

System dynamics analysis of factors impacting on command and control technology acceptance for anti-poaching operations

Rudolph Oosthuizen, Leon Pretorius

Abstract:

Introducing a new technology into a complex sociotechnical system will have planned as well as unplanned impact. Dynamic interaction between the technology, people, and environment may result in counter intuitive systemic effects. Modelling of the system and the new technology can help to understand the requirements for successful implementation of the technology. A modelling methodology that combines two modelling frameworks, cognitive work analysis and system dynamics, can be used to model the effect of a new technology on complex sociotechnical system. Cognitive work analysis helps to capture available information on the system and the application of technology into constructs. The system dynamics method analyses the causal relationships between the variables in the system with models generated from the constructs. The modelling methodology is demonstrated through modelling and simulation of the effect of web based and smartphone technology on an anti-poaching command and control system. Systems dynamics simulations are used to assess the impact of different factors due to the new technology on system effectiveness. The constructs, model artefacts and simulation results of the methodology provided insight into the possible impact of the new technology to plan experiments.

Keywords:

Cognitive work analysis, complex, sociotechnical, system dynamics, system, anti-poaching, command and control.