Risk Assessment tools and methods: A Cynefin framework perspective

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Cynefin framework proposed by Snowden in 1999, identifies four categories: Chaotic, Complex, Complicated and Simple. Each one of these categories have different properties and procedures regarding the assessment of the system. Simple category implies that cause-effect relationship are governed by simple relations. Complicated category is still governed by cause-effect relationship, but with an extra need for understanding and modelling the system, which needs a more sophisticated analysis. Complex category is defined by nonlinear relationship, self organizing structure, and gives origin to emergent properties, that cannot be identified a priori. And finally the chaotic category is a universe where no predictions could be made, and a special treatment should be done in order to solve risk issues. Within this framework it is proposed to analyse risk assessment tools and methods in accordance with those categories. The majority of tools and methods resides in simple category, a lesser extent tools are appropriate in the complicated category, and very few of them are appropriate to be used in complex category. Chaos has no specific tools or method, but it is suggested in this poster that integrated methods approach should be appropriate. The contribution is as well to establish a basic comprehension of applicability of risk tools and methods whenever one organization is facing one of the Cynefin categories. methods like fault tree analysis - FTA, Event Sequence Diagram - ESD, Event Tree Analysis - ETA, FMEA/FMECA, Hazop/LOPA, What-if/Checklist, brainstorming, Preliminary Hazard Analysis, Delphi, ranking tools like TOPSIS, Vikor in some way are adequate in “Simple” category, and has been used for decades up to now. In “Complex” category, methods like Monte Carlo Simulation, Petri Net, Bayesian Belief Network, Cross-Impact matrix, Fuzzy inference are suitable to use. In “Complex” category methods and tools like System Dynamics, Agent-Based modelling, Functional Resonance Analysis Method - FRAM and Systematic-Theoretic Process Analysis - STAMP/STPA are suitable to face the challenges imposed. “Chaotic” category could be only addressed with integrated methods that could enable treatment of non-pattern situations, and the first act is to try to establish order, and trying to convert chaotic to complexity situation. In our vision, it is possible only, with well established methods and tools, and mainly their integration, which is emphasized in this poster.

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