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A Systematic Literature Review of Policy Analysis and Modeling in Systems Engineering

Meet the Authors

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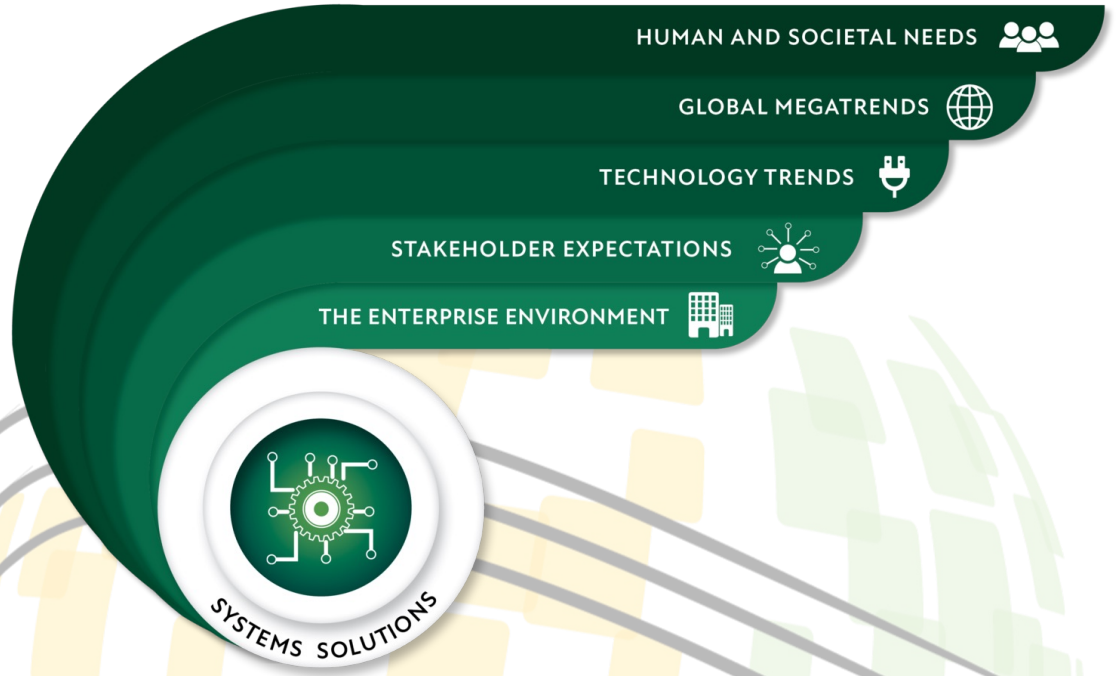
Systems Engineering Vision 2035 Requires PESTEL so does UNSDgs



INCOSE VISION 2035

- Political
- Economics
- Social
- Technical
- Environmental
- Legal

PESTEL Factors Require Policy Modeling for Effective Management (Buzuku et.al, 2019)

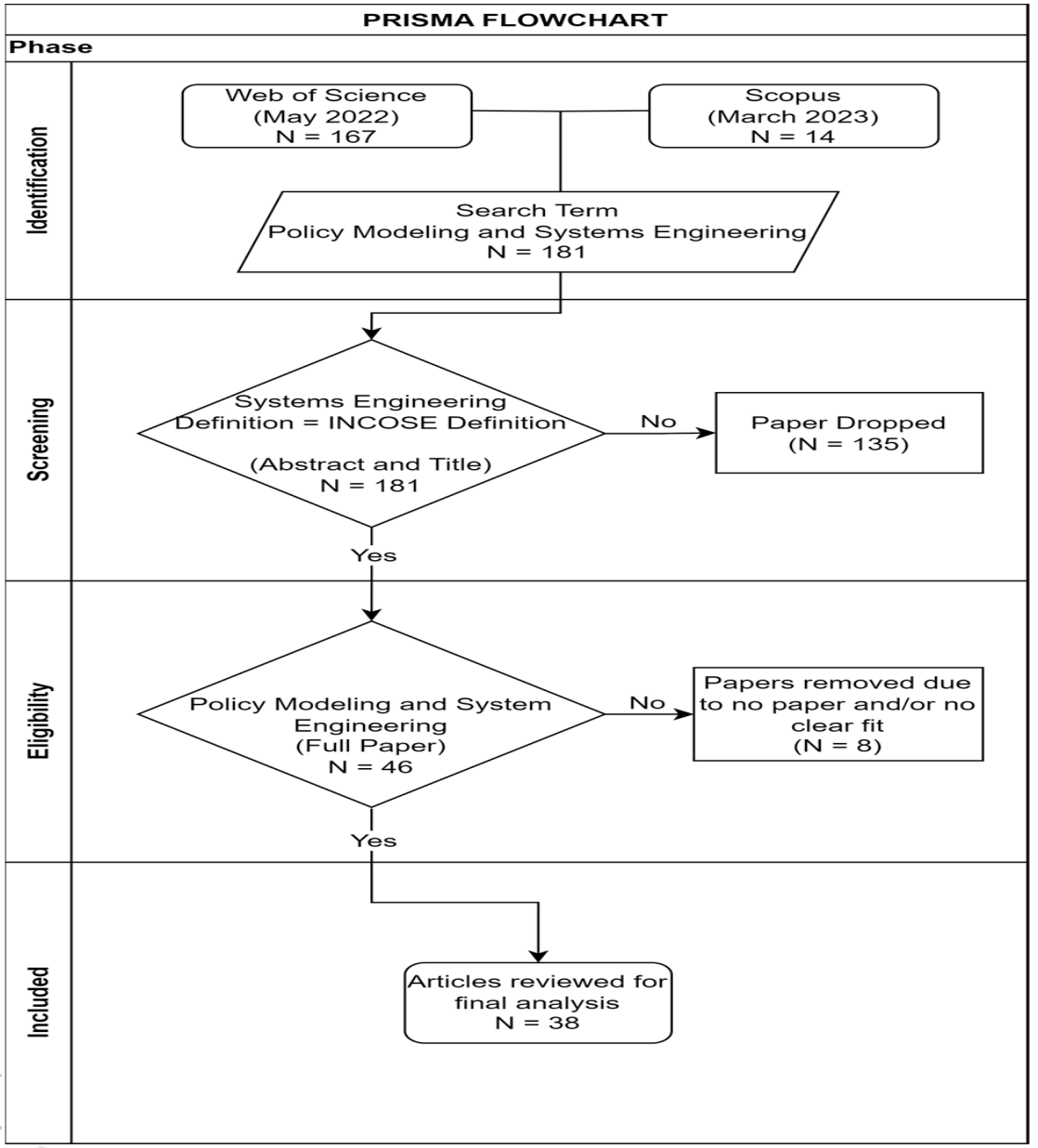
Developing Scenario Analysis to help Inform Policy

Modeling Policy Language to Identify Gaps in Policy

Domains Specific Policy Optimizations

Systematic Literature Review of Policy Modeling and Systems Engineering will Help develop the Research Landscape

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Methodology for a Systematic Literature Review



Overview of Research Landscape

System Engineering for Policy Modeling (13)	(Bhada & Krishnan, 2021; deMonsabert, Buede, & Vasilakopoulou, 1999; Dougherty et al., 2012; Ender, Murphy, & Haynes, 2010; Golkar & Craw- ley, 2014; Heitmann, Halbe, & Pahl-Wostl, 2019; Kryszkiewicz, Canfield, Bhada, & Wyglinski, 2022; Lubega & Farid, 2016; Madhavan, Phelps, Rouse, & Rappuoli, 2018; Pennock & Bodner, 2020; Powell & Mustafee, 2017; Robin Keller, Kirkwood, & Jones, 2009; Yen & Bras, 2012)
Policy Modeling for Systems Engineering (16)	(Alfaris et al., 2015; Crowther & Haimes, 2010; Dai et al., 2019; Herder, van Luijk, & Bruijnooge, 2008; Junliang, Yueliang, Yong, Zhuzhu, & Weijie, 2021; Lee et al., 2020; Martinez, 2000; Mesgari & Jabalameli, 2018; Minzhi, Hua, & Junlong, 2018; Nyström & Cornland, 2003; Onishi, 2005; Qingan & Lirong, 2021; Raptis et al., 2013; Shaked & Reich, 2019; Weijermars et al., 2012; Wieland & Pritchett, 2007)
Informational/ Literature Review (5)	(Bellamy & Basole, 2013; Chang, Pires, & Mar- tinho, 2011; de Bruijn & Herder, 2009; Haberlin &Haimes, 2018; Means, Wagner, Kern, Newman, & Weiner, 2020)
Policy Design (1)	(Buzuku et al., 2019)
Automation (1)	(Younse, Cameron, & Bradley, 2021)

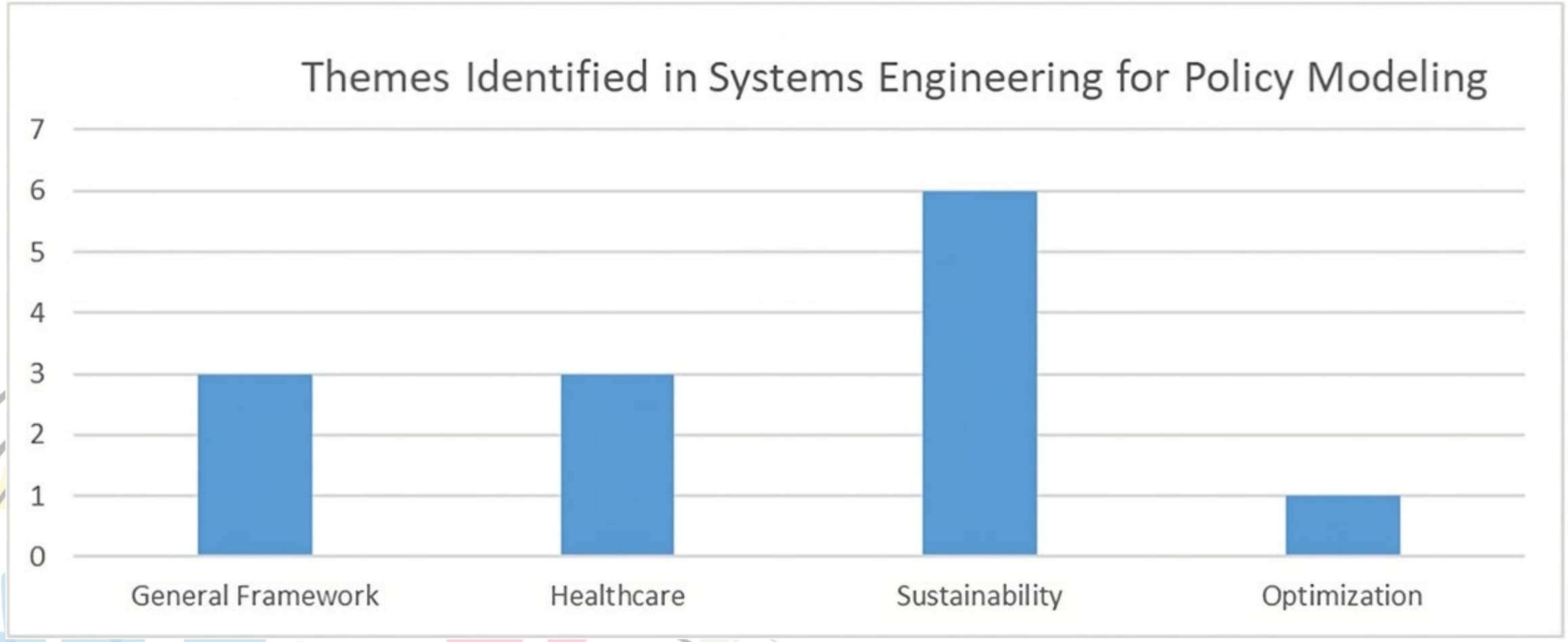
Themes in the Research Landscape

Category	Papers
Optimization (3)	(Dai et al., 2019; Kryszkiewicz et al., 2022; Miller, Yukish, & Simpson, 2018)
System of ystems (1)	(de Bruijn & Herder, 2009)
General Frameworks/ Method-ology (9)	(Bellamy & Basole, 2013; Bhada & Krishnan, 2021; Buzuku et al., 2019; Crowther & Haimes, 2010; Golkar & Crawley, 2014; Haberlin & Haimes, 2018; Pennock & Bodner, 2020; Shaked & Reich, 2019)
Health (4)	(Dougherty et al., 2012; Madhavan et al., 2018; Means et al.,2020; Powell & Mustafee, 2017)
Sustainability (13)	(Alfaris et al., 2015; Chang et al., 2011; deMonsabert et al., 1999; Ender et al., 2010; Heitmann et al., 2019; Heuberger et al., 2017; Lubega & Farid, 2016; Mesgari & Jabalameli, 2018; Nyström & Cornland, 2003; Raptis et al., 2013; Robin Keller et al., 2009; Weijermars et al., 2012; Yen & Bras, 2012)
Machine to Machine (3)	(Martinez, 2000; Minzhi et al., 2018; Younse et al., 2021)
Safety and Maintenance (3)	(Herder et al., 2008; Junliang et al., 2021; Qingan & Lirong, 2021)

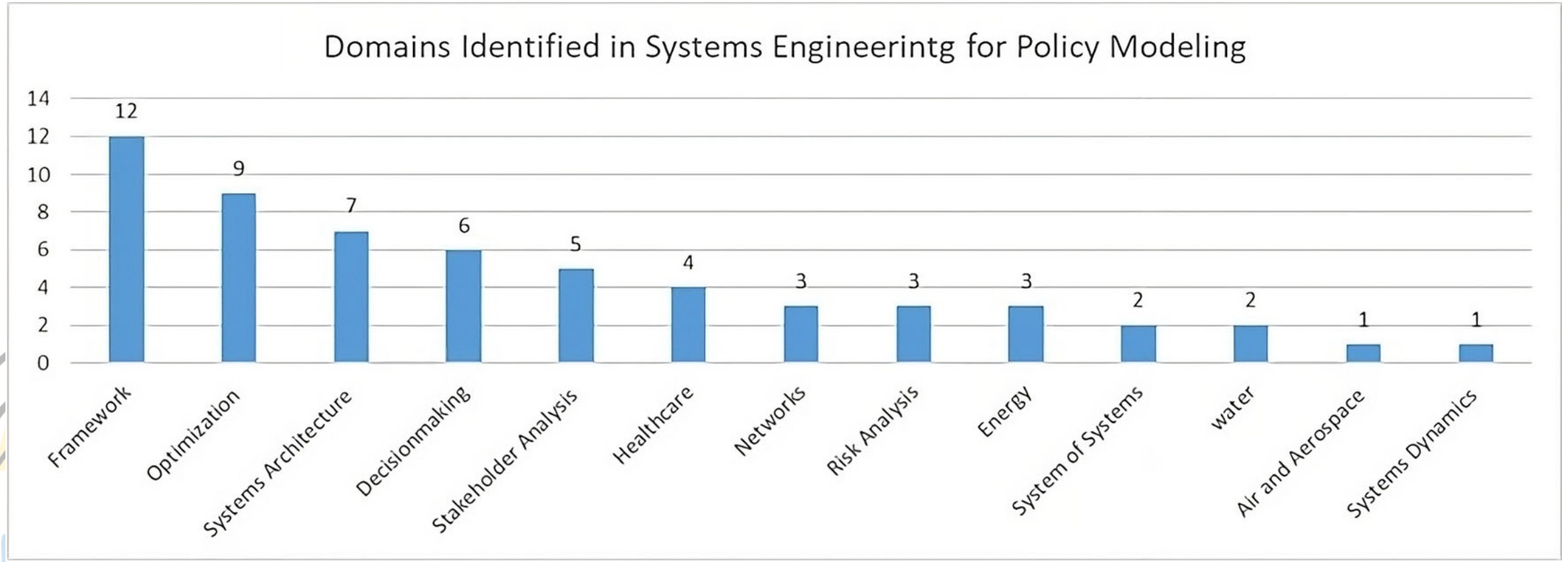
Domains in The Research Landscape

- Air and aerospace (2 papers)
- System dynamics (4 papers)
- Healthcare (5 papers)
- Networks (5 papers)
- Systems of systems (5 papers)
- Risk analysis (6 papers)
- Water (6 papers)
- Stakeholder analysis (7 papers)
- Energy (7 papers)
- Systems architecture (15 papers)
- Decision-making (16 papers)
- Optimization (25 papers)
- Frameworks (25 papers)

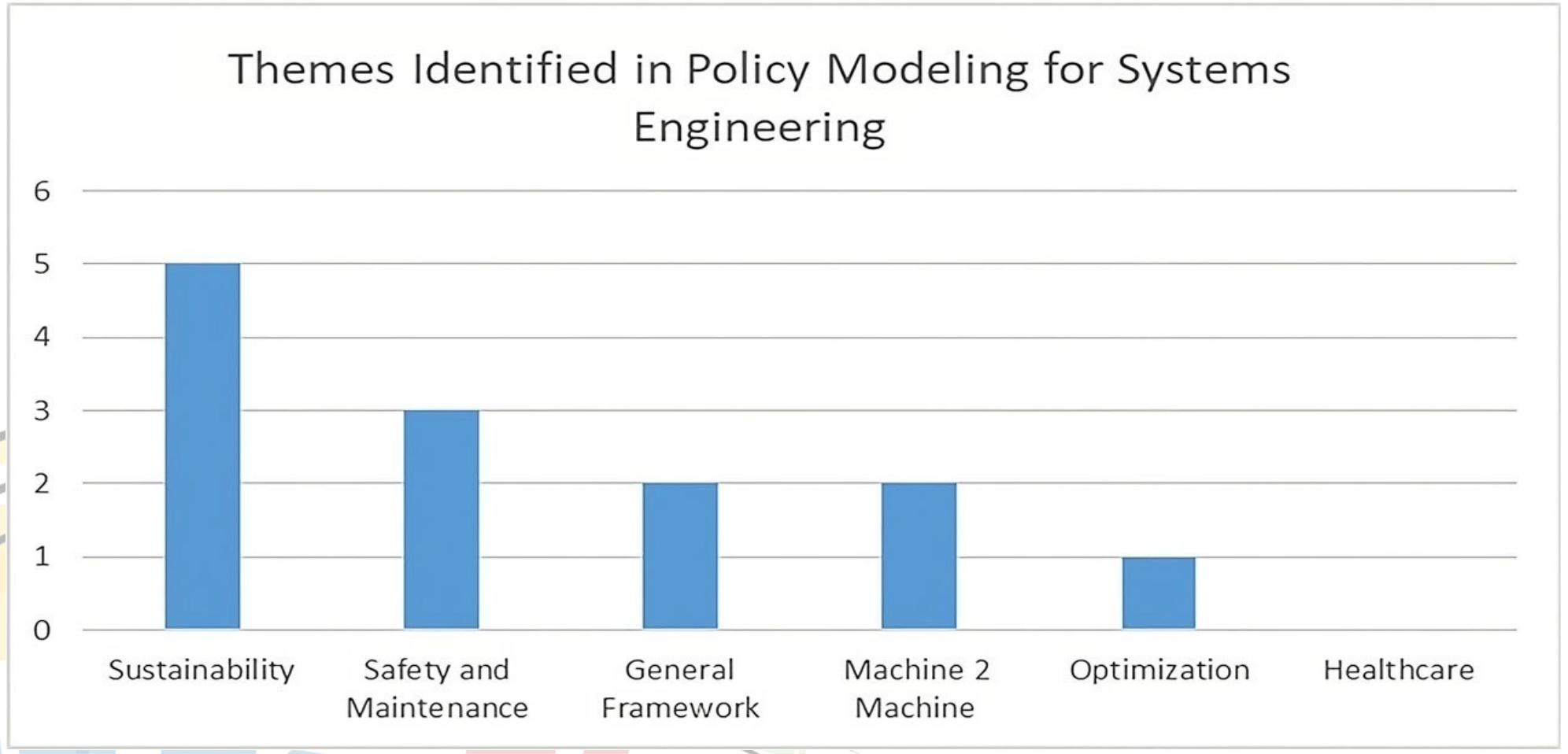
Themes Identified In Systems Engineering for Policy Modeling



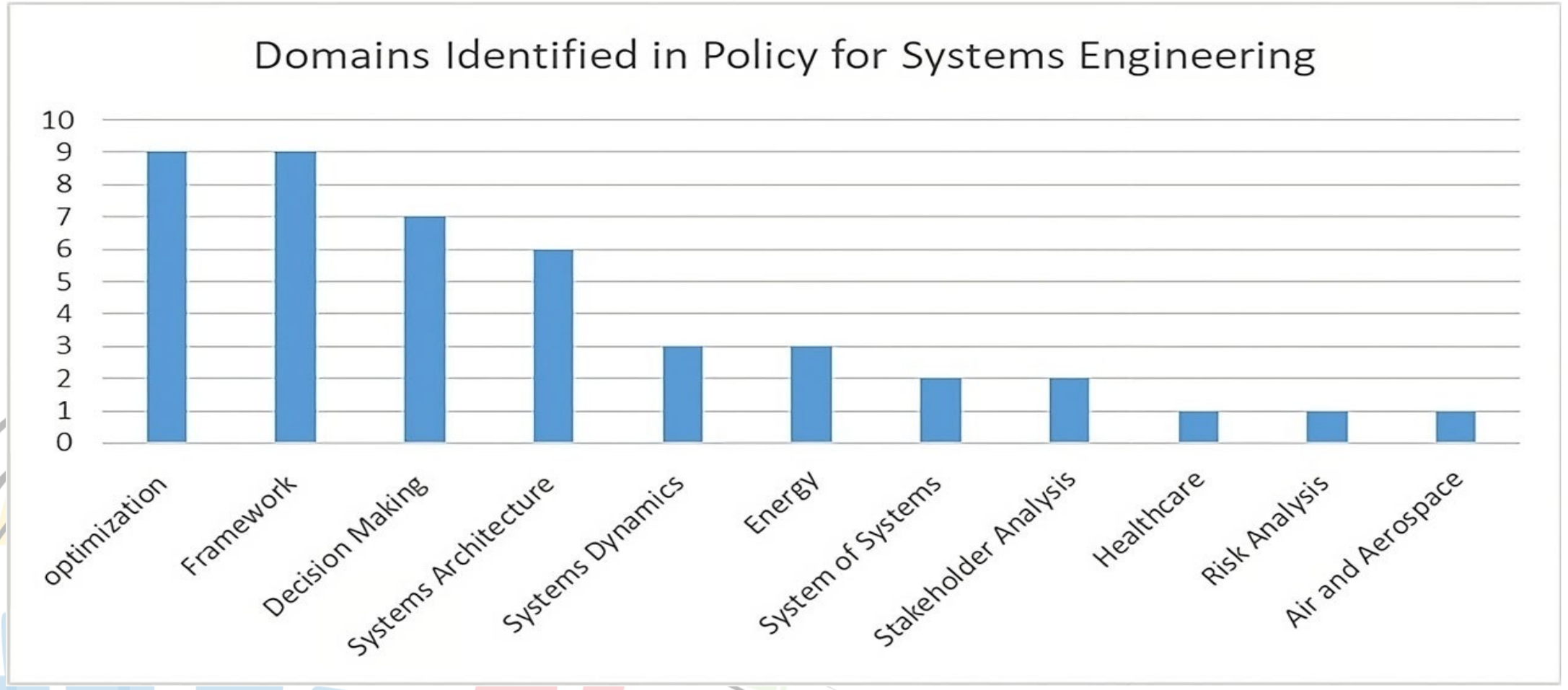
Framework has the Highest Representation



Sustainability has the Highest Representation



Optimization has the Highest Representation



Results

- Research Landscape at the Intersections of Policy Modeling and Systems Engineering
- Sustainability, Frameworks and Optimizations
- More Research is needed to support INCOSE vision 2035

Questions ?