

ADD-VERSE



Accelerating digitalisation for decision making in VUCA environments

A KKS Research Profile application from Blekinge Institute of Technology

VISION: Becoming an internationally leading research environment and a top partner of choice for the development of modelling, simulation, and visualization capabilities for making informed decisions when designing complex systems in VUCA (Volatile, Uncertain, Complex and Ambiguous) environments.

OBJECTIVES: Develop, demonstrate and validate the joint use of digital technologies - including modelling, simulation, visualization and AI technologies – to guide decision making in a VUCA environments.

HOST: ADD-VERSE is hosted by the department of Mechanical Engineering at BTH and builds on the knowledge from the following research projects:
<https://www.productdevelopment.se/research/research-projects/>

Host University Principal	Henric Johnson
Project Owner	Johan Wall
Project manager	Marco Bertoni
Deputy project manager	Tobias Larsson

Contact: marco.bertoni@bth.se

WHAT IS VUCA? : VUCA stands for Volatility, Uncertainty, Complexity, and Ambiguity. Initially introduced by the U.S. Army to describe the complex and unpredictable nature of the post-Cold War military world, the concept has transcended its military origins to become a widely used framework in business, education, and leadership.

A VUCA environment is characterised by volatile customer demands influenced by the rapid spread of information, raw material shortages that disrupt manufacturing and development processes, as well as uncertain technology readinesses that impacts production timelines. VUCA can simply take the form of a stuck vessel, such as the 2021 Suez Canal blockade caused by the Ever Given container ship, which disrupted global trade for six days, delaying over 400 vessels and turning industries on their head overnight.

The modern VUCA world challenges decision makers to make timely decisions despite incomplete or conflicting data. How to choose 'right' amidst mixed customer feedback, complexities arising from globalized operations, distant political disruptions and more?

VOLATILITY

Characteristics: Rapid and unexpected challenges

The environment is unexpected or unstable and may be of unknown duration, but it is not necessarily hard to understand. Knowledge about it is often available.

UNCERTAINTY

Characteristics: several 'known unknowns'

Despite a lack of other information, the event course of an event and its forecasted effects are known. Change is possible but not a given.

COMPLEXITY

Characteristics: Multiple key decision factors

The situation has many interconnected parts and variables. Some information is available or can be predicted, but the volume or nature of it can be overwhelming to process.

AMBIGUITY

Characteristics: Too many unknown unknowns

Casual relationships are completely unclear and no precedent exist. You are very much in the dark and you face 'unknown unknowns'.

WHY ADD-VERSE, WHY NOW?

The initiative aligns with BTH's strategic goals by strengthening industry partnerships and promoting interdisciplinary research. It enhances regional, national, and international excellence through coproduction processes that influence educational programs. Focused on applied research, it supports KKS's mission to drive innovation and competitiveness in Swedish industry, ensuring sustainable growth and long-term impact for both academia and industry.



EUROPE

Europe's industrial leadership faces challenges like decarbonization, rising energy costs, and rapid tech advancements. Adaptability and resilience are essential in navigating economic, environmental, and geopolitical shifts. Accelerating digital tool development for data-driven insights will enable informed decision-making, boosting competitiveness across key sectors in a volatile, complex landscape.



SWEDEN

Sweden's competitiveness faces challenges from economic uncertainty, rapid technological change, and geopolitical tensions. Rising energy costs, supply chain disruptions, and demands for sustainability strain industries. To stay competitive, the country must innovate quickly, strengthen resilience, and adapt its innovation strategy, methods and tools.



BLEKINGE

Blekinge is a region on a mission, with a strong focus on smart industry, maritime applications and advanced technologies. Operating in the Baltic's volatile geopolitical environment, the region has a history and a present marked by environmental unpredictability and complex relationships with neighbouring powers. Its military and trade prominence have made it both a target and an adaptable force.



Our heritage: <https://www.productdevelopment.se/research/research-projects/>
Our labs: <https://www.productdevelopment.se/virtual-production-studio-lab/inaugurated/>
Our research excellence: <https://www.productdevelopment.se/model-driven-development-and-decision-support/>



TOPICS AND TRACKS

Model and twin

- Develop digital Twin Architectures fit for VUCA world decision making.
- Develop innovative techniques for resilience modelling in VUCA settings
- Improve probabilistic forecasting and Bayesian networks.
- Develop enhanced uncertainty quantification and maturity techniques.

Simulate

- Define multi-level hardware simulation support with the help of AI
- Develop a scalable hybrid simulations for system-of-system analysis and design.
- Integrate AI-enhanced support to improve prediction and to turn DTs into synthetic environments for training.

Visualise

- Develop and exploit of Mixed Reality environments for data visualization.
- Understand the use of Virtual Production techniques for VUCA decision making supported by AI-driven dashboards
- Integrate human feedback into simulation processes (human-in-the-loop).
- Investigate the use of multi-sensory tools for model interaction.

Co-create

- Investigate how accelerated digitalization affect exploit vs. explore strategy in design decision making.
- Develop sandboxes and moonshot prototyping practices to support co-creation activities.
- Investigate how immersive environments affect cross-functional and distributed decision-making

KEY FACTS

Application deadline	February 3 rd , 2025
ADD-VERSE kick-off	September 1 st , 2025
Project Duration	8 years (4+4)
KKS funding	30 to 40 millions SEK
Consortium	BTH + 6 to 8 industrial partners
Initial Commitment	4 years (can be extended)
Commitment level	see options on the right

ACADEMIC COLLABORATIONS

Model and Twin	University of Linköping (SE) University of St. Etienne (FR)
Simulate	Mc Gill University (CA) University of Bergamo (I)
Visualise	Politecnico di Milano (I) Via College Aarhus (DK)
Co-create	University of Lucerne (CH) Denmark Technical University (DK)

PARTNER COMMITMENT LEVELS

Galaxy	500.000 SEK cash/year 2.000.000 SEK in-kind/year
Supernova	250.000 SEK cash/year 2.000.000 SEK in-kind/year
Star	1.500.000 SEK in-kind/year
Planet	1.000.000 SEK in-kind/year
Comet	700.000 SEK in-kind/year
Meteor	350.000 SEK in-kind/year