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The background of the entire page is a futuristic, teal-colored digital interface. It features a central world map with glowing data points and lines. On the right side, a white robotic hand is visible, pointing towards the map. On the left side, a human hand is also visible, pointing towards the map. The interface includes various data visualization elements such as bar charts, circular gauges, and grid patterns.

# Data Analytics for Informed Decision-Making in **Complex** Projects

Exploring the Human-Data Relationship

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## EXECUTIVE SUMMARY

During the 2022-23 International Roundtable Series we explored the use of Data Analytics for Informed Decision-Making in Complex Projects. Drawing on the expertise of senior practitioners and academics, from a range of disciplines, industries and countries, we considered where new advances in technology could make a valuable contribution to decision-making in complex projects, but also their limitations and barriers to their use.

This report builds on the insights from the previous report on Harnessing Emergence in Complex Projects: Rethinking Risk, Opportunity and Resilience and examines Data Analytics and AI (or data-driven technologies) as a way of 'knowing' in complex projects.

It became clear during the Roundtable workshops that the use of data analytics and AI in complex projects required a human-data relationship, and that their adoption was not limited to technical considerations. This report explores this human-data relationship. It considers what it is to make decisions in complex projects, what data analytics and artificial intelligence can offer to support effective decision-making, and what needs to be considered to harness their potential.

### **Part 1 – Motivation**

Ultimately, the goal of the ICCPM International Roundtable Series is to provide readers with valuable insights that can help them navigate project complexity. This Series explored the intersection of data analytics, AI, and human decision-making in complex projects. It was motivated by the premise that a data-driven approach allows for better decision-making, improved resource allocation, and the ability to identify and address potential issues early in the project lifecycle, but also the understanding that complex projects are a human activity and their influence on the adoption and use of any technology must be considered.

### **Part 2 – Making Sense of Complexity for Decision-Making in Complex Projects**

Complex projects often involve multifaceted decision-making processes influenced by various factors, including technical, financial, environmental, psychological, socio-cultural, and organisational considerations. Capturing the nuances of these decision-making processes and providing actionable insights can be challenging. This Part explores decision-making in complex projects, the potential of artificial intelligence supporting decision-making, and the critical role of humans.

### **Part 3 – The Rise of Data Analytics and Artificial Intelligence**

The field of data analytics and AI involves a diverse range of experts, including data scientists, domain experts (project professionals), engineers, and ethicists etc. Addressing the interdisciplinary nature of AI and ensuring that the report speaks to a broad audience, with varying levels of expertise, can be a challenge. We have tried to strike a balance between technical depth and accessibility, focusing on the opportunities and challenges associated with the use of data analytics and AI for decision-making in complex projects. To support this discussion, Part 3 seeks to offer the layperson an introductory understanding of the field, understanding that AI and data analytics are constantly evolving, with new algorithms, tools, and techniques emerging at a rapid pace.

## **Part 4 – The Complexity of Human-Data Relationships**

The use of data analytics and AI is a human activity. It is humans that create these technologies, and it is humans that establish the rules around their use. As technology seeks to replicate or replace human decision-making, we must ask ourselves what it is to be human. What aspects of our humanity are positive in complex project decision-making, and what aspects may be detrimental? When does, or should, human decision-making take primacy? Part 4 explores the impact of worldview and paradigms on our use of data analytics and AI and considers what the human-data relationship should be in complex project decision-making.

## **Part 5 – Tools Before Rules**

As AI and data analytics become more integrated into complex projects, issues related to data privacy, ethics, and responsible AI usage are becoming increasingly important. Local and international regulators are struggling to keep up as technology continues to rapidly evolve. This is reflected in projects, where practitioners are adopting tools with system wide implications, while governance structures are struggling to adapt. Writing a report that considers these concerns while staying ahead of developments can be challenging. We have avoided wading into a detailed analysis of any particular regulatory reform in this report, but rather considered the impact of rapid development and the need for governance beyond technical assurance.

## **Part 6 – Using Data Analytics for Informed Decision-Making in Complex Projects**

It was clear from the Roundtable discussions that data analytics, and in particular AI, has great potential to support informed decision-making in complex projects. It was also clear that this is not simply the adoption of a new technology, but rather a new human-data relationship with primacy given to humans or machines depending on the situation. In this final Part, we consider when each should be given primacy for decision-making in complex projects and explore what is needed to support this new decision-making paradigm.

We commend this report to you and hope that it helps inform your adoption of data analytics and AI for decision-making in complex projects. We hope it helps you better understand the tools available to you and provides insights that help you navigate the human-data relationship to maximise the success of your complex project delivery.

