is addressed as well as the influence of social interaction, the chances of success of the project are greatly improved.

In other words, engaging the organizational practitioners in a co-design process at the early stages of a complex project, the practitioners are empowered to incorporate their lived experience in the re-designed organizational work process.

This combined approach, involving the actuality perspective and a co-design approach, allows the experiences of the project's stakeholders to be taken serious and into account, widens the understanding of the problem, and facilitates the co-design of a solution where the organizational structure and practices can realign and where the social interaction will be facilitated.

“Engaging the organizational practitioners in a co-design process at the early stages of a complex project, the practitioners are empowered to incorporate their lived experience in the re-designed organizational work process“

Enhancing the Risk Management Capability in Complex Projects: How can Inlus Support both the Project Manager and Team Members

As discussed above, an inclusive and stakeholder-centric approach to managing risks in complex projects greatly enhances their chances of success. Who are the stakeholders in complex projects, then, and how can their risk management capability be enhanced with Inlus? We will discuss some of our own research findings below, and divide them into the perspectives of the Project Manager and a Team Member / Stakeholder.

Experiences from Inlus by Project Managers:

- **Insights to risks:** "We discovered valuable insights concerning risks, potential issues, or the ways to address them in the project."
- **Harmonizing the process of risk management:** "We managed to harmonize our way of working with risk management."
- **Continuous risk management:** "Inlus encourages to treat project risk management as a continuous process."
- **Trust:** "Inlus increased trust among the project management and project team, and its ways of working."
- **Risk discovery:** We discovered new risks in the project that we had not identified before."
- **Confirming assessments of the project's risks:** "We managed to confirm what we had believed would be potential risks and how we would best address them, which reduced uncertainty."

Experiences from Inlus by Team Members:

- **Enhanced collaboration and team culture:** "Because of the process and dialogue, we ended up changing the course of the project."
- **Team behavior and risk mitigation:** "Because of what Inlus brought to our knowledge about the project's risk status, we have changed the course of actions in the project."
- **Team's capability to anticipate and address issues:** "Inlus increased our capability as a team to anticipate and solve potential issues in the project."
- **Enhancing dialogue about project objectives:** "We managed to promote dialogue about the objectives of the project, which increased the odds of the project team of succeeding."
- **Increasing risk awareness:** "Inlus increased the awareness of the most critical risks in the project among the project team and the stakeholders."
- **Encouraging communication:** "The tool encouraged me to voice my opinions about the project's risks better than before."
- **Learning from peers:** "With the help of the tool, I learned from the other members in the project team."



Flexible support by Inklus in projects: Going beyond risk management

Risk management in complex projects is obviously important, yet there are many other priority processes in projects that can be supported by Inklus.

As an example, choosing the best project design ('Choosing by Advantage') is best done as an inclusive process, involving as many of the key stakeholders in the process as meaningfully possible. This can be easily and flexibly achieved using Inklus as a tool.

Choosing by Advantage is a method used in Lean Construction to make decisions about selecting the best option for a project. It involves evaluating different options and selecting the one that offers the greatest advantages, based on specific criteria and prioritized values.

CBA helps to ensure that project decisions are made in an objective and systematic way, taking into account the trade-offs between different options and the desired outcomes. By using CBA, construction teams can improve the efficiency, quality, and overall performance of their projects.

“Risk management in complex projects is obviously important, yet there are many other priority processes in projects that can be supported by Inklus“

Benefits of an Inclusive Approach to Project Risk Management as Compared to the Traditional Approaches

This brings us to the discussion on why inclusion, in other words the involvement and engagement of different stakeholders in a project, is critical and how it can be facilitated. The benefits that Inclusive, people-engaging approaches can provide to project risk management include:

- **Improved stakeholder buy-in and participation:** By engaging stakeholders early and often in the risk management process, they are more likely to understand and support the decisions that are made, and to take ownership of the risks associated with the project.
- **Greater identification of risks:** Traditional quantitative approaches often rely on a limited set of data and historical information to identify risks, whereas inclusive approaches involve a wider range of stakeholders and perspectives, which can lead to a more comprehensive identification of risks.
- **Preventing conflicts:** In complex projects, when things go sour, they may go sour in a very costly way. It's not infrequent to see conflicts in large and complex projects being handled in courts, sometimes in processes that may last years and mainly benefit the lawyers involved on both sides. When stakeholders are engaged in identifying, assessing, and managing the potential risks in a project from early on, conflicts are way less probable, and even if they occur, stakeholders will encounter them prepared.
- **Enhanced creativity and innovation:** Inclusive approaches can foster an environment where new and creative ideas can be shared and considered, leading to more effective risk management strategies – and to also identifying opportunities.
- **Increased resilience and adaptability:** By engaging stakeholders in the risk management process and encouraging them to think creatively, inclusive approaches can help build a more resilient and adaptable project team that is better able to respond to unexpected risks and changes.
- **Better alignment, communication and coordination:** Complex projects often take months or years and involve people that have inherently conflicting interests that also change over time. Engaging stakeholders in the risk management process over the course of the lifetime of the project can lead to better alignment of the goals of different stakeholders, and better communication and coordination among project team members, which can help to mitigate the impact of risks when they do occur.

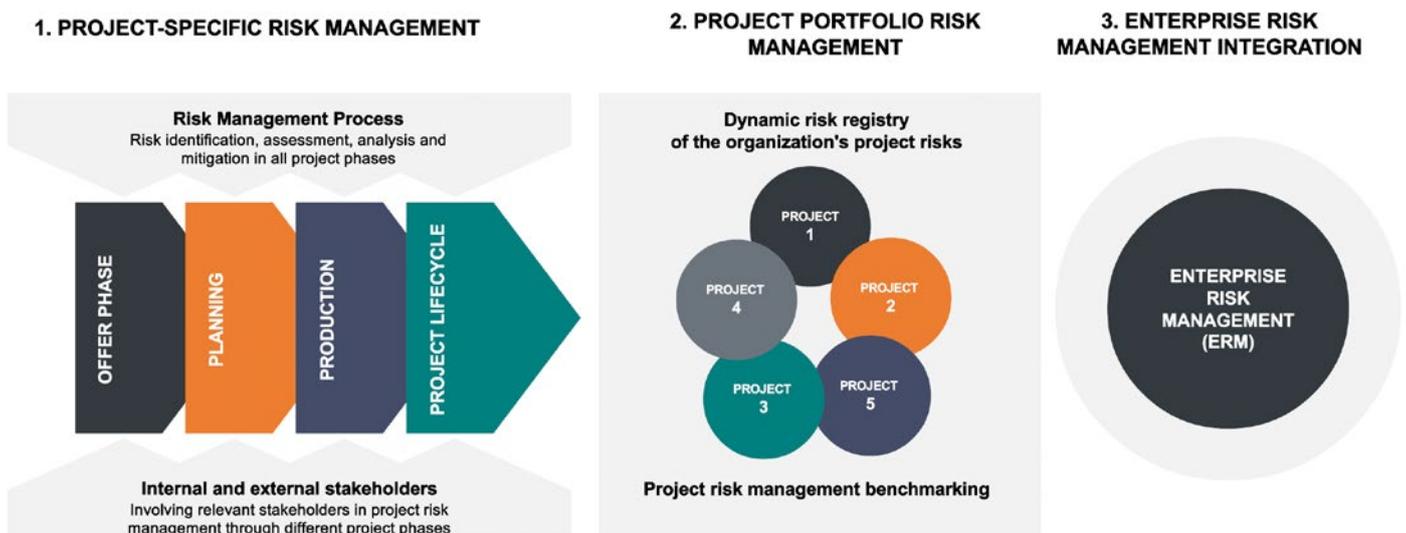
The Inclusive Risk Management Process: How Does it Work?

Comprehensive Project Risk Management: Three Levels

Before going into the phases of managing risks in a project in an inclusive fashion, let us acknowledge that there are three levels of risk management in a comprehensive approach to risk management in a project organization:

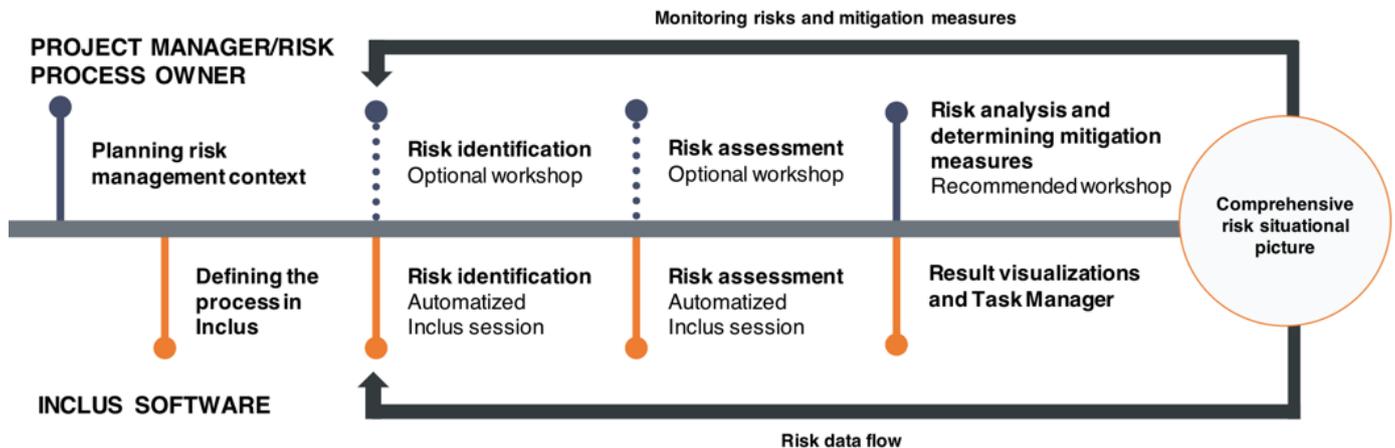
1. **Project-specific risk management** where the risks are managed at the level of an individual project
2. **Project portfolio risk management** where the project risks are grouped and can be managed and benchmarked from a bird's eye view
3. **Enterprise risk management (ERM)** that takes into account not only the risks involved with the project portfolio but it also integrates those with the rest of the risks that the entire organization is facing

The levels of project risk management are illustrated in the graph below.



Effective Project Risk Management Step-by-Step

The graph below illustrates the overview of a risk management process as described and supported by Inklus. We will briefly go through the phases of the process in the following.



- Step 1:** Planning for the risk management concept by the risk management responsible person in the project, typically the Project Manager. Templates for doing this are readily available through the Inklus tool, and can be adjusted according to the specific needs of each project.
- Step 2:** Identifying the risks relevant for the project. Can be performed in a workshop style, in which case the process is more engaging yet also consumes more time. Alternatively, the identification of risks can also be supported by Inklus that will automatically send out questionnaire templates to the relevant stakeholders who can point out and prioritize the risks that they see relevant on their own.
- Step 3:** Assessing the risks that were identified and prioritized in the previous phase. This step, too can be performed in either workshop style or independently by the stakeholders, supported by automatic email requests through Inklus. As a result, the organization will get a comprehensive overview of the then-assessed risk situation.
- Step 4:** Conducting a risk management analysis and determining the actions to mitigate the evaluated risks, should any of them become a reality. It is recommended that this phase be organized in a workshop fashion to ensure proper alignment of opinions, engagement, and commitment to working together towards a common goal among all stakeholders. In the end, the risk analysis will be visualized in Inklus and transformed into a task list for named stakeholders to address.

Subsequently as the project progresses and the situations evolve, the project organization will continue to monitor the risk environment and mitigate risks as they emerge, essentially circling back to Step 2 and identifying new or evolved risks.

Project risk identification

Flag the most important risk that should be assessed and analyzed further
 Comment risks that need more clarification
 Suggest new risks that should be considered in the risk list

Role

Project management | Finance | Project specialist | Invoicing | Planning

Search or suggest:
 Write your suggestion here Add suggestion

● Sales and offer phase

- Implementation resources 4
- Additional- and change fees 2
- Possibility to receive/close the project 1
- Work force and resourcing impact 2
- Implementation fees 1
- Special features of the project 1
- Profitability 1
- Defining the costs 1
- Schedule and characteristics 1

● Planning phase

- Contract- and liability risks 3
- Aligning the plans 2
- New risk SUGGESTION
- Materials delivery SUGGESTION
- Planning initial information 1
- Authorities/directives 1
- Soil investigations/data 1

Planning phase risk assessment

Assess risks in the project planning phase from your own perspective.
 Add task suggestions for possible risk management actions

Role

Project management | Finance | Project specialist | Invoicing | Planning

Click **i** buttons to receive more information about that subject.
 You are answering as jesper.nystrom@inclus.com. Your answers will be saved automatically and available when logged in.

● Planning phase

Planning initial information

Impact

Very small | Small | Moderate | Large | Very large

Likelihood

Very unlikely | Unlikely | Uncertain | Likely | Almost certain

Minimum cost impact(€)

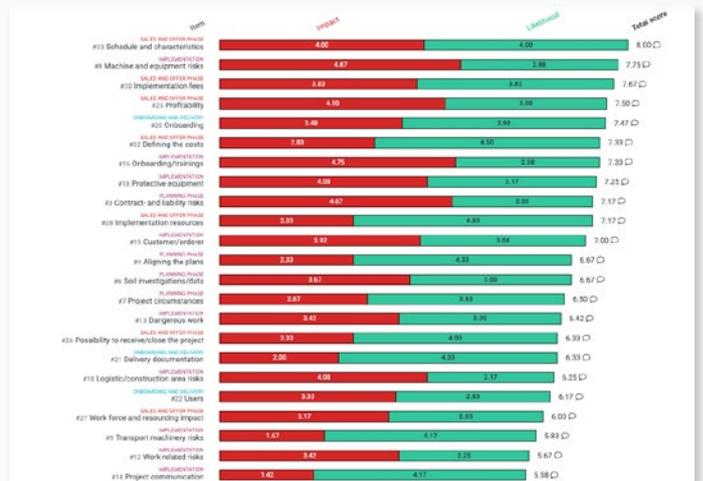
0 | 250000 | 500000 | 750000 | 1000000 | 1250000 | 1500000 | 1750000 | 2000000 | 2250000

Max cost impact(€)

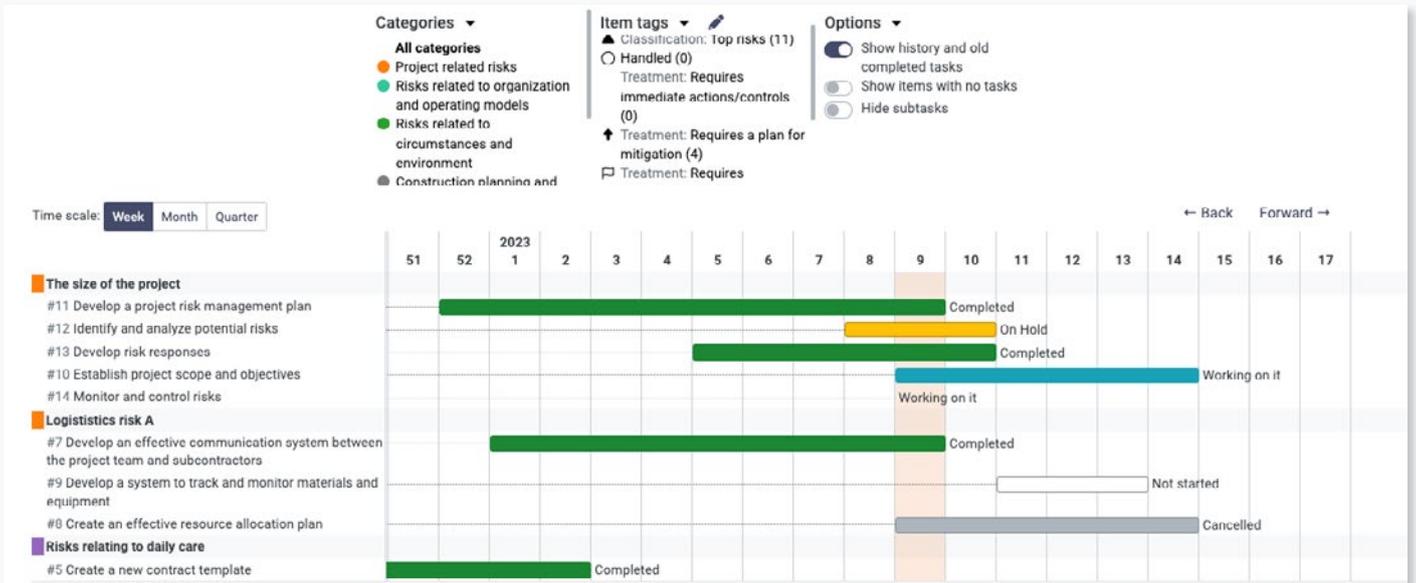
0 | 250000 | 500000 | 750000 | 1000000 | 1250000 | 1500000 | 1750000 | 2000000 | 2250000

Real-time collaborative risk identification in the Inclus software.

Inclus risk assessment with easily customized content and criteria. The assessment form can also be used in collecting proposed action items to mitigate the identified risks.



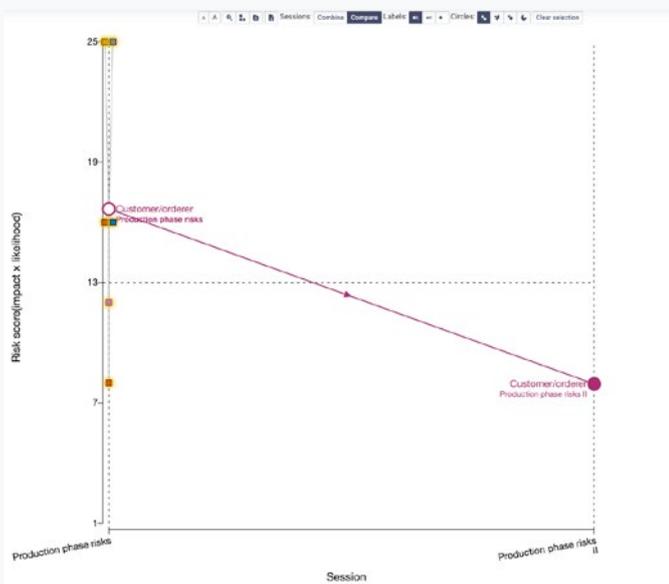
The dynamic results page in Inclus summarizes the risk assessment of a project into a range of easy-to-interpret visualizations that map out the risks involved. It is easy for the user to dig deeper into individual risk items and learn more about the observations related to each risk that have been identified.



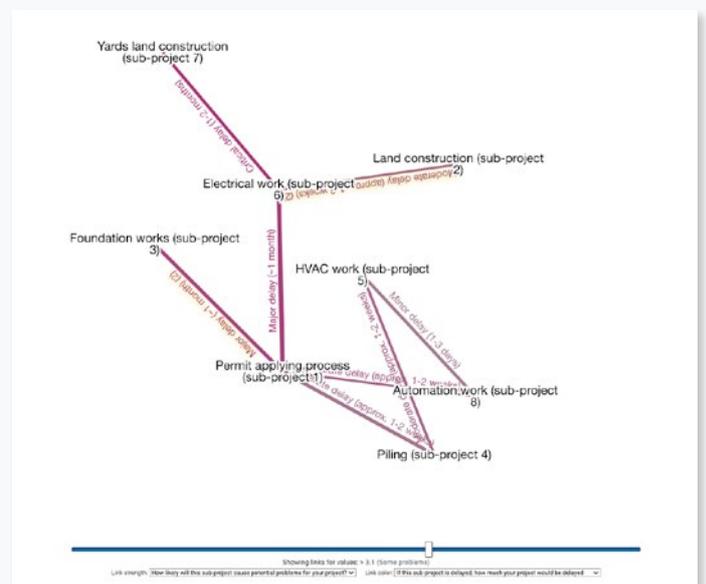
Mitigate and oversee assigned risk controls in the Task Manager of Inklus.



Keep track of the entire project portfolio and compare risks between projects with Inklus Benchmarking and Dashboards.



Monitor how risks develop over time.

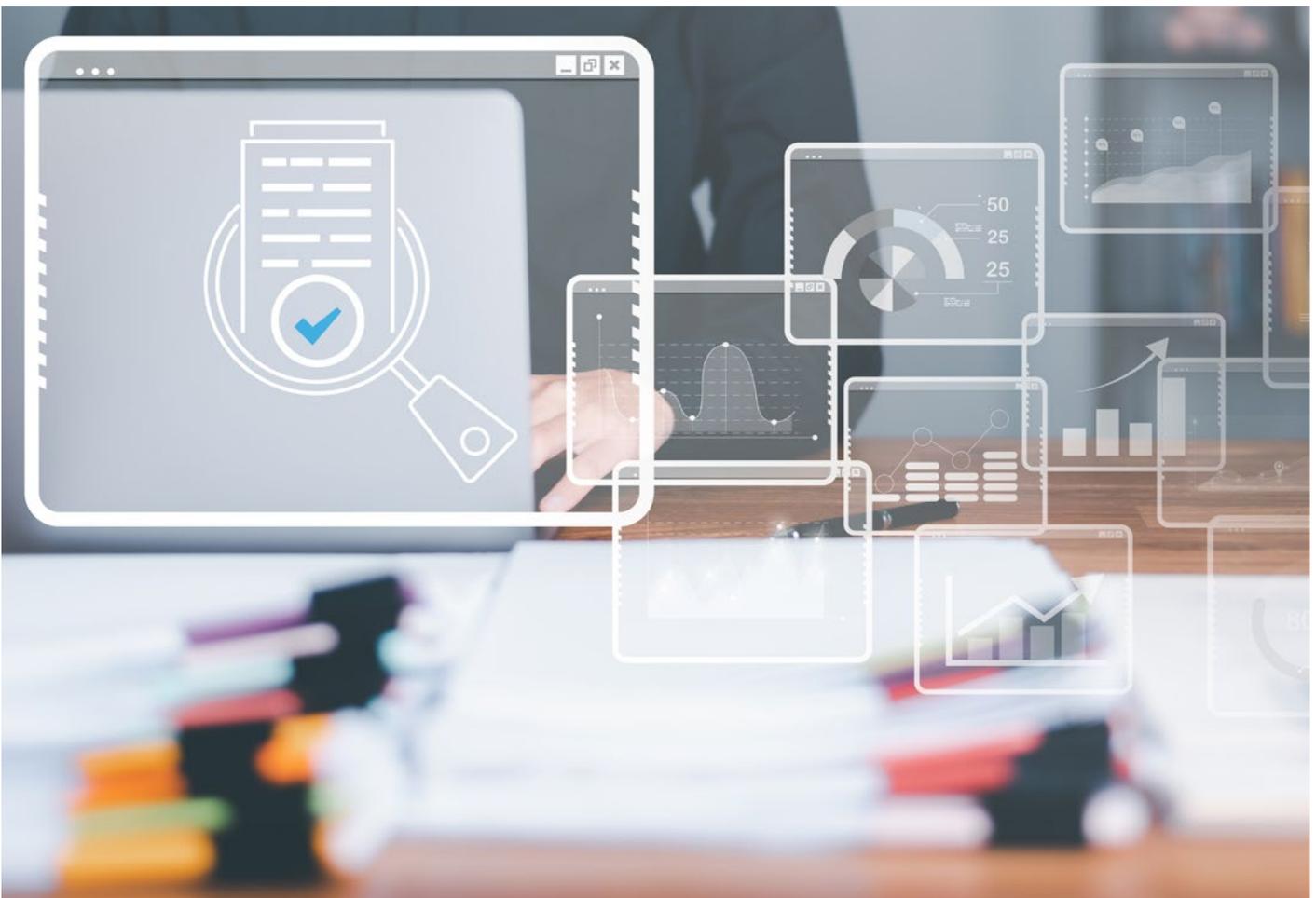


Conduct a project cross-impact analysis to understand interdependencies within your project(s).

Benefits of an Inclusive Project Risk Management Process

One unique feature of Inlus is that the organization using it can compare and benchmark the best risk management practices across the project portfolio. Each project has their individual status of which the top management can have an overview in real time. The management can benchmark the risk assessments of individual projects to the entire organization's enterprise risk management status.

Through Inlus, the tacit knowledge of a project's participants becomes visible and can be utilized both during the particular project but also importantly, in future projects of similar nature. In addition, it is possible to bring along for instance the specific technical expertise of certain experts in order to identify and manage particular risks. The tool can also be utilized in for instance managing security-related risks as well as risks concerning the entire enterprise.

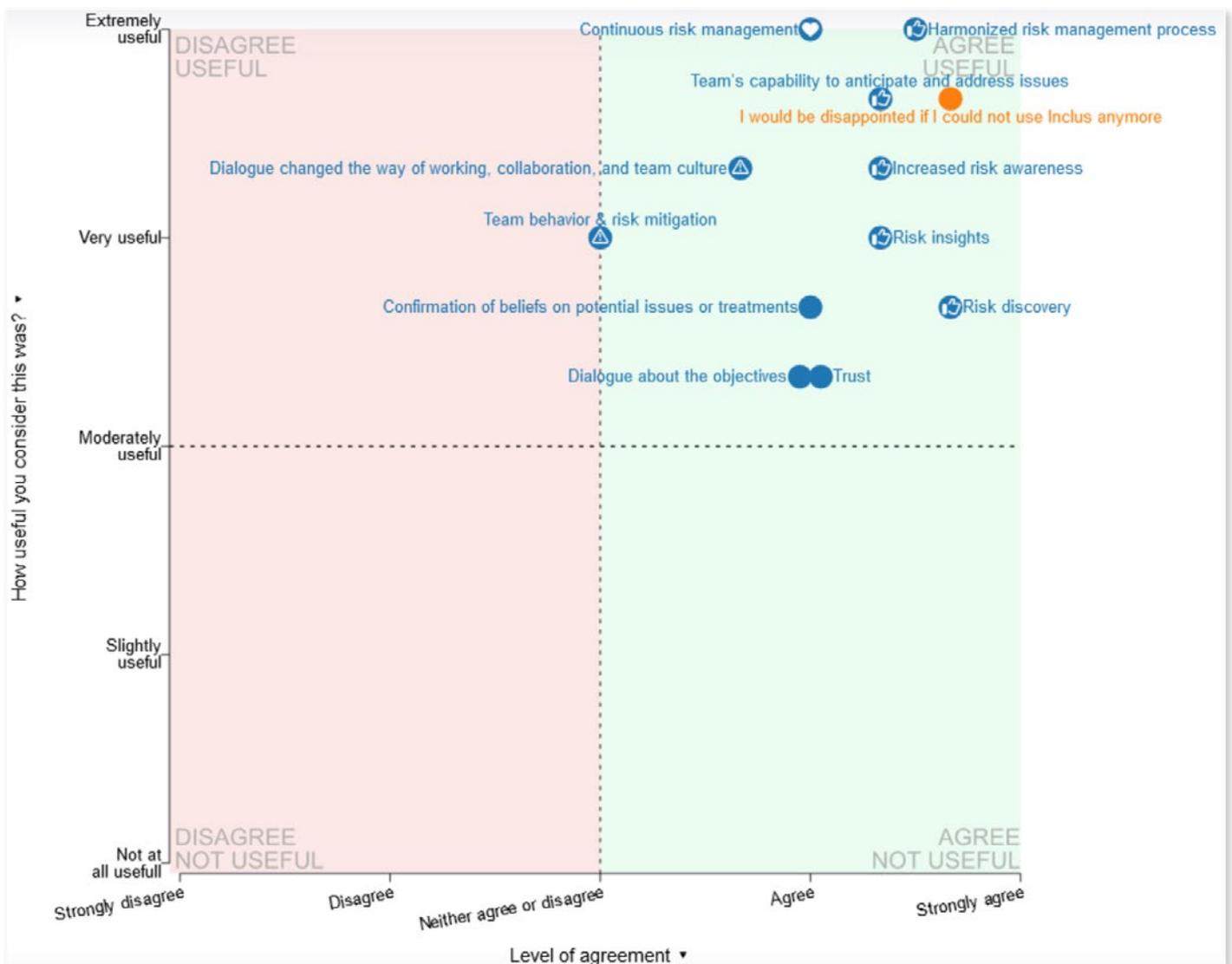


Inclusive Risk Management with Inclus: Case Examples

Overall, Inclus' project risk management clients have witnessed a wide range of benefits from using the tool, as illustrated in the graph below.

Some of the most impactful benefits experienced by the user organizations include an increasingly collaborative team culture, the ability of the team to anticipate and mitigate risks, a harmonized risk management process, an increased awareness of risks altogether, and continuity in the risk management activity.

Remarkably popular has also been the view that users would be disappointed, should they no longer have the opportunity to use the Inclus tools.



Perceived benefits of using Inclus, as reported by users in a survey.

The participants in the survey illustrated in the previous graph responded to the following questions:

"I would be disappointed if I could not use Inklus anymore"

"Inklus increased our capability as a team to anticipate and solve potential issues in the project"

"Because of the findings, we changed the course of actions in the project"

"We discovered new risks in the project that we had not been identified previously"

"We discovered valuable insights concerning risks, potential issues, or the ways to address them in the project"

"We managed to confirm our beliefs on the potential risks or they way to treat them, reducing uncertainty"

"We managed to harmonize our way of working with risk management"

"We managed to promote dialogue about the objectives of the projects, which increased the odds of the project team to succeed"

"Inklus increased risk awareness about the most critical risks among the project team and stakeholders"

"Tool encouraged me to express my views more in the project"

"With the help of the tool, I learnt from the other members of the project team"

"Because of the process and dialogue, we changed the course of actions in the project"

"Inklus increased trust in the project management, ways of working, project team, or among the team"

"Tool encouraged to do continuous risk management in the project"

Case Skanska

Skanska is one of Finland's largest residential property, commercial and production facility, and infrastructure constructors and project developers. The partnership between Skanska and Inclus began in 2017, and this cooperation has since covered three major construction projects. The first joint project was the Valtari alliance, after which was the Ahvenisto hospital project Assi, and the latest cooperation has been the OYS2030 Future hospital project of Oulu University Hospital.

More reliable risk assessment through crowdsourcing

Skanska's cooperation with Inclus started when Skanska was searching for a tool and processes to better involve people in the decision-making specifically in the multi-professional environments of alliance projects.

Inclus and Skanska co-developed and deployed a risk management tool in the Valtari alliance of the Finnish Transport Infrastructure Agency, city of Lahti, municipality of Hollola, Skanska, and AFRY. Valtari is an alliance for the construction of trunk road Vt12 Southern Ring Road of Lahti, where the risks and opportunities are shared among the parties. The estimated value of the Valtari project is 172 million euros.

Inclus is utilised for risk and opportunity management also in the OYS2030 project, which objective is to build the smartest hospital in the world. OYS2030 is a renewal programme where the operations and facilities of the Oulu University Hospital are updated to respond to the needs of the special health care of the future. Inclus' tools have been a great asset in the project.

Views brought visible in decision-making

Skanska has made versatile use of Inclus' tools. In addition to risk management, the tools have been utilised in decision-making assessment. Using Inclus helps make visible the risk assessments of particular situations from the right people. Inclus brings the viewpoints into the same visual dashboard where they can easily be discussed, and no one needs to feel insecure about their opinion.

[Read more](#)

Case Sweco

Sweco is an expert company on the built environment and industry, and has cooperated with Inklus for over two years. Sweco has utilised Inklus' tools in several different projects.

Sweco has a number of client projects where they assess plans, compare implementation options, and make decisions. The method previously used for this work was excessively time-consuming, and not transparent enough.

At the early stages of a project, forming a shared vision on its objectives with the client is critical. With Inklus, Sweco has managed to systematize its approach to the initial phases of a project.

The cooperation between Inklus and Sweco has run smoothly from the beginning. Inklus has been able to easily adjust its tool to meet Sweco's needs, and technical support has been available to Sweco whenever needed.

Inklus has contributed to making Sweco's projects more attractive and engaging to their participants, increasing their level of commitment. With Inklus' tool, Sweco can focus on the essentials of a project and monitor its development significantly better than before.

[Read more](#)

Summary and Conclusions

Projects are handled by people, and a lot of the project's success depends on the human factor: How the project participants engage and communicate with each other over the course of the (often lengthy) project, and how it is determined, in a group, which information is relevant and of high quality, and what conclusions should be drawn from it.

This ebook presents and discusses the merits and characteristics of an inclusive risk management project and software tools. The benefits of a people-engaging approach to complex project risk management include improved stakeholder buy-in and participation, greater identification – and prevention – of risks, enhanced creativity and innovation, increased resilience and adaptability, and better alignment, communication and coordination.

Throughout this ebook, we advocate the mindset that risk management processes and tools should become part of the daily work routines of the entire project organization. That way, proactively managing and mitigating risks and also uncovering for instance cost saving opportunities related to complex projects becomes a natural part of the project's management as opposed to a separate and time consuming side process of its own.

Learn more about inclusive project risk management

Get in touch to book a free inclusive risk management consultation call and Inklus software demo

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