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GKI-SDG: Geospatial Knowledge Infrastructure & Sustainable Development Model

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Abstract: *This paper illustrate GKI-SDG Model. The* ***Objectives:*** *To understand the Geospatial Knowledge Infrastructure, Digital Transformation and Sustainable Development Goals, In addition integrated Digital Transformation and GKI.* ***Importance****: To Support the Decision support and Decision Makers.* ***Methodology:*** *Analysis, Design, and implementations. GKI-SDG: its modern conceptual technology for develop our world. Throw three sectors: Society Sectors, Economic Sector, and Environment Sectors. In addition principles of Digital Transformation and Package Technology of Geospatial Technology. In this study we are build the new methodology and after apply this methodology we develop the modern model for GKI-SDG, GKI-SDG Model contain five phases: GKI-SDG Sectors, GKI-SDG Domains, GKI-SDG Elements, GKI-SDG Technology, GKI-SDG Applications, 4th Industrial Revolution technologies.*

Keywords: *AI, IoT, Data Cloud. Geographic Information System, Remote Sensing.*

1. Introduction

Geospatial Knowledge Infrastructure & Digital Transformation Model

1.1. GKI: Geospatial Knowledge Infrastructure Definitions

GKI is an infrastructure to integrate geospatial approaches, data and technologies into the wider digital ecosystem. In so doing it delivers the location-based knowledge, services and automation expected by economies, societies and citizens in the 4IR age.

Table 1: *SDI:Spatial Data Infrastructure & GKI:Geospatial Knowledge Infrastructure*

	SDI:Spatial Data Infrastructure	GKI:Geospatial Knowledge Infrastructure
1.	Data-centric	Analytics-centric (fit for analytics data)
2.	Centralized system	Distributed system
3.	Desktop/web-portal	Distributed cloud-based
4.	2D representation	4D/5D representation
5.	Supply-centric	Demand-centric (user-centric)
6.	Static data	Dynamic data with wide range of data
7.	Limited data range	Non-spatial users as well
8.	Professional users only	Intelligent search
9.	Linear and independent	On-the-fly data analysis, Predictive modeling
10.	Government	Government, industry and citizens

Also there are many research discuss the GKI as: [1],[2],[3],[4],[5],[6],[7],[8] ,[9] in addition in the geospatial fields [10], [11], [12], [13], [14] , [15], [16], [17], [18], [19] , [20], [21], [22], [23], [24] , [25], [26], [27], [28], [29], [30], [31], [32],[33],[34]. [35],[36].

1.2. GKI-SDG Goals

GKI-SDG Goals:

1) Collecting and classifying data, information and knowledge for the sustainability of society, the economy and the environment.
2) Design and implementation Sustainable Development Geodatabase development and Storage in GIS Data Cloud.
3) Enables the knowledge infrastructure of geospatial technology, with the addition of technology that supports digital transformation.
4) Analyzing, sharing and applying data, information and knowledge to the sustainable development goals
5) Raising awareness to contribute to geospatial knowledge in sustainable development

1.3. GKI-SDG Principles

GKI-SDG Principles: Knowledge is the focus, Predictive, Be led by users, Take achievable actions now, Agility, Decentralized, Collaborative.

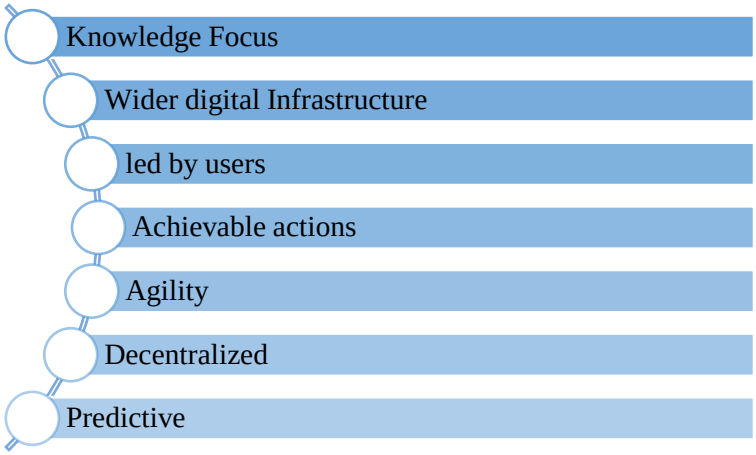

Figure 1 : GKI-SDG Principles

1.4. GKI-SDG Elements

GKI-SDG Elements: **Element 1**: Integrated Strategies & Polices Framework**, Element 2**: Geodatabase & GIS data Cloud, **Element3**: Partnerships and Collaboration, **Element 4**: SDG Leadership, **Element 5:** Applications, Analytics and Modeling, **Element 6**: Geospatial Dimension to the Digital Transformation Infrastructure.

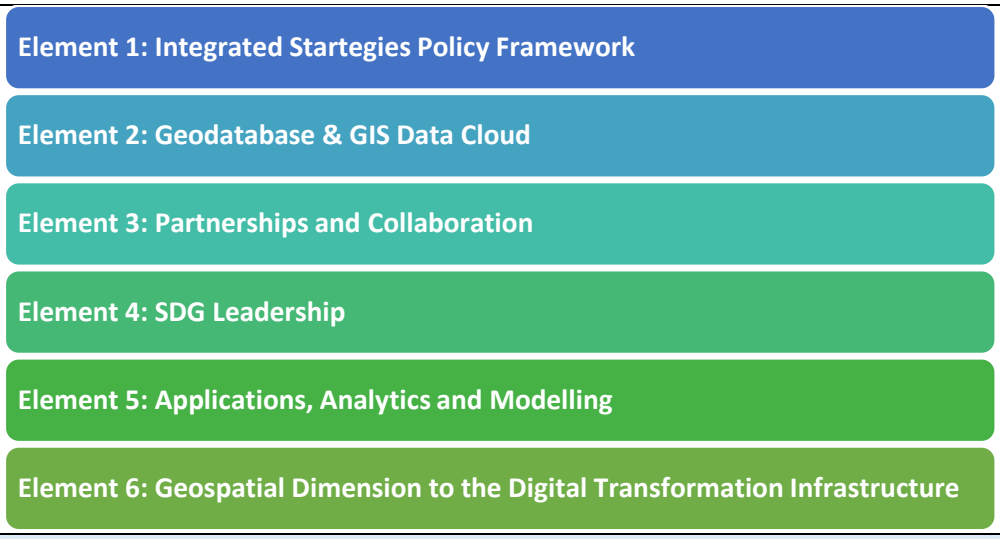

Figure 2 : GKI-SDG Elements

1.5. The Knowledge Management Cognitive Pyramid

The Knowledge Management Cognitive Pyramid demonstrates the relationship between data and knowledge.

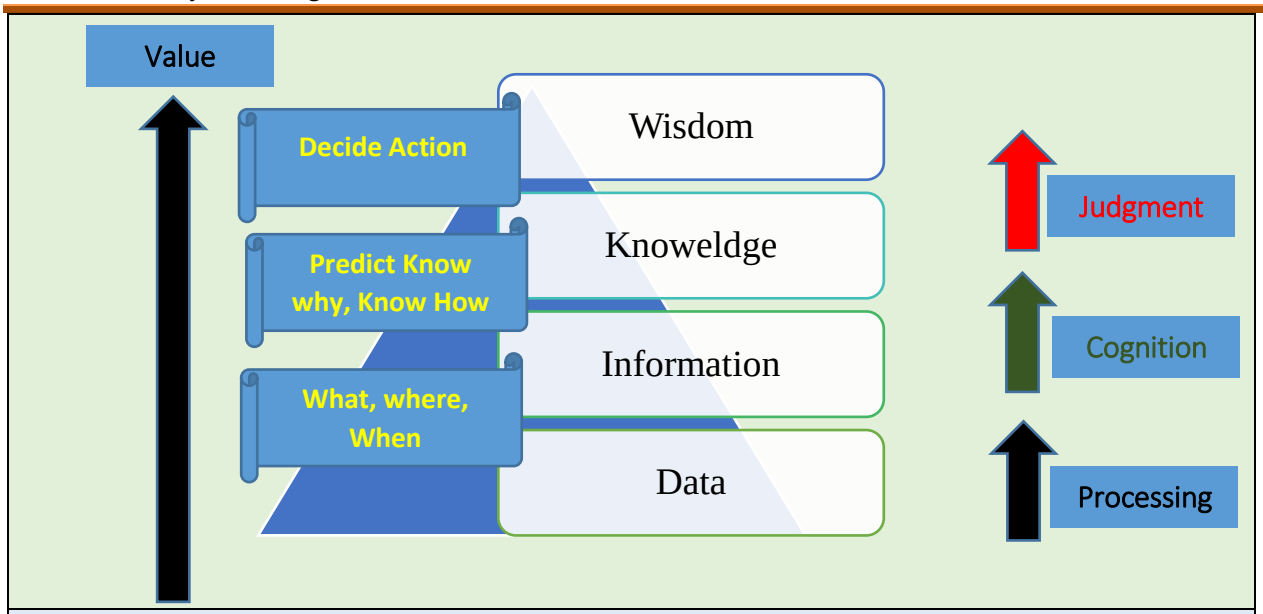

Figure 3 : The Data Information-Knowledge-Wisdom (DIKW) pyramid

1.6. Digital Transformation

In 2017, the Organization of Economic Cooperation and Development (OECD) launched a new global project –"Going Digital: Making the Transformation Work for Growth and Well-being". Its goal is "to help policymakers better understand the digital transformation that is taking place and create a policy environment that enables their economies and societies to prosper in a world that is increasingly digital and data-driven" (OECD, 2018) [37]. There are many definitions for Digital Transformation, There are many research discuss the digital transformation strategies [38], [39], [40], [41].[42], [43], [44], **[45], [46].**

Table 2: Digital Transformation Definitions

Source	Definition
European Commission (2019)[47]	"Digital transformation is characterized by a fusion of advanced technologies and the integration Of physical and digital systems, the predominance of innovative business models and new processes, and the creation of smart products and services."
OECD (2018)[]	"Digital transformation refers to the economic and societal effects of digitization and digitalization. Digitization is the conversion of analog data and processes into a machine-readable format. Digitalization is the use of digital technologies and data as well as their interconnection which results in new or changes to existing activities.
Ismail, Khater, and Zaki (2017)[48]	[Digital transformation is a] "process through which companies converge multiple new digital technologies, enhanced with ubiquitous connectivity, with the intention of reaching superior performance and sustained competitive advantage, by transforming multiple business dimensions, including the business model, the customer experience (comprising digitally enabled products and services) and operations (comprising processes and decision-making), and simultaneously impacting people (including skills talent and culture) and networks (including the entire value system)."
Schwertner (2017)[49]	"The application of technology to build new business models, processes, software and systems that result in more profitable revenue, greater competitive advantage, and higher efficiency.
Deloitte (2018)[50]	"Digital transformation is the use of technology to radically improve the performance or reach of an organization. In a digitally transformed business, digital technologies enable improved processes, engaged talent, and new business models."
Bloomberg (2018)[51]	"Digital transformation requires the organization to deal better with change overall, essentially making change a core competency as the enterprise becomes customer-driven end-to-end. Such agility will facilitate ongoing digitalization initiatives but should not be confused with them."

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1.7. Digital Transformation Domains

Five Domains of Digital Transformation Customers, Competition, Data, Innovation, and Value. [47].

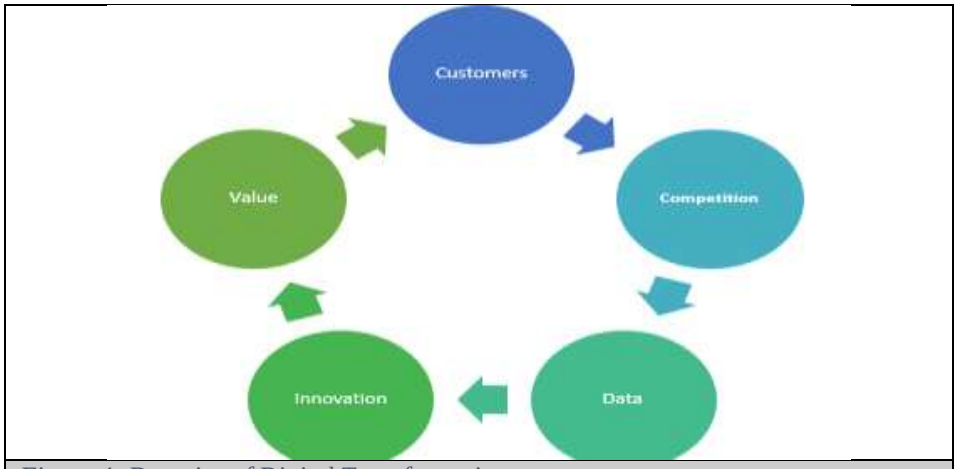


Figure 4: Domains of Digital Transformation

1.8. Digital Transformation Technologies

Today, new digital transformation technologies are emerging, existing technologies are strengthening- the concept of digital transformation.

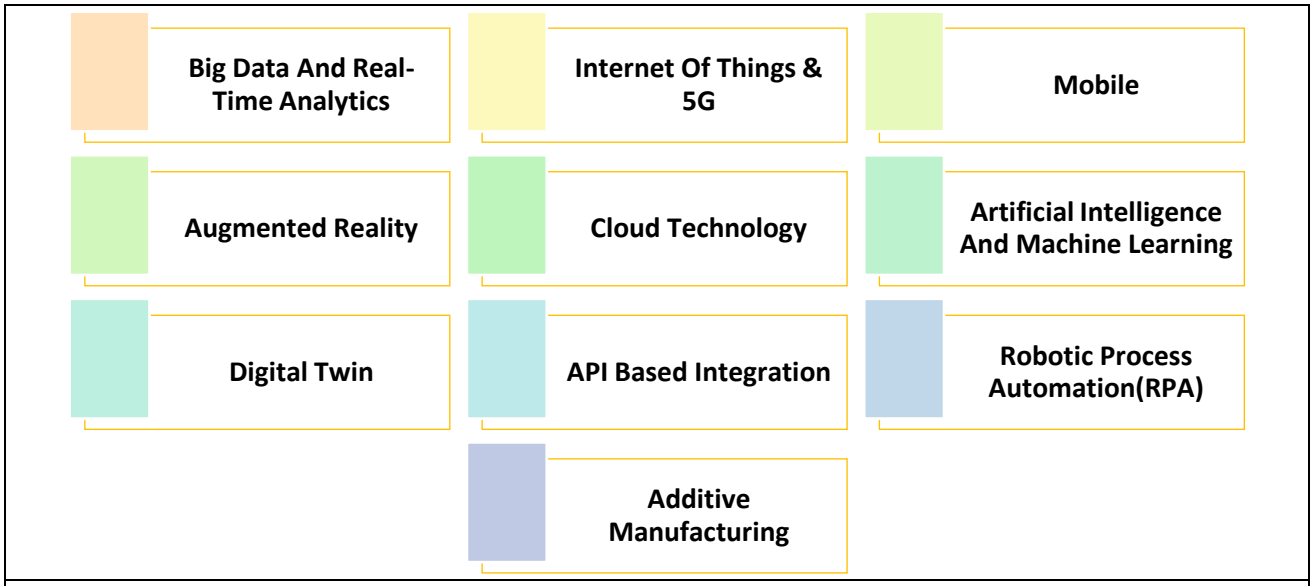


Figure 5: Technologies of Digital Transformation

2. Methodology

GKI-SDG: Model have three stages to build this model: Stage1, Analysis. Stages2, Design. Stage3, Implementation.

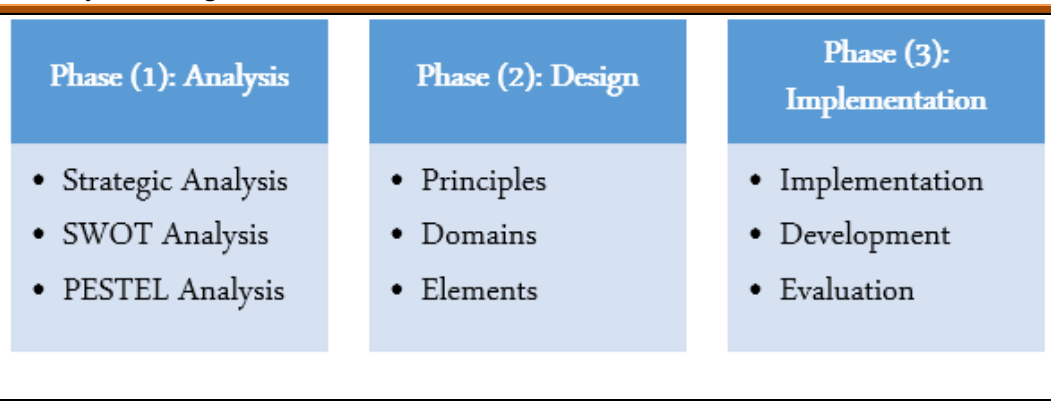
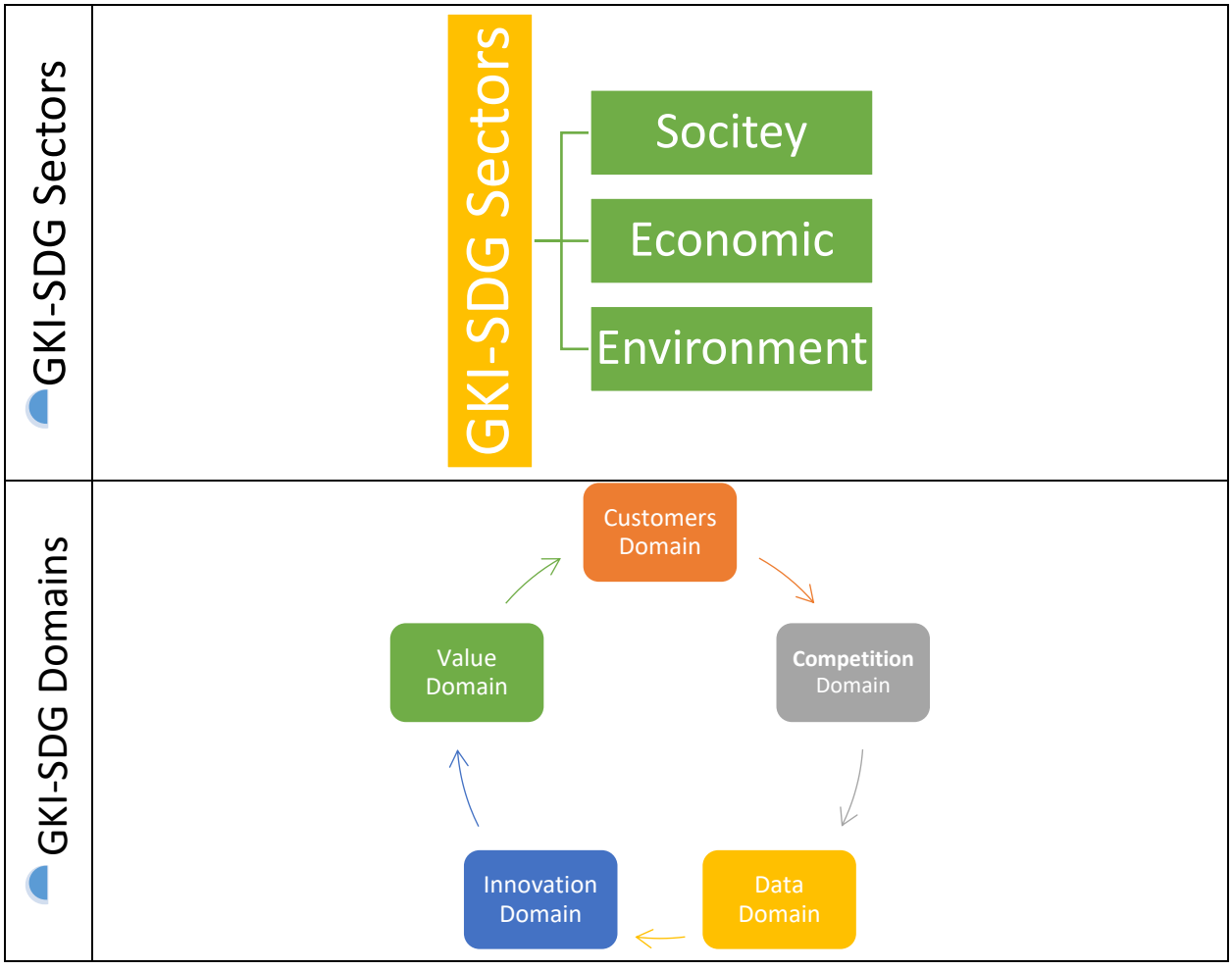


Figure 6: GKI-SDG Methodology

3. Results & Discussions

GKI-SDG: its modern conceptual technology for develop our world. Throw three sectors: Society Sectors, Economic Sector, and Environment Sectors. In addition principles of Digital Transformation and Package Technology of Geospatial Technology..



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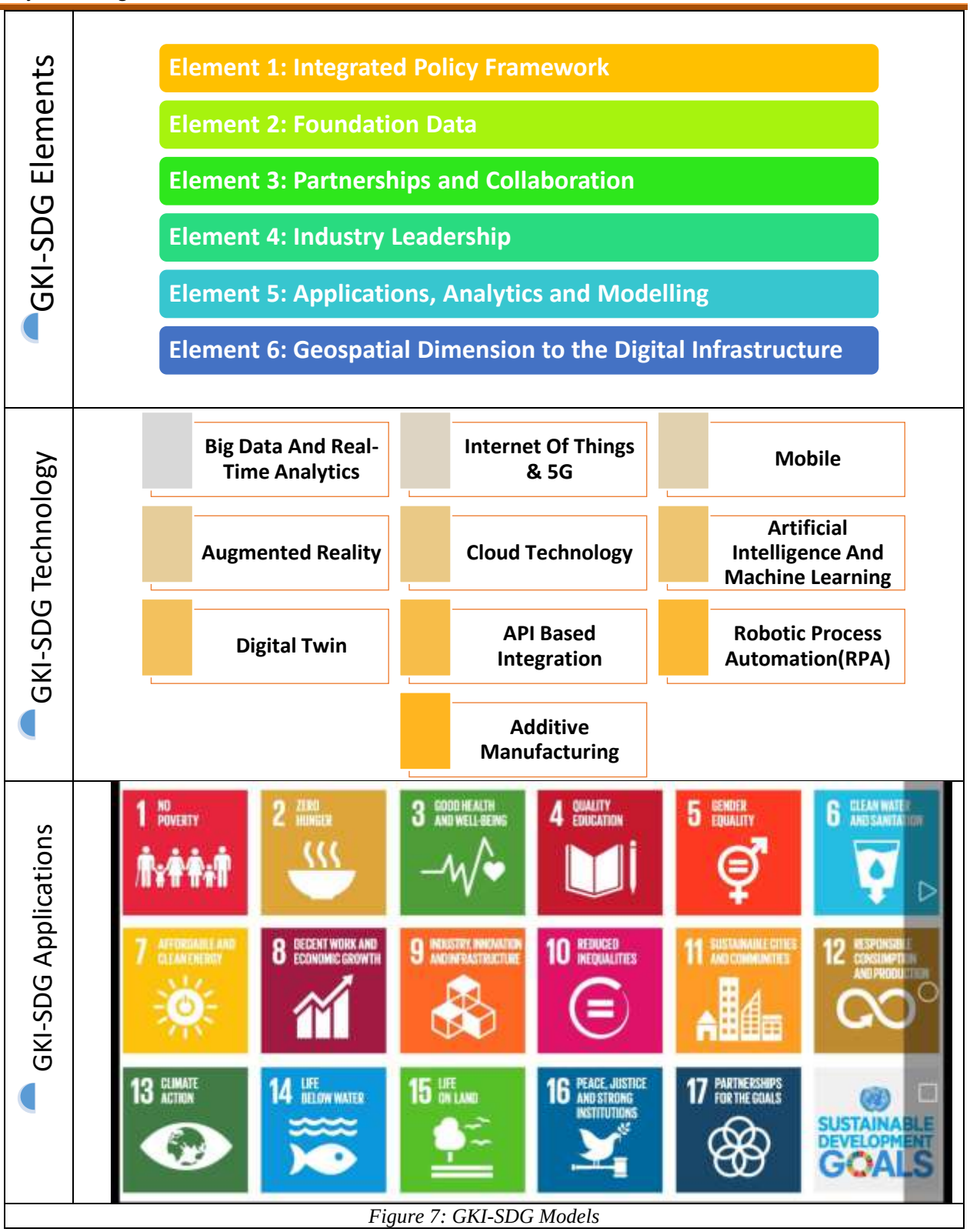

Figure 7: GKI-SDG Models

4. Conclusions

In this study we are build the new methodology and after apply this methodology we develop the modern model for *GKI-SDG*. *its* contain five phases: GKI-SDG Sectors, GKI-SDG Domains, GKI-SDG Elements, GKI-SDG Technology, GKI-SDG Applications

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