



## **SYNCHRONIC WEBFARE AND SUSTAINABILITY**

A Thesis Submitted in Partial Fulfilment of the Requirements  
for the Degree of Doctor of Philosophy in

### **CU.4 Theories, Institutions and Cultures**

Obtained in the framework of the Doctoral Programme of  
National Interest in Sustainable Development and Climate  
Change



by

**Pauldin Lawrence**

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**Supervisor: Prof. Maurizio Ferraris**

## **ABSTRACT**

The primary ambition of the thesis is to formulate a theory of digital hermeneutics for ensuring a sustainable use of digital data for socio economic progress. With that ambition the thesis first formulates a theory of social sustainability and then a digital hermeneutics. It also proposes some concrete methods by which the theoretical proposals conceived by the thesis, while surveys through the possibilities of Digital Public Infrastructures (DPIs). The thesis, essentially, advances a framework for digital hermeneutics that interprets digital data as a social object carrying both semantic and syntactic meaning. Departing from conventional views that privilege semantic content, it emphasizes the syntactic dimension—arising from the documental nature of digital data—as essential to understanding its role in constituting social reality. Drawing on Maurizio Ferraris’s documental theory of social reality, the proposal situates digital data within the ontology of documents, where the syntactic structure of data enables the formation and persistence of social objects. The prevailing discourse often neglects this aspect, reducing digital data to mere carriers of meaning rather than active components of social existence. The study reconsiders digital hermeneutics by, first, examining its various interpretations across disciplines; then, clarifying the

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role of documents in shaping social reality; next, demonstrating why digital data should be treated as documental entities; and finally, proposing a model of digital hermeneutics that unites both semantic and syntactic dimensions to better account for the social significance of digital data.



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## **INTRODUCTION**

The advent of digital technologies has created both positive and negative disruptions in various walks of human life. Humankind has used various kind of technology from time immemorial, ranging from stones or wood pieces to crypto or spaceships. The relation between humankind and technology is reciprocal in a way that both mutually influence each other. Human beings use technology to fulfill their needs, while technology on their turn instill in human beings new types of need. Therefore, technology is not just instrumental for human beings, but something that has ontological shades to it.

The disruptions caused by the advent of digital technologies should be understood in this context. Digital technologies are not an exemption for the close connection between human beings and technology. Moreover, it is an instantiation that proves the mutual influence between human beings and technology. Unlike other technologies, the use of digital technologies produces more

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immediate and visible effects. More the number of people using digital technologies of various kinds to access goods and services, more would be vivacity of human-technology relation.

The at homeness for humankind with technology would lead to the rise in the use of digital technologies in the future. While this rise has several positive consequences, it becomes necessary not let the negative consequences to outpace them. A correct reading of the history of technology demonstrates that there has always been certain drawback to all sort of technological innovation. It does not necessarily mean that technology is bad per se or is something which does not belong to human nature. Instead, it encourages to cautiously look out for ways by which tame new technologies for the best of humanity. A fear mongering attitude that demonizes technology as something blurs human nature would offer little in this cautious taming of technology. At the same time, it would never manage to separate the use of technology from human nature.

Technologists innovate technologies that address various kinds of human needs. Their innovations are incentivized through investment from diverse sources. The technologies that best suits the need survive in the long run till they are replaced by better

ones. However, the technologies that turn out successful fulfilling the human needs may not necessarily benefit everyone in the society. As in several cases, the oppressed, the marginalized and the downtrodden may be left behind. These three terms are contextual: a financially well off, old age person may not be marginalized economically, but the particular individual could be marginalized in terms of his inability to use digital technology to carry out his needs. Therefore, the work of technologists should be complimented by experts from social and human sciences for rendering them effective.

A good way for social sciences for collaborating with STEM subjects would be reflecting on the principles of social sustainability. The discourse on sustainability has gathered unprecedented momentum in the past decade. The social sustainability pillar of such discourses wide opens the door for a constructive interaction between human sciences, social sciences and STEM subjects. The touchstone for understanding the goodness of a technology is the positive effects it produced in the society. If technology can address current social problems while catering to both individual and collective needs, it can be considered as something as an instance of social sustainability.

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However, there is a lack of consensus among scholars on understanding of social sustainability. There are several studies on the topic, and corresponding definitions that works in various contexts. The first chapter of this thesis surveyed on such studies, and historical background of the concept 'social sustainability,' to come up with a definition for it. The construction interaction between various disciplines in terms of social sustainability requires an inclusive definition. At the same time, it has sought to draw inspiration from established economic theories in order to make it more practical in diverse contexts. Several theories on social sustainability becomes detached from measurable methods of social welfare. The definition proposed in the first chapter seeks to overcome this drawback. Therefore, the first chapter creates a theoretical framework for the most possible space for practical application in the context of social sustainability.

Social sustainability conceived in this thesis is adaptable for any sector for the management of the resources belonging to it. Digital technologies as a sector can make use of these principles for managing the newly found resource – digital data. But there are several impediments that prevents the use of data according to the principles of social sustainability discussed here. Evidently, the novelty of this new resource comes with the lack of studies on

the it. Consequently, there are several misconceptions about digital data.

The second chapter of the thesis discusses a digital hermeneutics that addresses these misconceptions. Hermeneutics is the branch of study which deals with interpretation of various objects ranging from texts to personhood from a philosophical perspective. Digital hermeneutics has emerged from this branch for interpreting digital objects and digital spaces. The theory of digital hermeneutics discussed in this thesis interprets digital data to provide a holistic understanding of it. The misconceptions surrounding data stems from the partial understanding of it.

The digital hermeneutics proposed in this thesis investigates the social and philosophical aspect of digital data. Although the term digital hermeneutics is used in various contexts in the backdrop of new digital technologies, this thesis limits the scope of the term in reference to interpretation of digital data. It investigates the social value of digital data for a holistic interpretation. The ontology of data remains obscure most often due to the partial understanding of data as information. Interpretation of data through the framework of social ontological theories will help understand the social aspect of data with more

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clarity. Although the disruptions created by data driven initiatives on society, the social dynamics has not been well studied.

The thesis proposes the concept of concept of social good in this context. Goods and services have been categorized as private, public, or common in the context of their exchange. Digital data does not fit into any of these categories given its peculiar social nature. On the basis of the social ontological theory *documentality*, this thesis conceives the category of social good as a compartment where data fits in. This classification is necessary to ensure the management of digital data in a sustainable way.

The conception of digital data as a social good permit its governance according to the principles of social sustainability stipulated in this thesis. The current understanding of digital data as information makes the use of data for socio-economic welfare difficult. Governments and institutions have struggled to overcome this problem by constructing and deconstructing rules around digital data. Many of such attempts did not succeed due to lack of understanding of the social nature of data. The conception of digital data as a social good captures the social nature of data, and therefore facilitates its sustainable management and governance.

The third- and fourth-chapter surveys through a more practical application the conception of digital data as a social good. On their way for the best possible way of valorisation of digital technologies, governments in partnership with private stakeholders came up with the initiative of digital public infrastructure (DPI). DPIs, similar to the legacy infrastructure, are the facility constructed for the exchange of goods and service that benefits people. The practice of using DPIs for value creation from digital technologies has made the social value of data clearer. The construction and use of DPIs for using digital technologies is a practical paradigm that proves the theoretical arguments provided in the first two chapters.

A more concrete version of this practical paradigm is offered in the fourth chapter. While the third chapter discusses DPIs and their social ontological and philosophical underpinnings, the fourth chapter studies one of the mature DPIs of this century – the India Stack. India Stack is the DPI developed by the Government of India in partnership with private organizations. They sought to develop an open source, interoperable, and scalable digital infrastructure that best deliver the benefits of digital technologies to its population. The components of the DPI, and the principles of its governance were designed to include the most possible number

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of members of the society. Consequently, it managed to put in place a socially sustainable model of governance and use of digital technologies.

The case study of DPIs in general and the India Stack in particular does not contain any explicit remark on digital data as a social good. The novelty of considering data as a social good belong exclusively to this thesis. The case studies support the theoretical arguments of the first two chapters. At the same time, the digital hermeneutics that gives birth to the concept of social good can be used to make the ever-evolving sector of DPIs better.







# ***CHAPTER 1***

## **SOCIAL SUSTAINABILITY REEXAMINED**



Social sustainability was a concept relatively ignored during the initial phase of the discussions on the concept of sustainable development, although its precepts were perennially present throughout human history. The past two or three decades has witnessed the concept of social sustainability coming to light after being eclipsed by the discourses on environmental and economic sustainability. Both academic and non-academic interests on the topic have led to the creation of a rich literature on its theoretical and practical aspects. However, they are scattered depending on the basis of the emphasis or priorities of the stakeholders who formulated them. On this context, this chapter surveys through such literature to propose a relatively universal definition of social sustainability.

The chapter is divided into three main sections with subsections within. The first section is a survey to understand the state of art of the theme social sustainability. It initially consults some historical and theoretical aspects of social sustainability before identifying the three common factors – equity, participation, multi-pillar approach – present in most of the major discourses on social sustainability. The second section proposes a social ontology based

on human need satisfaction and explicate benefits of using the capability approach (CA) proposed by Amartya Sen for addressing the question of human need satisfaction and well-being. The primary motive for human beings to come together to form a society is to realize their various kinds of needs, and therefore it is necessary to address this ontological aspect society for conceiving any theory of social sustainability. The first two sections are the premises for the third section where a definition of social sustainability is advanced. The third section begins by observing some of the drawbacks with current definitions of social sustainability. Later, it proposes a definition that seeks to avoid such drawbacks, and further, it elucidates a concrete case of application the concept of social sustainability proposed in this chapter.

## **1. SOCIAL SUSTAINABILITY**

The concept of social sustainability has been perennially present in human history. As the following section elucidate, it is connected with the concept of welfare of people. People live in societies for having better ways of need satisfaction that increase their gross welfare. Therefore, it is desirable to reflect on society,

welfare and social sustainability before reflecting on the concept of 'welfare.'

### **1.1 History of Social Sustainability**

It is impossible to think about social sustainability without stating of the basic understanding about on which this thesis is based on. There are several theories in the field of social ontology that have consulted the theme. Some of them are discussed in the section x, while here a basic summary is outlined. Human societies emerged when human beings as a species started to live in group recognizing that their survival rate is higher when lived in groups than in individual isolation. The satisfaction of the varied needs of them is the reason for them to exist in groups. As the Aristotelean observation goes: "men come together in cities for security; they stay together for good life." Therefore, they continue to live in groups, and the protection of the group slowly become an imperative for the species. However, the nature of needs and their satisfaction changed over time. Consequently, it is necessary to look at the various phases of history of social sustainability is necessary.

The history and evolution of the term "social sustainability" can be examined through a threefold categorization: its

omnipresence throughout human history, interventions by international organizations, and contributions from other social groups and individuals. The concept of sustainability, understood as the capacity of humans to live in the present while considering future generations, has been intrinsic to human existence. Historical records of ancient civilizations, such as those in India, Australia, South America, Egypt, Europe, and the Middle East, illustrate this long-term planning nature of human beings.

In ancient India, the Panchayat system, conceptualized under the political thinker Kautilya, implemented a bottom-up administrative model to ensure participatory governance, fostering social sustainability (Kautilya, 1915/4th BC). The Inca civilization employed a kin-based agricultural system, the Ayllu, ensuring equitable resource distribution among all societal members (Murra, 1980). In Egypt, centralized grain storage and redistribution during famines showcased organizational resilience in addressing social needs (Kemp, 2006). Ancient Greece's Agora spaces were the foundation of democratic processes, providing an inclusive platform for civic engagement (Hansen, 1991). The Mesopotamian Code of Hammurabi protected vulnerable groups such as widows and orphans, reflecting an early form of social justice (Bottéro, 1992). Similarly, Australian Aboriginal 'dreamtime stories'

reinforced community cohesion and transmitted social values (Rose, 1996). These examples show that populations placed importance on long term social organisation from their very beginning, and in some way or other addressed the fundamental human needs, ranging from life sustenance to self-esteem and freedom.

The 20th century marked a new phase for social sustainability, characterized by more systematic and theoretical discussions largely led by international organizations. Unlike ancient practices, which implicitly contained the idea of social sustainability or sustainability, modern discussions explicitly framed it as a distinct theme. This shift was driven by global crises like the rise of economic inequality, social conflicts, social injustices etc... that demanded a rethinking of development paradigms. Beginning in the 1960s, institutions such as the United Nations and the World Bank initiated projects integrating sustainability principles. The establishment of the United Nations Research Institute for Social Development in 1963 marked a pivotal moment, setting the stage for further milestones like the 1972 Stockholm Conference on the Human Environment. The 1987 Brundtland Report (WCED, 1987) provided the seminal definition of sustainable development, emphasizing the balance between

meeting the needs of present generation without compromising future generations' ability to meet their needs.

Likewise, the World Bank's contributions to social sustainability include the formation of the Social Development Unit in 1989, which advanced the "people first" agenda (Cernea, 1991). Policies like the Indigenous Peoples Policy and the Information Disclosure Policy further underscored inclusivity and transparency. Initiatives such as the Comprehensive Development Framework, Poverty Reduction Strategy Papers, and Millennium Development Goals are among the systematic approach to promote social sustainability. More recent projects, such as the Governance and Anti-Corruption Strategy, Human Capital Project, Strategic Framework for Mainstreaming Citizen Engagement, and the Green, Resilient, and Inclusive Development (GRID) strategy, continue to emphasize inclusion, cohesion, and accountability. Similarly, the United Nations' Commission for Social Development has played a vital role in advancing these principles (UNDESA, 2021).

Other global bodies, such as the Organisation for Economic Co-operation and Development (OECD), have contributed by promoting policies aimed at achieving sustainable economic growth and improving living standards. In 1980, the International

Union for Conservation of Nature released the World Conservation Strategy, further bridging ecological and social sustainability (McKenzie, 2004). Corporate frameworks like Corporate Social Responsibility (CSR) and Environmental, Social, and Governance (ESG) indicators also exemplify formal efforts to align organizational practices with sustainability goals.

The third category – various social groups and individuals – focuses on non-governmental organizations, grassroots movements, and intellectual currents that have enriched the discourse on social sustainability. Ecofeminism, for instance, highlights the intersectionality of environmental and social issues. Vandana Shiva's work underscores how patriarchal structures harm both women and the environment, advocating for their liberation as a pathway to sustainability (Shiva, 1989, 1993). Eco-socialists like John Bellamy Foster emphasize resource redistribution to achieve ecological and social equity (Foster, 2000), while Michael Löwy criticises green capitalism, and advocate for systemic alternatives (Löwy, 2015). Joel Kovel suggests collaboration between labor and environmentalist movements to forge sustainable pathways (Kovel, 2007).

Indigenous movements have also revitalized discussions on traditional ecological knowledge. For instance, scholars started researching on the indigenous practices align with sustainability principles and promoted them (Berkes, 2008). Examples include the Zapatista Movement in Mexico, which integrates indigenous knowledge into contemporary resistance strategies (Esteva and Prakash, 1998), and the New Zealand concept of Kaitiakitanga, emphasizing guardianship of natural resources (Smith, 1999). Such movements underscore the vital role of cultural and traditional practices in sustaining both ecological systems and social cohesion.

Human efforts to thrive on Earth, as manifested through various inventions, theories, and social systems, have often aimed for long-term sustainability. However, current ecological, economic, and social crises reveal the shortcomings of past models. For instance, the global economic system, despite the lessons of the 2008 financial crisis and the like, continues to exhibit vulnerabilities. This realization underscores the need for a deeper understanding of historical and contemporary approaches to social sustainability to build more resilient and inclusive systems for the future.

## **1.2 Theorization and Conceptualization of Social Sustainability**

As the international and the national organizations, nation-states, and other stakeholders have increasingly turned their attention to social sustainability, the theorisation of the subject matter gained momentum. Landmark literature in this domain can be categorized into two primary groups: 1) literature that focuses exclusively on social sustainability as a concept; 2) literature that addresses social sustainability while exploring related issues.

Within the first category, the description provided by the World Bank serves as a foundational reference. According to the paper (Barron et al. 2023), social sustainability is marked by social cohesion, social inclusion, resilience, process legitimacy, and occurs when individuals feel engaged in the development process and believe that their descendants will benefit from it. The absence of these traits makes members of any particular society skeptical about their membership in it. It is necessary for members to be involved in deciding the working of the society and felt as their concerns are addressed sufficiently. Stable and long-term administrative regimes all over the world as managed to be responsive to the voices of the members for whom they were

created for, and the stability of regimes where under threat when they failed to address the concerns members. The participatory aspect of social sustainability allows members to believe that the society will be structured in a way that their descendants will also enjoy the same advantages as them. Similarly, McKenzie (2004) describes social sustainability as both a 'life-enhancing condition' and the 'process' to achieve such a condition. It calls for the participation of the members to curate sustainable societies. Curation of sustainable societies is not only a concern of the present generations but also of the future generation. Involvement of community members in making sustainable societies deliver both the objectives. Further, the term life enhancing condition offers spaces to include environmental and economic sustainability which are essential for a holistic approach towards sustainable development. The intrinsic connection between the three aspects implies that ignoring one of them would result in an imbalance in sustainable development dynamics in general. Social sustainability may not be achieved in the absence of attention towards the environment and economic pillars of sustainable development. Evidently, as Polése and Stren observed as part of the UNESCO's MOST (Management of Sustainable Transformation) the success of social policies is at large determined by factors like governance,

cultural policy, infrastructure (services), housing, transport, and employment (Polése and Stren, 1999). The presence of sufficient infrastructure, and at the same time equitable access to it is a necessary condition to achieve sustainable societies. The concept of equity is not limited to current generations but also to the future generations (McKenzie, 2004). Littig and Geibler (2005) offers a more nuanced vision on sustainable development from the three-pillar perspective. They conceptualize social sustainability as a state where society is organized to meet human needs while preserving the ecosystem, emphasizing on normative claims such as social justice, human dignity, and participation. Although they give particular attention to environmental sustainability, they do not see it as something detached from social and economic. Consequently, the document tries to conceptualize indicators that measure economic factors like labour, equity, income distribution and their effects on the ecology. Eizenberg and Jabareen (2017) propose a conceptual framework for evaluating social sustainability based on equity, safety, eco-prosumption, and urban forms. The positive and negative consequences of development is not equitably distributed among various populations. Planned and calculated interventions are necessary to balance between this distribution of positive and negative consequences of

development. This would help in solving several forms of social injustices existing in the society. They try to collaborate both physical and abstract spaces to track the theme of social sustainability by taking into consideration the urban forms and eco prosumption. Social sustainability cannot be realized if the economic and environmental resources are not equitably distributed among the members of the society. Rasouli and Kumarasuriyar (2016) identify macro- and micro-level factors, including the fulfillment of basic needs (e.g., food, shelter, and health) and assurance of quality of life and equity. The macro and micro level-based approach towards social sustainability essentially aims to bring together the economic and environmental aspects of sustainable development. One among the fundamental reasons for the inequitable distribution of the positive and negative consequences of the industrial revolution happened in the 1960s and 1970s is the separation of the three pillars of sustainable development. Institutional interventions on both micro and macro levels are would render societies more sustainable. However, the metrics that are included in under the micro and macro distinction is not universal since scholars have taken their own methods to enlist them. For instance, Spangenberg's list of marco level bucket consists of distribution of income and assets while the micro level

bucket consists of education, training, income, social contacts, communication and participation, social security (Spangenberg, 2004). Rasouli and Kumarasuriyar components of macro level consists of housing, food, clothing, health, sanitation. Meanwhile, the list of micro level is further divided into social, service, and governance under which various metrics useful to measure quality of life like social and cultural life, social homogeneity and cohesion, integration, diversity, sense of place, communication and participation, social justice and equity, social amenity, equity, social capital, access to good, education, training, equitable income, democracy, engaged governance etc.. are included. Murphy's (2012) comprehensive survey of academic and non-academic documents defines the 'social pillar' of sustainable development in terms of equity, awareness, participation, and social cohesion. The emphasis on the four factors allows to take a holistic approach towards sustainable development. The combination presupposes that both economic and environmental factor need to be taken into consideration for achieving social sustainability. For instance, the feature social cohesion could be at risk if an equitable distribution of environmental resource like river water or food supplies are not ensured to the members of the society. Similarly, in the economic front, an unequal distribution of

wages would threaten the social cohesion. The factor of equity has attracted special attention of Murphy and it is addressed in the most wider context possible. Equity is evaluated in terms of how advantages and disadvantages of the development is distributed among people, not just in various sections of a particular society but also between nations (developed and developing) or regions (global north and global south), or generations (inter-generational, intra generational, or transgenerational). An unequal distribution of the consequences of development is seen by the fact that the poor people, regardless of the global north or south suffers from the climate change issues. Developing countries further disproportionately suffer from the climate change since they may not have sufficient mechanisms to deal with it. Future generations also have a similar fate if the equitable modes of distribution is not put in place with a vision for them. Creating awareness about these issues are necessary to promote social sustainability. Awareness could be done by means of national and international organisations making intervention like developing projects, documents, education programs etc... for educating people. Similarly, 'ecological modernisation literature' can play significant role in achieving the same goal. A lack of awareness from the side of general public, businesses, and institutions would hinder the

attempts to tackle the issue of unsustainable social practices. A participatory approach towards is necessary to transform the awareness created among individuals and organization into concrete actions. A continuous engagement with stakeholders of respective sectors in evaluation their contribution to social sustainability would make sustainable development goals more realizable. The implementation of a sustainable development policy requires continuous monitoring and updating. Sufficient participation of all stakeholders would result in its smooth implementation as in the case of close engagement of government bodies with civil society result in the smooth implementation of various social policies. Murphy gives special attention to social cohesion, a factor which is relatively ignored in the discourses around social sustainability. The policy documents on the field tend to consider it as taken for granted if all other factors like equity, participation, or access to opportunities etc... are made available. However, a separate consideration would bring out a more nuanced version of the concept. Social cohesion entails several aspects like social interaction/social networks in the community, participation in collective groups and networks in the community, community stability, pride/sense of place, and safety and security. However, it remains unclear whether social cohesion is the result of social

sustainability or a condition to achieve it. This problem is considered in a detailed way in section three. Ahmen (2013) adopts a philosophical approach, employing Derrida's concept of deference to evaluate social sustainability. Vallance et al. (2011) propose three aspects of social sustainability: development, bridge, and maintenance, prioritizing both tangible and intangible human needs. Social sustainability is again placed in conjunction with environmental and economic sustainability although the methodology is different. Magis and Shinn (2009) identify themes such as human well-being, equity, and democratic governance as the defining factors of social sustainability.

The second category includes the works of scholars like Nicola Dempsey (2011) which highlights social sustainability as a 'dynamic concept' influenced by social equity, community interaction, and a sense of place. Somanath et al. (2021) provide a detailed list of scientific articles focusing on social sustainability in the built environment, emphasizing social equity and capital. Alghababsheh and Gallear (2022) while proposing measures to improving social sustainability in the supply chain sector, emphasis the participation of all the stakeholders involved to realising social sustainability. On a similar note, promotion of social sustainability in healthcare sector also requires the collaboration among all the

actors involved in the sector (Maghsoudi et al. 2020). Meanwhile, Wolff and Eshtrom (2020), in the context of education system, suggests that integrating the principles of sustainability into curricula would ensure the growth of social sustainability.

### **1.3 RECURRING COMMON THEMES**

#### **1.3.1 Equity**

Equity emerges as a recurring and fundamental theme in social sustainability. The principles that resemble social sustainability Kevin Murphy (2012) identifies equity and participation as essential components of the social pillar of sustainable development, emphasizing equitable redistribution as a precondition for individual development. The UN Commission for Sustainable Development (2001) and OECD (2009) highlight equity as a key social theme and in its organizing dimension, respectively. Equity's repeated appearance in literature stems from its role as a bridge between the environmental, economic, and social dimensions of sustainable development (Becker et al., 1999).

In the context of environmental sustainability, equity also addresses issues of economic restructuring and social injustice, as

evidenced by programs like forest certification processes (Klooster, 2010). Sachs (1999) notes that equitable income distribution and access to resources are characteristics of social sustainability. Similarly, intergenerational equity is significant as it ensures equal opportunities for future generations (Spangenberg and Omann, 2006). For example, the World Bank (2005) suggests that equity is positively correlated with long-term economic growth. Practical models, such as Australia's Social Sustainability framework (McKenzie, 2004), and empirical studies like Rocha's (2018) work on ecologically vulnerable groups, consider the role of equity as essential for sustainable development.

Equity in the context of social sustainability covers a wide spectrum of the fields including social justice, economic equity, global equity, environmental equity, equitable access to education and knowledge, healthcare and well-being etc.. Aristotle is among the early philosophers who had shared his views on the subject of equity while distinguishing it from equality (Aristotle, 350 B.C.E./1926). A good start-point to understand equity is to understand it in the context of resource distribution. It is the context where economic theory and philosophical reflection confluence. Equity entails the idea of distributing resources in proportion to the needs of individuals. The literature on equity

thereafter reflects this basic thought in diverse ways. However, the subjective nature of the concept of human needs become a hurdle in putting this basic philosophy into practice. One way to overcome the hurdle is to couple the concept of need with that of merit since the latter would decide a criterion for distributing the available resources. The solution sounds good in the sense that people would work to become meritorious in order to claim for the satisfaction of their needs. Nevertheless, the theoretical elegance of this proposal diminishes when confronted with practical cases. It leaves behind individuals who did not manage to attain merit even not because of their own fault and the already disadvantaged. Consequently, the gap between the rich and poor, both in terms people and nations, continued to widen in course of time. It is in this context that discourses in welfare economics gave way to non-welfare or well-being theories in implementing equity in human societies.

Nevertheless, a merit-based approach still enjoys its position under the guise of the kind of philosophy of growth in capitalist economies. The philosophy of growth in economics considers economic growth as an intrinsic factor that assures well-being of individuals, and this growth in turn, is measured in GDP. And most often, economic theory that sustain the philosophy of growth start

with the premise that the market is under equilibrium and that the market forces which permits the growth would usher wellbeing of the participants as well. Evidently enough, this premise is false as the fast-growing economies in terms of GDP fail to reduce the gap between the haves and have nots. The mistake here is to identify a good GDP rate with the general well-being of the economic agents and members of the society. Meanwhile, the economies that managed to channelize the benefits of economic growth to microlevel for enabling individuals to achieve merit and address their needs ensure improvement in well-being indexes. Interventions by strong institutions to promote equity has resulted in the general well-being of the individuals (Acemoglu et al 2012). Therefore, the satisfaction of needs based on the merit and the philosophy of growth are not intrinsically bad, but they have to be complemented with strong interventions to promote equity for ensuring general well-being of the individuals.

Although economic equity occupies large stage in the discourses centred around equity, it need not necessarily be the case. Equity applies not only to the just distribution of economic resources, but also to other resources like knowledge, healthcare, natural resources etc... though economics provide a good framework to measure and manage various kinds of resources. For

instance, consider the case of digital data. Digital data is heralded as one among the precious resources of twenty first century, and an apt paradigm to apply the reflections shared on the prior paragraphs. Big tech companies merited the ownership of vast of amounts of digital data resources since they discovered the technology and techniques for doing data driven business in the digital world. This merit has allowed tech companies to address their need – profit maximization. The enormous potential of the sector attracted large investments and created revenues contributing to the economic growth. However, it not only increased wealth disparity, but also led to socio-political imbalances. One among the reasons to these negative impacts is the fact that the access to the new resource or its possession was not equitably distributed. On the contrary, the models that managed to bring the sense of equity into the management and use of digital data has emerged as sustainable models.

The satisfaction of need based on merit thesis and the philosophy of growth won't usher the promised well-being for individuals and thereby society in general, if not fine-tuned with principles of equity. Even though the economic and technological growth continuous unhindered in the absence of equity, the ramifications it would create on the social fabric increases. Unequal

distribution of resources or unequal access to resources have been identified as a threat to social cohesion. It further creates unhealthy competition because people would feel that the resources are limited and their survival depends on its accumulation via whatsoever means. On the contrary, equity substitutes competition with cooperation. Equitable distribution of resources ensures people that their share in the pie of resources would be subjected to a final equitable redistribution regardless of the means through which they try to increase their share initially. This would enable people to engage in activities which offer them self-fulfilment via means of cooperation. Therefore, equity plays an instrumental role in protecting the society, whose fundamental quality include social cohesion.

Equity, in the context of resources, can be affronted in two ways – equitable redistribution of the value created from the resources, or creating systems that promote equitable access to the resources so that people can derive benefits from it. The latter is a better way since everyone will work to derive value from the available resources, and the former will not lament for being taken away their resources to be distributed to the 'lazy' people. The concept of equity in the context of social sustainability consists in realizing systems that allow equitable access to the resources.

Evidently, the prior sentence risks the fallacy of circular definition. But a conceptual clarity on the matter of equitable distribution of resources will be provided in the section two. The fundamental aim of this subsection is to point out that equity as an essential factor for implementing social sustainability, and underscore the idea that institutional intervention is necessary for balancing between a need based and merit based approach towards resource distribution.

### **1.3.2 Participation**

Participation refers to the involvement of individuals in deciding the nature of policies and policy implementations that decide their lives. The term appears time and again in the social sustainability literature. The UN Conference for Environment and Development (UNCED) 1992 in Rio and the UN document of (1993) emphasize the importance of participation in realising sustainable development. World bank identifies participation and transparency as one among the drivers of process legitimacy, and the latter is considered as an essential aspect of social sustainability (Barron et al. 2023). Bostrom after distinguishing the theoretical and procedural aspects of social sustainability, categorizes participation as part of the procedural aspect (Bostrom, 2012). Manifestly, social

policies that does not give adequate attention to the aspect of participation fails to get implemented or to produce the desired results (Casula Vifell & Soneryd, 2012). Any kind of hinderance to participation in social, economic, and political life will negatively affect the well-being of an individual (Pierson 2002; Ratcliffe 2000). Participation assumes such importance not only because it assures the translation of sociological theories into policy implementation (Littig and Grießler, 2005), but also, it promotes social learning that helps the people to 'internalise' the policies (Reed, 2008). Moreover, social participation is among the measurable indicators of social sustainability (Dempsey, 2009).

Among various concrete examples on the matter, the social participation driving a sustainable project to success is the case of the environmental plan of a Brazilian company comments attention (Devlin, Tubino 2012). All the stakeholders involved in the project, especially, the local people were given a say in deciding the destiny of the project. Policies of social progress that took the role of participation at face value has contributed to the reduction in conflict (Min et al. 2017; Fearon and Laitin 2012). In addition to the decrease in the amount of conflict, participation, foster an increase in social cohesion (Cuesta, Madrigal, Pecorari, 2022).

On the light of the above observations, participation is a desirable factor for the promotion of social sustainability. The philosophy of participation in the context of social sustainability is based on its capacity to promote trust among people and sense of belongingness. Recent studies show that trust index has go down significantly in the course of time. A fundamental reason for the erosion of trust between people, and between people and institution is the veil of ignorance. People feel ignorant about the way social policies are made, and they feel less represented in the processes that supposedly lead to social progress. Proactive measures to ensure people's participation in policy making, especially in the context of advanced digital technologies, would help to improve trust levels. In the same fashion, participation provide people with a sense of belongingness that make them responsible to the social organisation in which they partake. It helps people to realise that the any kind of social change they undergo are not something imposed on them but chosen by them. This further incentivise them to make more informed and better choices through continuous participation in the process of social change. Trust and the sense of belongingness, results of stakeholder participation in the process of social change ensure social cohesion.

### **1.3.3 Multi-Pillar Approach**

A third common factor that gathered attention recently in the discourse around sustainable development is the multi-pillar approach. The three pillars of sustainability – economic, environmental, and social – are interlinked in such a way that neglecting any one of them can have detrimental effects on the other. Despite this interconnection, much of the discourse on sustainable development tends to focus predominantly on environmental sustainability. This bias is evident in policy frameworks and academic research, where the environmental pillar often takes precedence. The economic pillar also enjoys considerable attention due to its strong theoretical foundation and the availability of practical evaluative methods. In contrast, the social pillar has historically been marginalized, even though social issues are deeply intertwined with both economic and environmental challenges (Littig & Griebler, 2005). For instance, poverty and social inequity exacerbate environmental degradation, as marginalized communities often depend on unsustainable resource use for survival. The World Commission on Environment and Development (WCED) underscores this point, stating that ecological sustainability cannot be achieved without addressing

poverty, uneven development, and population growth (WCED, 1987).

Over time, the significance of social sustainability has gained recognition as an essential component of sustainable development. Scholars such as Lehtonen (2004) and Fitzpatrick (2011) argue that the social dimension is critical for achieving holistic and equitable outcomes. Social sustainability encompasses aspects such as equity, inclusion, community resilience, and participatory governance, which are indispensable for creating sustainable societies. The Bristol Accord exemplifies this perspective, emphasizing the importance of safety, inclusion, participation, and equality as fundamental conditions for sustainable communities (ODPM, 2006). These elements foster a sense of belonging and ensure that development benefits are distributed equitably across society, aligning with the principles of social justice and fairness.

The neglect of the social pillar has led to significant challenges, particularly in contexts where environmental priorities overshadow social considerations. Agyeman (2002) describes the tension between "green" and "brown" agendas, where environmental objectives often conflict with the needs of marginalized populations. For example, conservation initiatives

that displace indigenous communities or restrict access to traditional livelihoods illustrate the unintended consequences of prioritizing environmental sustainability over social equity. Addressing these conflicts requires a balanced approach that integrates all three pillars, ensuring that environmental and economic goals do not come at the expense of social well-being.

The advent of tools like the Multicriteria Analysis (MCA) should be understood in this context (Spangenberg and Omann, 2006). By incorporating diverse metrics, MCA enables the evaluation of sustainability initiatives from a holistic perspective, ensuring that social, economic, and environmental dimensions are all considered. This methodological innovation aligns with broader efforts to enhance human well-being, as it allows policymakers to identify trade-offs and synergies among different objectives (Hajkowicz & Collins, 2007). For instance, integrating social indicators such as education access, healthcare availability, and community participation into sustainability assessments can help create more inclusive and equitable development strategies.

A compelling example of the multi-pillar approach in practice is again the case of a Brazilian mining company that transformed its operations by enhancing community participation (Devlin &

Tubino, 2012). Initially, the company faced significant opposition from local communities due to its environmental impacts and lack of engagement with stakeholders. However, by adopting a participatory approach, the company involved local residents in decision-making processes, ensuring that their voices were heard and their concerns addressed. This shift not only improved the company's social license to operate but also enhanced its sustainability performance, as it aligned economic, environmental, and social goals. The success of this initiative underscores the importance of integrating social sustainability into corporate and institutional strategies.

Another illustrative example of the multi-pillar approach is from the city of Curitiba in Brazil. Renowned for its innovative urban planning, Curitiba has implemented policies that balance environmental, economic, and social objectives. The city's Bus Rapid Transit (BRT) system exemplifies this integration, as it promotes low-carbon transportation while enhancing accessibility for low-income populations (Rabinovitch & Leitman, 1996). Additionally, Curitiba's participatory urban planning processes have empowered residents to contribute to decision-making, fostering social cohesion and inclusivity (Cervero, 1998). Programs such as the "Green Exchange," which incentivize waste recycling

by offering food and bus tokens to marginalized communities, further demonstrate the city's commitment to addressing social and environmental concerns simultaneously (Macedo, 2004).

Scientific research supports the efficacy of the multi-pillar approach in addressing complex sustainability challenges. Studies on urban resilience highlight the importance of integrated policies that consider social, economic, and environmental dimensions. Meerow et al. (2016) argue that cities with holistic sustainability strategies are better equipped to withstand shocks, whether environmental disasters, economic crises, or social unrest. Similarly, Aldrich (2012) show that fostering social capital through community engagement initiatives enhances adaptive capacity and disaster preparedness, linking social sustainability with environmental resilience.

In short, the institutions and policy makers who want to implement sustainable development should take into consideration all of its three pillars. Ignoring any one of them will have destructive consequences in the long run while, addressing each of the pillar sufficiently brings long lasting constructive effects on the respective sectors.

## **2. SOCIAL SUSTAINABILITY AND SOCIAL ONTOLOGY**

Having identified the most found themes in social sustainability, this section seeks to define the ontology of society. It is necessary to understand the ontology of society in order to find out a theory of sustainability suitable for society. This section, as the first, plays a foundational role in the construction of the definition of social sustainability which this chapter elaborates in the final section. The concept of webfare which seeks to extract welfare from the surplus value produced in the web necessarily needs to be founded on the strong social ontological theories in order to make its implementation sustainable.

### **2.1 A need based social ontology**

Social ontology as an academic discipline emerged in the late twentieth century after centuries of discussions and theorization around the concept of the "social." Historical antecedents of these discussions date back to ancient civilizations such as Greek, Indian, and Egyptian, which sought to organize their members in structured ways. However, these early efforts were not analytic or theoretical as seen in modern academia. Instead, they created practical systems through agreements, customs, laws, and conventions to maintain societal order (Gillian and Miller, 2024).

Over time, the concept of “society” began to attract more analytical attention, particularly from the 15th century onwards.

In the early modern period, philosophers such as Thomas Hobbes and David Hume introduced foundational ideas on the origins of society. Hobbes argued that the “commonwealth” emerged from a covenant among individuals seeking to escape the state of nature, which he described as “solitary, poor, nasty, brutish, and short” (Hobbes, 1651). Hume, on the other hand, posited that society was a product of conventions developed through interactions among individuals, a view that underscores the emergent and collective nature of social objects (Hume, 1740). John Locke’s contributions similarly tied the origins of society to divine and natural laws, emphasizing the protection of private property as a critical purpose of societal organization (Locke, 1690). Enlightenment thinkers such as Montesquieu, Ferguson, and Adam Smith further advanced the notion that societies arise from human actions and interactions rather than being preordained constructs. Karl Marx later offered a materialist interpretation, asserting that the social structure is fundamentally shaped by commodity relations (Marx, 1867).

In the 20th century, the question of social ontology evolved with contributions from thinkers like Friedrich Nietzsche and Michel Foucault. Nietzsche's "will to power" emphasized the role of morality in shaping societal structures, while Foucault employed genealogical methods to explore how power and discourse define societal norms and institutions (Nietzsche, 1887; Foucault, 1977). Alongside these perspectives, theorists debated whether society emerges from the aggregate of social entities or whether it precedes and shapes these entities. Thinkers like Adam Ferguson and John Stuart Mill viewed society as an aggregation of individual interactions and human minds, respectively (Mill, 1848). Contrarily, Hegel's concept of the World Spirit and Emile Durkheim's emphasis on collective consciousness suggested that society is a supra-individual entity that influences its constituent parts (Hegel, 1807; Durkheim, 1893).

It would be challenging to determine which theory best explains the ontology of society due to the complexity and diversity of perspectives. This chapter refrains from adjudicating between these views, and instead focuses on the question, "Why do societies emerge?" Using the distinction between proximate and actual causes from legal studies, this section proposes a framework for understanding societal formation. In legal terms,

proximate causes refer to immediate events leading to an effect, whereas actual causes encompass the broader circumstances enabling those events. Applied to social ontology, this framework posits that human need satisfaction serves as the actual cause for the emergence of society, while the aforementioned theories of social ontology represent proximate causes.

Evolutionary studies provide compelling evidence for the role of need satisfaction in societal formation. Early human groups banded together to enhance survival rates by facilitating food acquisition, protection from predators, and reproduction (von Hippel, 2018). This practical necessity for group living eventually led to the internalization of social connection as a fundamental human need. Contemporary neuroscience supports this view, demonstrating that the human brain's neocortex evolved to accommodate complex social interactions (Dunbar, 1992). Additionally, psychological research reveals that the absence of social connections adversely affects both physical and mental well-being, underscoring the intrinsic value of social bonds (Holt-Lunstad et al., 2023).

Theories of social ontology primarily addresses proximate causes. For instance, Hobbes' social contract theory identifies fear

as a motivating factor for individuals to form societal covenants, but it downplays the broader need for security and well-being that drives such agreements (Hobbes, 1651). Similarly, Durkheim's focus on collective consciousness as a binding force overlooks the instrumental value of societal structures in satisfying human needs (Durkheim, 1893). This chapter's framework synthesizes these perspectives, highlighting that societal formation stems from both immediate agreements and the deeper imperative of need satisfaction. In short:

Human need satisfaction (actual cause) – theories of social ontology (explains the proximate causes) – Society (the effect).

The theory of documentality, proposed by Maurizio Ferraris, offers means to justify this thesis. Documentality argues that societies are constructed not only through conventions, contracts, or pacts but also through the documentation of these agreements (Ferraris, 2012). Documents serve as tangible artifacts that formalize social arrangements, enabling complex societies to function effectively. For example, constitutions, laws, and institutional records codify the principles and practices that govern societal interactions.

An examination of constitutional documents across nations illustrates the centrality of need satisfaction in societal organization. The Brazilian Constitution includes well-being and development among its core objectives, while the Indian Constitution emphasizes the dignity of individuals through social, economic, and political justice. Similarly, the South African Constitution's Bill of Rights enshrines housing, healthcare, and social security as fundamental rights. Even relatively less democratic regime such as Saudi Arabia and the United Arab Emirates, incorporate principles of welfare and justice into their governing frameworks (Constitution of Brazil, 1988; Constitution of India, 1949; Constitution of South Africa, 1996).

Historical counterexample further underscores the importance of need satisfaction. Societies that failed to address the welfare of their members often faced instability and collapse. Economic stagnation and unmet needs contributed to the fall of the regimes like the French monarchy, the Qing Dynasty, and the Soviet Union. Similarly, the Weimar Republic's inability to address economic hardships paved the way for the rise of totalitarianism in Germany. These examples highlight the instrumental value of societies in fulfilling human needs, as well as the consequences of neglecting this imperative (Tilly, 1993; Diamond, 2005).

## **2.2 A short note on needs**

The concept of "needs" has been a cornerstone of numerous theories in moral philosophy, social justice, political philosophy, and economics. Examining these perspectives is crucial for framing social sustainability, as this theory posits that human needs are the primary drivers behind the formation of society. Discussions about needs can be broadly categorized into two strands: those that focus on the inherent value of needs and those that address methods for fulfilling the diverse needs of individuals.

The first perspective emphasizes the normativity of needs, exploring whether needs have intrinsic value. Scholars who advocate for a needs-based ethical theory argue that needs are inherently normative, possessing an intrinsic value that guides human behaviour and moral reasoning. Simone Weil (1952), for instance, argues that human needs are foundational to morality, with unmet needs compromising human dignity and well-being. Similarly, Brock and Reader (2002) emphasize that needs are essential for understanding moral obligations and forming ethical codes. They assert that societal and institutional structures must prioritize meeting these needs to uphold justice and equity.

However, some critics challenge this view, arguing that needs often lack universality and are contingent on context. Barry (1965) for example, suggest that needs are subjective and may serve as tools for achieving broader objectives rather than being ends in themselves. White (1975) adds that the variability of human needs complicates their normative status, cautioning against attributing intrinsic value to needs without considering their adaptability and dependence on societal and cultural frameworks. This critique highlights the complexity of defining needs as universal or intrinsic, urging caution in applying this perspective indiscriminately.

The second perspective shifts the focus to practical strategies for meeting human needs. This literature often intersects with studies on distributive justice, resource allocation, and economic policy, addressing questions about prioritization, equity, and mechanisms for addressing evolving needs. For example, Doyal and Gough (1991) propose a framework for identifying universal human needs and designing social arrangements to fulfill them, bridging theoretical and practical concerns. Their work underscores the importance of creating systems that adapt to the changing nature of human requirements, ensuring that needs are met in diverse contexts.

In light of these discussions, needs can be categorized into two primary types: those with intrinsic value and those with instrumental value. Needs with intrinsic value are fundamental and irreplaceable, essential for human survival and dignity, and could be a source of moral obligation as well. Examples include nutrition, clean water, and shelter, as well as social connection, which has recently gained recognition as a fundamental need due to its impact on mental and physical health. Instrumental needs, on the other hand, serve as means to achieve broader objectives and are often context-dependent. For instance, while being well nourished is an intrinsic need, the specific method of doing so — dietary preferences or sources of nutrition — is instrumental. These categories highlight the dynamic nature of needs, as intrinsic needs can evolve over time. Social connection, for instance, was not initially considered intrinsic but has become fundamental due to its role in overall well-being.

Human needs, both intrinsic and instrumental, form the foundation of society. Societies are established, in part, to meet these needs, and failure to do so threatens their stability and longevity. A society that does not adequately respond to the needs of its members risks losing its cohesion and legitimacy. For example, neglecting basic needs like food security or equitable

healthcare can erode trust in institutions and lead to social unrest. Addressing needs equitably and effectively is, therefore, a cornerstone of social sustainability. Societies must ensure that both intrinsic and instrumental needs are met, recognizing that neglecting either can jeopardize their integrity.

By framing human needs as the drivers of social formation and sustainability, this perspective underscores the importance of aligning societal structures with the satisfaction of fundamental requirements. Human beings have historically relied on collective structures to meet their needs, and contemporary societies must continue this tradition while adapting to evolving needs and contexts. Social sustainability, therefore, necessitates a focus on equitable need satisfaction, ensuring that societies remain resilient and cohesive in the face of modern challenges.

### **2.3 Capability Approach and social sustainability**

However, the plethora of human needs and the difference in the importance given to them people does not allow to conceive a universal canon of human needs. Although it would be easy to agree on certain intrinsic needs, the practical realization of needs requires tools and frameworks that address that can accommodate the varieties in human need. The sustainability of a society is

largely dependent on its capacity to strike the right balance between needs of the individuals and the needs of the group. On the same way, it also has to address the diverse and conflicting needs within the needs of individuals and groups. Among the various theories which sought to address this issue, I choose the capability approach by Amartya Sen as the most appropriate one in the context of social sustainability. This section briefs on the features on the CA which would allow it to support a definition of social sustainability that fulfill the need satisfaction criteria of a

The capability approach (CA) was first introduced by Amartya Sen comes to this chapter in the context of the importance of human need satisfaction in the ontology of society. Sen defines the capability approach as an intellectual framework that evaluates a person's achievements and freedoms based on their actual ability to perform and achieve the things they have reason to value (Sen, 2009a). This approach revolves around five core concepts: capabilities, functionings, conversion factors, resources, and agency (Bartolomei et al 2024). Capabilities refer to the genuine freedoms individuals have to pursue the valued states of being, ranging from elementary capabilities such as freedom to stay well-nourished and avoiding preventable diseases to more complex ones like achieving self-respect and societal

integration (Sen, 1990c). Sen's use of "freedom" in this context is distinct from its interpretations in political science and philosophy, as it underscores the practical ability to achieve well-being.

Functionings, often referred to as "beings and doings," represent the realized capabilities of individuals. Conversion factors—categorized as personal, social, and environmental—mediate the transformation of capabilities into functionings (Crocker & Robeyns, 2009). Agency, a critical but debated component of CA, refers to an individual's capacity to act and bring about change based on personal values and objectives (Sen, 1999a). While some scholars, like Robeyns, consider agency optional, others, such as Bartolemei et al. (2024), regard it as fundamental. This analysis concurs with the latter perspective, emphasizing the CA's focus on methodological individualism in the context of social sustainability. Lastly, resources in the CA extend beyond material goods to include non-material, market, and non-market resources (Folbre, 2008).

The philosophical merit of the CA lies in its critique of traditional evaluative frameworks like GDP and GNP, which have long dominated economics but fail to capture human well-being comprehensively. These measures have faced sustained criticism,

from early economic thought to contemporary analyses (Stiglitz, Sen, & Fitoussi, 2010). Welfare economics emerged as an alternative, incorporating non-material factors into assessments of well-being. Approaches such as utilitarianism, the hedonistic happiness index, and subjective well-being theories provided more nuanced metrics but often perpetuated biases. For example, some welfare frameworks accepted gendered divisions of labor without critique (Robeyns, p. 191). The CA departs from these traditions, establishing itself as a "non-welfarist" model for evaluating well-being (Bleichrodt & Quiggin, 2013).

The openness of the CA, rooted in its philosophical foundations, allows for its application across a wide array of fields (Stewart, 2006). These applications can be categorized into two areas: theoretical debates and practical implementations. Theoretical applications include discussions on distributive justice, developmental studies, welfare economics, and human development. Practical applications encompass global public health, environmental protection, education, technological design, and welfare state policies. This versatility takes the CA an invaluable tool for addressing complex societal challenges.

Criticisms of the CA highlight its limitations but also illuminate its strengths in the context of social sustainability. One significant critique is Sen's reluctance to specify a definitive list of capabilities, leaving this task to public reasoning (Sugden, 1993). Scholars like Nussbaum and Robeyns have proposed frameworks for identifying relevant capabilities, yet Sen's open-ended approach accommodates diverse societal contexts. Another critique targets the CA's emphasis on individuals, which some view as neglecting collective dynamics (Evans, 2002; Deneulin & Stewart, 2002; Stewart, 2005). However, Robeyns counters this critique by distinguishing normative individualism from ontological individualism, asserting that while the CA prioritise individuals, it does so constructively to promote societal well-being.

The CA's relevance to social sustainability stems from four key aspects, two of which arise directly from its criticisms. Firstly, the CA's pluralistic nature allows it to adapt to diverse indicators of human well-being. Unlike frameworks with fixed parameters, the CA remains responsive to the evolving needs of individuals and societies, bridging gaps between the Global North and South. Secondly, its emphasis on individual agency ensures that the needs and aspirations of all societal members are addressed, preventing marginalization and fostering inclusivity. Thirdly, the

interdisciplinary nature of the CA enhances its applicability across various domains, from public health to environmental sustainability. This aligns with the multi-pillar model of sustainable development, which emphasizes the interconnectedness of social, economic, and environmental dimensions. Finally, the CA's flexibility and openness to future advancements make it a forward-looking evaluative framework. As technological and societal transformations reshape human lives, the CA's adaptability ensures its relevance in assessing and meeting emerging needs. Moreover, the CA's dual commitment to individual agency and public reasoning positions it as a robust framework for social sustainability. By prioritizing individual well-being while fostering collective resilience, the CA addresses the foundational drivers of societal cohesion: the satisfaction of human needs and the preservation of individual dignity.

### **3. REDEFINING SOCIAL SUSTAINABILITY**

After a brief note on the drawbacks of the current theories of social sustainability, this section dives deep into the new definition of social sustainability. However, the definition proposed here is at large influenced by the current discourses on social sustainability, both in academic and non-academic environments.

### **3.1 Drawbacks of current definitions**

Firstly, most of the definitions satisfies the role of a description or explanation of the concept rather than a definition. Social sustainability is defined on terms of the features like social equity, social cohesion, built environment, participation etc... Such definitions seem to end up in the problem of circular definition. Under the fallacy of circular definitions, the concept under consideration is defined using the very same term or closely related terms. The problem with this approach is that the definition fails to account for all the features necessary for social sustainability. For instance, the themes like intergenerational, intragenerational, transcultural levels, which are important concerns in social sustainability does not get addresses adequately (McKenzie 2004, Eizenberg, Jabreeen). Stern argues that the economic growth model will have direct consequences on future generations and therefore equity is a concept that not only limit to intragenerational matters but intergenerational also (Stern 2006).

Secondly, the definitions risk the lack of cause-effect distinction of various aspect to social sustainability when applied to concrete case. For instance, a definition of social sustainability in terms of social cohesion and equity finds itself at trouble, when

deciding whether lack of social equity is a problem that emerges in the absence of social cohesion or absence of social equity leads to the absence of social cohesion (McKenzie 2004).

Finally, the existence of society is taken for granted without paying much attention to its ontology or epistemology. There is a significant absence of the theories of social ontology is evident in the pioneering works on social sustainability. Even though such works offer in depth insight to the topic, this article seeks to boost up the effectiveness of such insights by bringing into the aspect of social ontology to the definition of social sustainability.

### **3.2 A new definition**

The heart of the discourses on social sustainability lies in achieving the right balance between well-being of the individuals by helping them to satisfy their varied needs, and the well-being of the community through which they managed to satisfy their needs. The efficiency of the definition for social sustainability lies in its capacity to achieve this balance, and the possibility to apply it to concrete cases. Many a times, definition of social sustainability does not manage to translate itself into levels of concrete application as it is seen in the case of economics. On the basis of the discussions of the prior two sections, this section formulates a

definition for social sustainability. The definition aims to address the two aspects of social sustainability and its potential for practical application. It tries to adequately address the two essential aspects of social sustainability – individual wellbeing and wellbeing of the community. Magis and Shinn has addressed the two essential aspects as well being of human beings in terms of basic need satisfaction, and well-being of the society in terms of the community of people. The following definition tries to accommodate the two essential aspects, and define social sustainability:

*Social sustainable development is the development which promote the capabilities of all the members of a group and, at the same time, preserves the ecosystem which facilitated the promotion of those capabilities.*

The definition addresses the question of individual well-being by bringing in the concept of capabilities found in Senian wellbeing economic theory. As discussed in section two the actual cause behind the emergence of society is the human quest for need satisfaction, and therefore, human need satisfaction is the basic requisite to sustain any society. However, the subjective nature of human needs renders the realisation of the same problematic in

two ways. Firstly, it is difficult to describe a canon of human needs given the socio, cultural, political and other numerous grounds of differences. Secondly, even if a canon of needs is established, human demand for need satisfaction would be limitless, if not controlled by some rein. The CA would resolve the first problem because it has never stipulated a canon of needs but the list of needs can be defined depending on the people of particular contexts. The open nature of the CA not only satisfies the types (both basic and advanced) of needs of present generation, but also of the future generations. Moreover, it responds to the dilemmas related to instrumental and intrinsic kind of needs. Capabilities give space for both types of needs while, terms like 'basic needs' may not do it. For instance, understanding the need for shelter as basic would be satisfied by a physical living space if understood in an instrumental and intrinsic way. But understanding it as a capability would not satisfy the condition of being a simple physical space to but looks into the intention for having a physical space for living. The basic need for shelter is satisfied if an apartment or a house is provided. However, if the the neighbourhood where the housing is situated is subjected to high pollution, social insecurity, high crime rate etc... it may not fulfill the very intention of the very purposes of having a shelter.

Nevertheless, needs are not equated with capabilities, but the definition proposes the application of CA framework for realising human needs.

However, it does not respond sufficiently to the second problem associated with need satisfaction and, the second criteria of social sustainability i. e. well-being of the group. There is the risk of overemphasis on the well-being of individuals than that of the group. It is in this context that the second part of the definition assumes importance. The term 'ecosystem' refers to both physical and non-physical environment which enables the survival of human beings. Since there has been prodigious discourse on environmental sustainability, the focus here will be more on the non-physical environment. Further, the question of social sustainability in the non-physical environment overrides economic sustainability, given the ambition of this chapter. Along with addressing the question of limit of needs and the question of well-being of the group, the second part of the definition satisfy the multi-pillar approach in sustainable development since it provides space to engage in dialogue with the other two kinds of sustainability. Barron and Gauntlett (2002) emphasize the importance of these non-material factors, arguing that equity and participation are essential for their maintenance. When individuals

perceive the system as equitable and inclusive, they are more likely to trust and support it.

### **3.3 Equity**

Well-being of the group can be achieved by ensuring the presence of two social goods – equity and participation. Section one has suggests that the scholars in the field of social sustainability equivocally accept this. Moreover, bringing in the qualities like cohesion, peace and prosperity that are essential for group’s wellbeing, it can decide for the limits of achievable capabilities. If the number of resources – both material and non-material – accessible for an individual renders her well off at the expense of the another individual or the group becoming worse off, well-being of the group is under threat. The set of capabilities achieved by the well-off individual has trespassed the threshold of capabilities since it has rendered someone else or the group in a worse off situation. The situation of the worse off section in the group would get worsen further if the inequitable distribution system continuous. Eventually, the worse of section would break away from the group leading to its peril, or in other words, group fails to sustain. Therefore, bringing in the concept of equity would decide the limits of capabilities permissible for the members of the

group, and thereby the will of group members to stick together in the group. Critics of equitable resource distribution often argue that it discourages competition and stifles growth by making people lazy and unmotivated. However, such concerns are largely unfounded, inefficiencies like laziness, which persists even in highly competitive environments. Additionally, the multidimensional assessment of well-being proposed by CA addresses the limitations of growth-centric economic models that focus narrowly on material prosperity.

### **3.4 Participation**

Now, a group with equitable distribution in place for the achievement of capabilities for its members to fulfil need satisfaction can continue to exist only if there is chance for participation. Human beings are not static but creatures which grow, evolve and re-emerge continuously, so as the groups which they form. Participation of the members in the group is necessary to ensure that its change happens in the direction where equity and the associated benefits are continued to sustain. Even the optimal level of resource distribution and best possible ways to improve capabilities would not prevent the emergence of sub groups within the group. Such sub-groups get manifested as

minority-majority, haves and have-nots, orthodox and conservative etc... within the group. A healthy group should ensure the participation of all its members in deciding the direction at which their group is evolving and emerging. Active involvement by all members of society ensures the ecosystem's health and incentivizes individuals to protect and sustain it. Democratic participation not only strengthens societal cohesion but also promotes constructive coexistence, allowing minority voices to shape collective welfare. Historical milestones, such as the Civil Rights Act of 1964 and the Paris Agreement, illustrate how the efforts of marginalized groups can lead to significant societal progress.

As in the case of equity, participation is also put under scrutiny and is a matter of debate. Given the cognitive bias, ignorance, lack of expertise etc... of the public, participation cannot be accepted without a touch of doubt. However, thinkers like Sen have placed good faith on public reasoning for deciding the set of capabilities which a population desire to develop. It is necessary to have faith in public reasoning and democratic values, and at the same time, implement ways to remove the obstacles like cognitive bias through adequate means. In any case, democratic methods

of promoting the direction of human and social development would be desirable than liberal paternalistic methods.

### **3.5 Multi-pillar approach**

Along with factors equity and participation, the concept of socially sustainable development requires a multi-pillar approach for its realization. It cannot be realized in absence of environmental and economic sustainability. A combination of these factors is necessary for the holistic need satisfaction individuals and societies. The ontology of needs underscores the central role of society in fulfilling human requirements, and the Brundtland report places emphasis on sustainable ways of need satisfaction. Social sustainability should not only ensure the sustainable need satisfaction for of human beings, but also play a role in deciding the types of needs. Even unjust societies can ensure need satisfaction of its members but may the quality of needs which the members aspire for would be distorted. For instance, an ultra-rich individual may need a dessert of her particular choice for a complete meal, while the poor individual of the same society would consider three meals a day a luxury. Similarly, a woman of a patriarchal society would consider the 'permission' from her family to visit her nearby town once a while

as a big need, while a woman of a more gender egalitarian would develop a need for climbing a step more in her cooperate career. Therefore, the threshold for human need satisfaction should be decided on the basis of Moreover, the evolution of needs in the future should also be taken into consideration, especially in the backdrop of recent technological advancements. Its high time to think about the needs of human beings when AI and similar technologies take up even some of the creative tasks once considered exclusive to human beings. If individuals are not given opportunity to decide the nature of technologies via means of equity and participation, the results would catastrophic.

Social sustainability is a concept which would evolve and emerge time and again as the way human beings change. Therefore, the definition proposed in this in chapter may not be the final one but relatively advantageous in the current scenario of sustainable development. On that note, the chapter concludes with three remarks. Firstly, the definition 2 outlined in here is meant to provide a framework to evaluate and implement social sustainability. It does not dictate bundle of social values or social capital that should be sought by any society. The idea behind this generic nature is to make this framework respectful to the plurality of mores, values and culture in various human societies, and

places hope on the other two pillars of sustainable development (environmental and economic) to arbitrate in cases of ideological and non-ideological conflicts. However, in any case, it insists on the values of equity and participation given their ability ensure the smooth implementation of the definition proposed here. Secondly, the framework can be used in two ways: 1) it can be used to evaluate the general social sustainability of a society; 2) the impact on social sustainability in the context of particular developments, as explained in the case of digital data. In the first case, the list of capabilities remains open as in the case of CA of Sen, while the second case would provide a more pronounced list of capabilities. Finally, it places equal importance on the well-being of both individual and community well-being, without taking sides of scholars who put individual over society or vice versa.

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# ***CHAPTER 2***

## **DIGITAL HERMENEUTICS: A SOCIAL GOOD PERSPECTIVE ON DATA**



The fundamental ambition of this chapter is outlining a theory of digital hermeneutics to promote data governance practices that are socially sustainable. It is an attempt to find out a theoretical basis to implement the definition for social sustainability coined in the first chapter. Digital data has become a valuable resource of the era which has profound implication on human societies. Data governance, consequently, can affect the social sustainability at large. This fact provides good reason to apply principles of social sustainability while designing norms for data governance practices.

The entire chapter is divided into three sections. The first section seeks to understand the themes concerning the value of digital data and the factor that make its governance difficult in face of its value. The value of digital data is usually measured in terms of the social and economic outputs generated out of it. The social value can be measured in terms of the social benefits digital data have produced and the ones which it could produce in the future. At the same time, it is worth considering the fact that data have

also contributed in damaging the social fabric raising serious questions about its impact on the social sustainability. In order to understand the social value of data, the section consults the effects of data driven initiatives on the society. It further discusses the economic impacts of data driven enterprises to understand the economic value of data. Data driven enterprises have brought in economic growth to private enterprises, so as to governments. The section also introduces the theme of privacy that has provoked improvements in the data governance practices of the time.

Section two problematize conflict between the socio-economic value of data between themselves and with the privacy aspect. It identifies the cause of the problem that lies in the way we perceive data. Data is perceived either as a private good, a public good or a common good for governing it. Each approach towards data is evaluated with the drawbacks involved with them. Later, to propose an alternative way, the section seeks to develop a theory of digital hermeneutics. On the basis of the documental theory of social ontology that views digital data as a social object, this chapter proposes the concept of social good. The social good approach tries to find a balance between the socio-economic value and the privacy aspect of digital data.

Section three evaluates the way by which the social good approach towards digital data fulfils the social sustainability definition outlined the first chapter. Digital data is an ideal candidate to apply the principles of social sustainability given its influence on current social scenario. It provides opportunity to apply and test the principles of participation and equity while deciding the management of a resource that will have consequences on organising society. This chapter is conceived as a theoretical foundation for the practical suggestion which would be discussed in the third and fourth chapter.

## **1. THE VALUE OF DIGITAL DATA**

The value of digital data is directly linked to its utility. Organisations have found myriad of cases where data driven intervention can generate value. This capacity for data to generate value is the factor that make it the new renewable resource of the century. However, the value production based on data by organisations has created conflicting interest with individuals. It becomes necessary strike the right balance between socio-economic value generation and privacy aspect of data for making the value generation from data.

## **1.1 Social Value**

The social value of data is dependent on its capacity to represent the social reality. It is not only capable of providing information about the social reality it but also can ontologically account for its existence in several instances. If any unit of digital data fails to provide the right information about the social reality it seeks to represent, then the social value of that particular data is negatively affected. The social nature of data is evident from the direct proportionality found between the quantity of data and its social value. More the amount of data, more will be the possibility to gain insights about the social reality it represents. This explains the dynamics found in various definitions of big data. Initially, the Vs referring to big data were Volume, Variety, and Velocity. Later another two more were added and the list became: Volume, Variety, Velocity, Value and Veracity. Recently, the 10 v's of digital data proposed by Karu 2023, 1) velocity 2) volume 4) variety 5) veracity 6) variability 7) validity 8) vulnerability 9) volatility and 10) visualisation (Karu, 2023). Most of the Vs are inevitably connected to the social aspect since it testifies the principle that value of a unit of digital data increases when it's compared with the other units. The value of data is not only connected to the

volume, but more essentially to its content and context (Mitchell et. al 2021).

The social value of data can be inferred from the positive and negative disruptions that data-driven initiatives has created on the social fabric. The social value of digital data is evident or can be inferred from the effects data has on the society. The use of digital data in the sectors like health (Moutselos & Maglogiannis, 2020), urban planning (Anejionu et al., 2019), environment (Miljand, 2020), transportation (Zannat & Choudhury, 2019) etc... has produced positive changes on them. It renders public administration more efficient and increases the citizen satisfaction (Arnaboldi & Azzone, 2020). The fact that digital data contains information about the social objects that constitute the social reality, allows policy makers to come up with data driven policies that produce the desired effects on social reality. Data driven policies improve governance practices of various administrative institutions significantly (Concilio et al., 2019). Data driven policies respond more effectively to the needs of citizens. For instance, the availability of big data and data analytics has helped various countries to contain the risks of the pandemic during its time. The countries that had efficiently used the available data were efficient in containing the challenges posed by the pandemic as well. The

emergence of society 5.0 or industry 5.0 out of the digital technological advance is the paradigm of this disruption. Digital tools developed under data driven initiatives penetrate to all aspects of human lives, giving birth to concept like Cyber-Physical Systems (CPS), Cyber-Physical-Social-Systems (Kuru, 2024). People find at home with the technologies made from the digital data because it responds closely to their realities which the data represented. The innovative digital technologies could not have had the success of this scale if they were not created using the digital data.

However, the disruptions are not necessarily positive since there are also instances where data driven firms may hoard data, leading to monopolistic tendencies in the sector. The wealth gap and growth gap between firms that are driven and other non-driven industries requires attention from social point of view than an economic point of view. Similarly, the impact of data driven firms on the political process and decision making too requires a social interpretation than an economic one. Other impacts of data driven initiatives on the social fabric of human life includes that of 'data colonialisation' (Browne, 2023). There have been some high-profile failures of AI technologies whose reasons can be traced back to the mismanagement of digital data. Again, the

observations like data ecosystems prove the social value of digital data (Purtova, N., & van Maanen, 2024).

Another manifestation of the digital data's social value is found in the numerous documents produced on big data, both in the regulatory and non-regulatory context. National and international organisations have recognized the social value of data through various documents and policies. The World Economic Forum recognised the potential social value or benefit that could be derived from digital data when it proposed the authorized Public Purpose Access (APPA). The APPA encourages the use of digital data in promoting human rights (World Economic Forum 2021). Further, the social benefits of the data have been illustrated in various studies that investigated public benefits, spanning from more efficient mobility (Lau 2020) to personalized healthcare (Morgan 2021), from improved waste management (Abdallah et al. 2020) to more accessible education (Marchant 2021). Digital data can promote the technological innovation that could usher both social and economic growth especially in Europe (Pinto et. al, 2023). The European parliament has recognised that the scale and scope of data driven initiatives can bring in industrial growth and social welfare (European Parliament, 2021). There has been an increase in the number of documents produced on this regard it

the past decade. Initially, most of the regulations concerning digital data were treated under the heading of privacy. The new disruptions and circumstances urged the institutions to reconsider the initial approach. Consequently, the documents on digital data seek to provide space for discussion on not only in the theme of privacy, but also its socio economic and political value (G20, 2019; European Parliament, 2022). For instance, the GDPR regulation that gives paramount importance to privacy protection was created in the year 2016 by the European Union. However, the documents produced by the Union in the following years did not restrict itself to the privacy aspect alone. While keeping the privacy aspect intact, it has sought to create space for addressing the social implications of digital data. The European Strategy for Data which dates to 2020 discusses the need for data accessibility, data interoperability, competitiveness, and citizen control. The Data Governance Act of 2022 endorses the potentials of data altruism which required digital data to be treated not as a private property alone, but as something that can bring in collective welfare. The recent Data Act of 2024 focuses attention on the data sharing aspect especially in the context of IoT. The Act protects the data of individual citizens in a way that it does not contradict or conflict the social benefits of big data. The growing presence and use of

digital data in the commerce and the businesses has urged the Union to come up with Digital Markets Act of 2023. This Act is informed by the need for institutions to make particular intervention in the sector of data driven industries for ensuring transparency and justice. Meanwhile the European Health Data Space regulation is a sector specific intervention from the side of the Union where it focuses on the safe and secure transfer of data for improving health services. Similarly, the overwhelming presence of the organisations that are not necessarily profit motivated in the valuation of big data confirms its social value.

## **1.2 Economic Value**

The economic value of data refers to the economic growth or lose generated by data driven initiatives. At the same time, the economic value of data essentially depends on the social value because the absence of latter will result in the absence of the former. The distinction between economic and social value is drawn based on the purposes for which is data is used and the metrics used to measure the impacts of data. Firstly, if data is used for the purpose of economic profit than social benefits, then it is an instantiation of the economic value of data. The use of data by private sector companies to improve their profits is the illustrative

example in this regard. Secondly, if the impacts of data driven initiatives are measured in monetary terms, then it is another instantiation of the economic value. For example, several governments or organisations describes the cost savings they have achieved after implementing data driven initiatives in particular sectors.

Evidently, the firms that had used data for doing businesses has marked an increase in their profit margins (Coyle et al., 2022). The data driven companies like Amazon, Meta, LinkedIn etc worth more than their counterparts who manufacture goods due the high value of the data those companies own (Shmueli et al 2018). Organisations that use digital data to build Business Intelligence by using digital data tends dominate in their respective sectors (Victor 2018). Businesses that are informed by digital data can respond more adequately to the needs of their customers. At the same time, the goods and services provided those firms by means of digital technologies increases their chances to further capitalise on the digital data and better their goods and services, which essentially becomes a virtuous circle. The concepts like Advanced Insight Analytics allows the firms to more about the market and clients to streamline their goods and services. The economic value of digital data is closely connected

with the Business Insights that could be derived from the Big Data using Business Analytics (Shmueli, 2018). The Business Insight is similar to the concept of 'wisdom' derived from data in Chen et. al. (Chen, 2016). They consider data (mere quantities like numbers, texts, figures, pictures etc..) as the first phase of the process where the following processes include information (processed or cleaned data), knowledge (acquaintance or familiarity with the information), and finally wisdom (insight). The emergence of high-fidelity virtual assets by using the technology of blockchain in the context of metaverse systems promises further economic growth in the sector (Kuru, 2023). Companies like IBM, Amazon EC2, Microsoft Azure, Fiware and Google generate revenues by providing cloud services known as Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS) using the pay-per-use model to store data. Studies show that right capitalisation of data will give 1.5% to 2% increase in the GDP rates of countries (OECD, 2019).

Studies show that right capitalisation of data will give 1.5% to 2% increase in the GDP rates of countries (OECD, 2019). The problems generated by the carbon foot print left by information and communication technology should be quantified in monetary terms to get a better idea of its economic value (costs).

The carbon foot print left by ICT has exceeded by nine per cent every year (The Shift Project, 2019).

The emergence and development of various methods to calculate the economic value of data underscores the increasing economic value of digital data. Coyle et al. summarise four approaches for the valuation of digital data: revealed preference; stated preference; impact based; real option analysis (Coyle et al, 2020). These approaches may have sub divisions as in the case of the revealed preference approach which contains: cost-based approach; income-based approach; market-based approach. The cost-based approach quantifies the cost incurred by the firm in the processing of data throughout the data supply chain. It includes the cost spent for maintaining both the hardware and the software infrastructure (Ker & Mazzini 2020). The OECD discusses four ways of calculating the economic value of digital data by looking at the information from use tables (part of the supply-use framework) and business statistics databases (expenditures on data storage products, i.e. hardware, software, and services); the revenues generated by firms creating explicit value from data (i.e. those collecting, compiling, and selling databases and associated products); data holdings and analysis may be contributing to firm valuations; links between trade flows and data flows, comparing

different measures of the trade in digitally deliverable products (OECD, 2021).

### **1.3 The Privacy Aspect**

The question of privacy in the context of digital data has led to numerous discussions and debates which continue to date. The conflict arises from the preoccupations of individual persons to share their data and the demand from the side of data users for the same data. Data subjects' preoccupation increases in the context of more data-driven initiatives that have an increasing influence on their lives by means of their data. The coining of terms like *surveillance capitalism* further fuels this preoccupation. Data users on the other hand need data to implement their ideas and seek to get data by diverse means including the use of nudging. Such practices may negatively affect the privacy of data subjects. Therefore, the present ways of data exchange seem not to address the question of privacy in the right way. The initiatives like smart city projects require a high level of privacy protection to permit the exchange of data of citizens through systems like Information Centric Networking (Kuru, 2024).

Ubiquitous systems like the ICN can be developed to stop the cyber-attacks on privacy. Similarly, Federated Learning

(FL), Collaborative Deep Learning (CDL), Privacy-Preserving Deep Learning (PPDL), Homomorphic Encryption (HE) scheme are techniques that protect privacy of people's data. However, the philosophical question of deciding the criteria to balance between privacy protection and public interest is yet to be defined. There have been several attempts to address the question of privacy from an ethical point of view. But the contextuality of ethical discussions has influenced the differentiation of legal frameworks that govern data governance.

The question of privacy is not something exclusive to digital data. It traces back to the conflict between individual interest and collective interest. The conflict between individual interest and collective interests is present throughout human history since the time when they started living as organized society. The nature of privacy is dependent on the nature of social ontology where privacy is discussed. The social ontologies that place societies over individuals interpret privacy different from the social ontologies places individuals over societies. The differences between the data governance regimes of the US and the China illustrates this difference in the conception of the social ontology. Undisputably, privacy of people should not be compromised given the potential threats it could create. The shield to protect privacy

of individuals is a shield to protect the society as well. Therefore, the degree of protection given to the privacy of people is directly proportional to the protection of the society. Consequently, the privacy question concerning the use of digital data could be decided based on the impact it will have on the society. In other words, the realization of social benefits or social value is the touchstone for privacy tests.

## **2. SOCIO ECONOMIC VALUE OF DATA AND PRIVACY**

The principal problem behind the conflict between socio-economic value creation and privacy aspect of data is the perception of data. Data is considered as information in digital age, and the its social aspect is largely ignored. The practical issue of the conflict between these values need to be redressed by theoretical clarification. On the basis of the philosophical thought of 'new realism' and borrowing inspiration from the approach of 'goods based view of objects' from economic theory, a feasible way out can be found out for the issue. The socio-economic value of data which is necessary to produce welfare from requires to be well defended in for sustainably putting into practice the concept of webfare.

## **2.1 The Perception of Socio-economic value and Privacy: State of the Art**

The three aspects – social, economic, and privacy – are not sufficiently addressed under the current understanding of digital data. The current understanding is by and large informed by various information theories and philosophy of information. It essentially considers digital data an entity which carries any information of something, and that which exists in any electronic medium. Philosophy of information is different from philosophy of digital data or digital hermeneutics because the digital data is one among the types of information while all information need not necessarily be always digital data. The camps of philosophy of information which stays close to digital data prodigiously employ semantic theories of meaning to interpret digital data. The approach towards digital data or information based on semantic theories seem to have two major aims: quantification and management of information and to identify the epistemological value of information.

The propensity of theories of interpretation of digital data to prioritise quantification of digital data than definition of the digital data is closely associated with the epistemological tendencies. The

paradigm of this approach can be seen in Shannon and Weaver in their attempt to quantify the pieces of information based on probability theories (Shannon, 1949). The emergence of optimal codes and the reductionism of digital data into numbers bear testimony for the approach based on quantification towards digital data. This approach helps a lot in the understanding the nature or features of digital data as well but may not help in arriving at a complete definition of it. Interpreting data based on the theories of probability fails to account for the philosophical implications of digital data. The competence of a data analytics is fundamentally centred on quantifying the digital data than to ask the ontological principles underlying data. Although present state of art of data analytics seems to be very efficient for its utility, the quantification approach will not be sufficient for interpreting digital data. The quantification of digital data not only allows for the management but also the variety of uses of it. Management of data usually becomes equivocal to the use of digital data. The theories of interpretation of digital data based on semantic theories barely aims at the use of digital data but the epistemological or the management side of it. But the stakeholders of digital data intelligently use the techniques of interpretation for realising their objectives like sales of goods and services in the case of data

driven businesses; research purposes by academics; political opinion in the case of politicians etc... However, the nature of information fundamentally changes when it becomes digital data assuming the socio-economic and privacy aspects.

The philosophic approach to interpret the situation at large failed since it followed the tradition of information theories. The emergence of philosophy of information can be seen as the continuation in the philosophic tradition which moves from the focus on metaphysics to epistemology, which later get influenced by the linguistic turn (Floridi, 2002). Under the guise of the supremacy of natural sciences over human sciences philosophy also tended to focus more on epistemology than ontology. Therefore, the newborn in the tradition of philosophy was groomed in the same fashion. Consequently, philosophers of information take a semantic approach in interpreting information with the ambition of gaining epistemological insights from it. Since theories of information transformed into philosophy of information, and the latter took momentum in the backdrop of advancement in ICT, a semantic approach towards information remained well justified. The computational methods of calculations had more to do with epistemology than ontology. The fact that information became the subject matter for the use of epistemological or semantic tools has

resulted in forgetting of the ontological aspect of information. In other words, the existence of information is taken for granted, while using epistemological tools on it. Not only the stakeholders in academia but also the stakeholders of industry focused on harnessing the epistemological aspect of data for making advancement in their respective fields. While academicians focused on data driven research initiatives to get more insights on a particular discipline for theoretical purposes, the industrialists embarked data driven initiatives to improve their goods and service delivery by using insight from data. As a result, the attempts to interpret digital data are also tinted with epistemological shades than ontological ones. In short, digital hermeneutics based on the mainstream philosophy of information misses the ontological aspects while overemphasizing the epistemological aspects, resulting in an incomplete theory of digital hermeneutics. The approach towards digital data from the perspective of information theories and philosophy of information provides sufficient ways for managing digital data for the purpose of gaining epistemological insight from it. These epistemological insights are later translated into various effects depending on the contexts (academia or industry) where they are employed. However, they fail to provide a robust theoretical framework for

capturing the ontological aspect of digital data that accounts for the three aspects mentioned.

## **2.2 The Goods Based Approach Towards Digital Data**

The epistemological understanding of digital data without proper understanding of the ontological aspect led to a wrong understanding of data as an entity, object or a good. The present theoretical framework permits to conceive digital data as a good, in the economic sense of the term. Digital data can assume the status of a private good, a public good or a common good with respect to the way it is governed. The categorisation proposed by Elinor Ostrom suits for the categorisation of digital data from the point of view of philosophy of information (Ostrom, 1999). But it may not help in permitting a sustainable data governance, given the drawbacks of private, public, or common based approach to data.

The distinction of goods based on private, public and common are based on two factors – rivalry and excludability. In a private good based approach, digital data is considered as a private good. The fundamental features of private goods are its excludability and rivalrous nature. The ownership of a private good by an individual excludes the ownership of the same good for

another person. On the same way, the consumption of the same good by its owner reduces the possibility of another person to consume it. For example, a bottle of water bought by an individual. The use, management and the rules that govern private goods springs from this basic understanding. The private goods-based approach towards digital data is usually realised by imitating the principles of private property ownership. This is evident from the tendencies to characterise digital data as intellectual property. Digital data can arguably be considered as a private property on pragmatic and managerial reason (Hazel, 2020). The pragmatic reason involves the cost of investment and corresponding returns in deriving benefits from data, while managerial reasons involve the possibility to make data markets works at optimum with the intervention of private players than public actors. The legal system tends to apply property laws based on the common law in order to address the challenges in the data governance sector (Harper, 2024). However, as mentioned before in this section, the private goods-based approach has created various problems in data governance sector. The reason for such problems can be found in the inability of the approach to address the two essential feature of digital data – the individual information part and the collective value part. Unlike the value of a private property that has a per se

value, digital data does not have a per se value. The bottle of water need not be compared with other bottles of water to derive its value, but the qualities of being water satisfies its corresponding use cases. Meanwhile the data about a bank transaction assumes value in terms of big data when it's compared with several other data. The per se value of the transaction such that the ease of an online payment or its accurateness is not under consideration when we see a digital data as a good in terms of big data. The condition of a private ownership shuts this collective value of digital data, or it does not adequately recognise its collective value. This approach will have two implications: firstly, it would prevent the efficient use of the newly discovered sustainable resource digital data because people could decide not to share their data even for philanthropic purposes whatsoever; secondly, people would share their data respecting the terms and conditions of managing a private good leading to overlook the potential consequences of the collective value. The second implication accounts for the negative socio-economic disruptions caused by data driven initiatives. The users of various online platforms cease their property rights to platform for using their services. The platforms later capitalise on the collective value of data, consequently enjoying unchecked economic and political power. Moreover, they may not share the

data acquired from the customer since it's a private property and therefore leading to the problems like data silos and limited data reusability. The private goods-based approach may promote productivity growth, but results in inequality and injustice that paradoxically make the sustainable resource unsustainable. In sum, the private goods-based approach makes digital data excludable and rivalrous and insufficiently responds to the private value and collective value aspect.

Meanwhile the public goods approach may become a guise to solve the problems in resulting from the unfairness in the data exchange and governance in a private based approach. The fundamental features of public good include non-excludability and non-rivalrous nature of the good. For instance, the consumption of light from a public street light by an individual does not prevent the other person from using the light (non-excludable) or cannot reduce the quantity of light for another person's consumption. The non rivalrous nature of digital data renders it the nature of a public good. For the non-rivalrous nature of data, it could be used to create social benefits even amidst privacy considerations (Jones and Tonetti, 2020). World Bank has conceived the term public intent data that could be useful for public policy making and consequently recommends political commitment and predictable

government financing for the same (World Bank, 2021). Scholars have argued both on theoretical and empirical grounds for governing data as public good by means of institutional interventions to derive welfare from digital data (Farefield and Engel, 2015). Essentially, the idea of public good outlaws the privacy aspect surrounding a good. For the same reason, as in the case of private good approach, the public good approach also fails to address the dual aspect of data. The fact that public goods are primarily owned and managed by the State or other similar institutions risks the importance of the privacy aspect. Here the collective aspect of digital data supersedes the privacy aspect or the individual aspect with grave consequences. Since the content of digital data is information about individual persons or other entities, an outright state control of it would risk dictatorship or surveillance. The management of public goods not necessarily requires the consent of individual persons but works on the basis of the dictates or vision of the state or institutional stakeholders. Even this view of has two implications: firstly, unchecked access to the digital data for state enterprises would risk democratic processes and might result in dictatorship and surveillance; secondly, it would prevent the development of diverse modes of using digital data since the state enterprises takes command over

all sorts of data usage. The States that already have a non-democratic regime could overlook the first aspect. Meanwhile, even such states cannot overcome the second aspect since it is directly connected with the improvement of the general prosperity. The public goods approach towards the management of digital data risks the decrease in the innovation in the field of data driven initiatives. It is yet another version of various cases in which excessive state intervention ruining the productivity. In sum, the public good approach too does provide good option for the management of digital data.

A third option to look at digital data is to consider it as a common good. The common good approach to digital data is born under the shade of the classification of goods proposed by Elinor Ostrom. It is inspired by the approach towards managing common pool resources that requires collective decision making. The nature of such resources, for instance, a village pond requires such kind of management for making it collectively beneficial. The common good approach was initially conceived to manage natural resources. However, the academics and experts in the field of data governance found parallel between common pool resources and digital data. Identifying data as part of knowledge commons further justifies the commons approach towards digital data. The

epistemological value of data to produce positive effects in both social and economic spheres makes it as similar to 'common knowledge' resources. The commons approach has managed to address the conflict between socio economic and privacy aspects to certain extent. There are research findings that proves the possibility of commons approach preserving the knowledge common trait of digital data and at the same time protecting the privacy aspect (Fia, 2021; Wong et al., 2022). Moreover, there are case studies that testifies the advantages of taking common goods approach as in the case of various data cooperatives functioning well in the sectors like financial services, healthcare, agriculture, energy provision, construction, and transportation (Bühler et al., 2023). The common goods approach is considered desirable in the management of digital technologies since they have the characteristic of other common goods that help development of individuals by virtue of being member of a society. This very nature of digital technologies and data justifies their collective management (Eghbal, 2020; Bernholz & Reich, 2020). The emergence of data cooperatives as a response to platform capitalism is essentially based on open data approach, which in turn is based on the commons approach towards data (Scholz, 2023). Similarly, several data intermediaries are based on the

commons-based approach. The prominence of data intermediaries very explicit from the fact the EU has dedicated an entire document on this topic and identified six types of data intermediaries (European Commission et al., 2023). The data common approach makes several data subject to open access, somehow reflecting certain principles of public good, which make vulnerable to cooperate and extractive practices (Bauwens & Niaros, 2017; Bodó, 2020), and at times slow down the capabilities of data to be used for social benefits as in the case of medical research (Kariotis et al., 2020).

The commons good approach but comes with its own shortcomings. Firstly, it attributes the characteristics of private, public, and common good to digital data without giving a criterion to distinguish between them. It lacks a theoretical background to achieve this distinction. Both the private and the collective aspect of digital data should be respected to have proper idea of the nature of data. For instance, a village pond can be considered as common good since the water in it is not created by any person and making it private may deprive a section of the people using it. It is not a public good because water is a rivalrous resource i. e. a unit consumed of it will not be consumed again for the same purpose. While a scientific equation is a common good even if its

consumption does not reduce the possibility of another to consume or use it. But at the same time the author of the equation can claim its ownership giving it the nature of a private good. However, it is considered as common good – something between private good and public good – for promoting the collective good. Notwithstanding these differences, in both cases – water and a scientific equation – the good or object under consideration has an intrinsic value or value per se. This value factor is missing in digital data when it is considered as big data. Its value is dependent on other thousands of data, and this dependence is not merely cumulative. Therefore, digital data does not suit into the category of common good. Secondly, the common good approach does not offer a sufficient justification for the collective management of digital data given the role played by private stakeholders in the development of these technologies. There are private companies like Comcast, Verizon, and AT&T etc... who have invested in the physical infrastructure like undersea cables, satellites, and routers etc... that permit the capitalisation of digital data. The commons-based approach fails to provide a theoretical basis for the justification. Consequently, the data governance based on the commons-based approach leaves the stakeholder who has more power to hijack the entire data governance system. This factor

explains the reason for the persistence power related problems even in those new data governance regimes. Collective governance often struggles with coordination, free-riding, and decision-making inefficiencies, particularly when participants have diverse interests and levels of power (Hess & Ostrom, 2007; Frischmann, 2012). The common good approach puts a different authority on command rather solving the essential issues related to the data governance. This is evident in the so-called digital vanguard problem where a single entity takes over command without essentially solving the problem in data management (Gerbaudo, 2017). Thirdly, it seems to undermine the economic value of digital data which is not a desired consequence for the data driven business sector (Bauwens and Pantazis, 2018). As in the case of private good based approach towards digital data creates the dominance of property rights, the common good based approach creates the dominance of the risk found in the public good based approach towards digital data. It tends to downplay the role of market approach risking the decrease in innovative solutions. It partly explains the inadequacy of data cooperatives that function based on commons-based approach. Lack of proper incentivization or proper financial retribution prevents the efficient functioning of data intermediaries or data trust that are developed based on the

common based approach. Finally, the big players find ways to dominate the sector even if there are laws based on commons-based approach (Birch & Muniesa, 2020).

Notwithstanding the drawbacks of common goods based approach towards data, The data cooperative model of data governance may provide inspiration for think about alternate way of sustainable data management owing to its affinity towards the long-standing tradition of cooperativism (Micheli et al., 2020). Data cooperatives, imitating other cooperative endeavours, address specific needs of people depending on the context of its formation. There are cooperatives that work on the fields of construction management (Bühler et al., 2023), defence against phishing (Salau et al., 2021), or citizen science projects (Tanwar et al., 2021). Even though these are examples of efficient data management and governance measures, they fail to provide a more universal way of data governance. Principles can be drawn from these individual efforts to formulate a more socially sustainable way of data management. Data cooperatives share common policy regulation, governance and membership, and core principles with cooperatives generally (Cheney et al., 2023; Gordon Nem bhard, 2014). There should be efforts to seek whether there more commons within these commonalities that

would become principles for carving out a more universal principle. The data commons approach that has been mostly developed by legal scholars and technologists lack practical application scenarios (Hicks 2022). The reliance of the commons-based approach on the concept of community fails to provide a universal basis to conceive a data governance approach. It believes that the resources that has implication on the members of community should be managed by the community members. It perfectly works in the cases where the notion about the community is rather clear as in the case of a community of based on the people from same profession. For instance, the knowledge common approach has enjoyed success because it was easy to determine the members of a particular knowledge community. The governing knowledge commons framework (GKC) is an illustrative where socio technical systems facilitate management of information/data (intangible assets) with a commons-based approach (Fia and van Maanen, 2025). In an extended version of commons-based approach, it works well with managing data commons in the case of managing data regarding indigenous community (indigenous data sovergneity or IDS). But it faces problems when the nature of community is more heterogenous. More the heterogeneity of the group, less will be the possibility to apply the features of a community to the group.

Therefore, the volatility of the notion of community will affect the data governance framework if it is based on the commons-based approach. The situation, thus, necessitates a more wide and inclusive foundation upon which data governance frameworks can be constructed. The concept of society assumes precedence over the concept of community in this context. Ostrom herself has point out the limitation of her theory to become foundation for governance models (Fia and Maanen, 2025). The concept of community perceives external factors like exogenous economic factors, political actors. The commons-based approach separates between the communities of data subjects and data holders. But the value of data is independent of these two players, neither dependent on a single player nor data per se. The commons-based approach calibrates the division between data subjects and data holders blinkering actual value of data. Sanfilippo and Frischmann have identified the 'ambiguous and vague' nature of community (Fia and Maanen, 2025). Further, the view has already resulted in the problems like community washing. The present data governance models are too 'data centric' that it fails to recognize its effects on individuals and groups, and thereby underestimating the moral, political, and legal underpinnings of data (Fia and Maanen, 2025). Negri and Hard identifies the value of data

underpinned by the wealth of social relationships, social intelligence, and social production (Hardt and Negri, 2017).

Given the drawbacks with the three ways of conceiving digital data – private, public, and common – the following section proposes an approach based on seeing data as a ‘social good.’ It constructs a theory of digital hermeneutics that is based the *documental* understanding of society proposed by Maurizio Ferraris.

### **2.3 Digital Hermeneutics**

Hermeneutics as a branch of knowledge carries a long and profound history on its back regarding interpretive methods, and traditions. But a little has been discussed in this camp in connection with interpreting digital data. Recent developments in the field of digital technologies have led scholars from different fields of human sciences to coin the term digital hermeneutics. But the term is not equivocal in various sectors. I would identify five camps to which the term digital hermeneutics refers to in the current world. Firstly, the use of digital tools in the field of interpretation uses the term. The use of technology to interpret and translate texts, manuscripts or inscriptions has gained currency in recent years (Daquino et al, 2020). Secondly, the term

refers to the interpretation of the information contained in the data stored in databases around the world. For instance, interpretation of twitter data for understanding some political opinion for formulating a political theory (Gerbaudo, 2016). Thirdly, digital hermeneutics is also used to speak about philosophy of technology. Scholars like Alberto Romele use the term while elaborating a philosophical point of view on digital technologies (Romele, 2019). Similarly, Don Ihde has used the categories of hermeneutics to interpret the relation between human beings, technology, and the nature mediated through technology (Ihde, 2021). Fourthly, the term can be aptly used to the branch of studies in data science. This branch of studies has made long strides due to its utility in managing and interpreting big data. Fifthly, digital hermeneutics can be appropriately used to refer to the research to understand the ontology behind digital data from a philosophical perspective. I would concentrate on the fifth sense in which digital hermeneutics is used since this is an area relatively less explored.

Digital hermeneutics employed in this thesis seeks to understand the ontology of digital data. For this purpose, the primary phase is to distinguish the features that differentiate digital data from other data which classical hermeneutics interpreted. Apparently, the subject matter of interpretation is the

same, save the difference that digital hermeneutics should consider the digitalized version of them. Moreover, the combination of digital data with the web has profound consequences. I would stipulate here some important differences between digital data and non-digital data, that we should consider for formulating a digital hermeneutics. Firstly, the digitalized version of text, images or other things can be reduced to the binary 0 and 1 as their basic constituents. For instance, a text can be reduced to combination of words or letters, while an image can be reduced to shapes and forms, but the basic constituents of the digitalized version of both is measured in terms of 0 and 1. Secondly, interpretation digital data make sense only in the presence of at least three parties, while classic hermeneutics can require just the minimum of two parties. For example, a person can read and interpret an ancient spiritual book for self-transformation but any attempt to interpret a digital trace presupposes someone else for whom the interpretation can be useful. It is true that a person can read the digitalized version of a spiritual book and get transformed, but the fact that she is reading the digitalized version creates data which is interesting for a third person. Thirdly, these digitalized data exist on a network, namely the web, which is very much different from the networks where non digital data exist. Most importantly, the

web is the production house of digital data not only by recording the traces of web users but also by digitalizing other already existing texts, images or similar data. Fourthly, the data created in the web need not be the result of a well curated or planned writing. They are simple recordings of the activities of the web users which at times could be very instinctual. Even the errors committed in the course of their activities are registered in the contrast to the case in which an author who never asks her editor to publish the rough copy of her work. Fifthly, non-digital works use the technique of comparison for validating the meaning while meaning of digital works derives from the very act of comparison. Comparison is an essential factor in the derivation of meaning of digital data, but it is not the case of non-digital data.

The history and evolution of classical hermeneutics shows that it is inadequate to deal with digital data. While at the same time, it shows the potential for the branch of knowledge to evolve again to interpret digital data. For conceiving a digital hermeneutics, I would divide the history of hermeneutics into three stages, of which the first two stages will be discussed in this section. Hermeneutics in its first stage is considered as the discipline which provided the theories and techniques of interpretation of texts. This is evident from the discourses found

in this discipline from the ancient Greek philosophy to Scholastic philosophy of the medieval age. In the second stage, hermeneutics expanded its radar under the works of philosophers like Schleiermacher, Dilthey, Heidegger, Gadamer, Ricoeur. These philosophers did not limit the scope of hermeneutics merely for text interpretation but brought novel topics for discussion. For instance, Schleiermacher applied the use of hermeneutics not only in understanding texts of certain areas but understanding linguistic experience in general (Theodore, 2021). Dilthey had fashioned hermeneutics to give more rigor to it as an epistemological tool for human sciences. He wanted to free human sciences from the poor condition of being considered as a branch of knowledge dependent on the methods of natural sciences (Ferraris, 1996). This enlargement of the scope of hermeneutics finds its continuation in the works of prominent figures of hermeneutics like Heidegger, Gadamer and Ricoeur. Heidegger characterizes his attempts to find meaning of human existence through investigating Being as a hermeneutical endeavour. Gadamer took hermeneutics to a methodological approach which is used to make knowledge possible in human science in a different way from natural science. Meanwhile, Ricoeur experimented the hermeneutical methods in facilitating self-understanding. Ferraris

notes this transition of hermeneutics from the status of art of interpretation to ontological curiosities while he outlines the history of hermeneutics (Ferraris, 1996).

The digital hermeneutics that is proposed in this thesis is founded on the idea of conceiving digital data a social object. This idea is originally proposed by the Italian philosopher Maurizio Ferraris (doc humanity) based on his theory of social ontology, documentality (Ferraris, 2012). The theory of documentality understands the social reality as constituted by documents that are the record of interactions between human beings and human beings with non-human beings. Human beings interact with their surroundings to satisfy their various kinds of needs. All sorts of human inventions, discoveries, arrangements, organisations that we see around are based on this urge for need satisfaction, so as the society. The theory of documentality seeks to interpret the principles underlying the way human beings make groups and organisations which becomes the social reality. It proposes an ontology that account for the existence of the whole social reality thus constructed. No discussion on human society can ignore the two basic components, viz human being and the acts performed by them. Theory of documentality explains how human beings and their acts bring into existence social reality.

The starting point for any social ontologist is to look at the existents that are generally considered to be social. It includes the social constructs of marriage, divorce, graduation; institutions like governments, universities, family; roles like the President of a State, citizen, asylum seeker etc... All those existents that are apparently social, presupposes the existence of human beings and their acts. As mentioned before, human beings interact with their surroundings or engage in act for satisfying their needs, and therefore they look for the best possible way to achieve it. The best possible way to achieve it is to work for it in a group rather than individually. This nature of acting together in groups is perennial to human species, whether they are the hunter gatherer groups or Multinational Corporates. However, the interactions or acts cannot be wildly random or chaotic but be ordered or stabilized since the opposite way would reduce the efficiency of the functioning of the group and thereby the need satisfaction. This does not mean that there is a pre-existing order to which all the human acts should conform, on the contrary, the order emerges from recordings of the acts in which the human beings indulged. The newly born order would further help in giving directions to further acts, which at the same time could be subjected to alterations. No entity – social or

natural – can undergo an alteration if it is not stabilized via means of recording (Ferraris, 2021).

Now, human beings, their desire for need satisfaction, their acts in group for the satisfaction of the needs, the birth of order, influence of the same order in the succeeding acts and the further alteration of same order are all linked by a common thread, namely, recording. The example of the hunter gatherers is a paradigm of this phenomenon. The cave paintings done by the hunter gatherers are the recording of the information about the techniques of hunting, places where to look for the prey, how to distribute the catch etc... Here, on their way to satisfy their need to have food, the hunter gatherer joined together (group) to engage in hunting (act) then carved out their hunting and food sharing techniques to the walls of a cave (recording) for future reference. Later, the others can look at the cave paintings (recording) to learn the ways (order) according to which they should proceed for hunting and sharing the catch. Likewise, the succeeding generations continued to capitalize on the order created by the recordings made by precedent generations to organize themselves better and at the same time, alter the order by keeping track of each new development. The order and stability brought in by recordings led to the formation of strong social

organizations. Consequently, we discover that although the types of human needs to be satisfied and the methods to satisfy the needs are significantly different in paleolithic age from the technocratic age, the principle which brought in diverse people together to follow a uniform social organization was by means of recording. In the absence of the technique of recording, it would have been difficult for people to arrive at long term agreements and collaboration, which are among the essentials for any society.

Recordings, in the context of social ontology, can take various forms like that of cave paintings, manuscripts, clay tablets, paper documents, measuring sticks, paper currency, cryptocurrency etc... Notwithstanding the form, each recording contains a particular act or interaction initiated by a human being. The content of a recording or document is an interaction between human persons or a human person with her surroundings. Once the content of a document is stabilized, the people become bound by the content since content could be altered by individual person. The fact that a document records the act performed by human persons renders it accessible several times. Documentation transforms praxis to poesis in a way it stabilizes the act. Thereby, the people came together to form a society by means of documentation are bind together by the documents they have

created. If their agreement to come together as a society was not documented somewhere, the members could leave the group easily because there is no evidence to prove the act of agreeing that they had done before. On the contrary, the accessibility of referring time and again the document that recorded the agreement would oblige the participant to stick to it. This efficiency of documents in building strong social organization made it the unique way for the creation of social objects that constitute the social reality. The evolutionary instinct of human people to survive the worst challenges of nature by staying together got effectively realized by their capacity to create documents.

No social object is an exception to the role played by documents in its formation. Nation states, international organizations, international conventions, presidents, ministers, finance and economics, markets etc continue to exist and function because there are documents that create and validate their existence. Natural objects which become social object cease to be so if the document that validate the particular social object cease to exist. Ferraris sums up the entire dynamics of recording and its connection with social reality with the equation social reality = inscribed act (Ferraris, 2012). In the initial stage to arrive at this equation, he distinguishes between ontology and epistemology

which is necessary to properly identify the distinction between natural objects and social objects. The influence of transcendental idealism obscured the distinction between natural objects and social objects by universalizing the principle – ‘intuitions without concept are blind.’ Ferraris proposes the new realistic approach to overcome this ‘transcendental fallacy’ by distinguishing ontology and epistemology (Ferraris, 2012). To put it simply, the quantity of the meat caught by the hunter-gatherer tribe is not dependent on their minds (ontology), while the quantity of the portion for each member in the tribe is determined by an agreement between them and the record of the agreement they have created (epistemology). In other words, the traces of human interactions, not psychological status of people as Thomas Reid points out, becomes the subject matter of social object (Reid, 2007). Ferraris, further identifies other four ‘ingredients’ that constitute the social object: firstly, no social object in history is deprived of an inscription or sign; secondly, the performative nature of language to bring into existence new realities; thirdly, the consequential nature of the realities produced by the linguistic performance; fourthly, the textual nature underlying the realities. The fourth one which Derrida uses to arrive at the conclusion that nothing exists outside the text, is altered when it comes to the theory of

documentality. Under the law, Social Object = inscribed act, there is nothing social existing outside the text (Ferraris, 2012).

The documentality theory of social reality becomes clearer in comparison with other theories of social ontology. The most prominent among them is that of the collective intentionality which explains the formation of a social object on the basis of the equation  $X \text{ become } Y \text{ in } C$ . A natural object  $X$  assumes the status of a social object  $Y$  in the context of  $C$  based on the collective intention of a group of people as proposed by John Searle. There are two problems in this theory viz. 1) it fails to explain the reality of negative social objects like debt which lacks a material existence as the way Searle conceives it 2) collective intention may not alter social reality as the way documents do (Smith, 2012). Speaking about the second objection, the example of a debt agreement signed between ten people. The collective intention of the five in the group to withdraw from the debt agreement never set them free, unless the remaining five agree on the same, and later modify the document that created debt (social object). Similarly, other theories of social ontology including institutional theory, normative social ontology, network theory, functional theory or critical realism, partly succeed in interpreting social reality but find it at odds to frame a complete theory of it.

The theory of documentality explains the dynamics behind the other prominent theories of social ontology. As in the case of theories based on *intentionality*, where *intentionality* alone does not satisfy the conditions for the existence of social reality. The intentionality of the people who agree on the certain conditions should be registered on a tangible object so that no individual tricks on the agreement. There will not be a society in the absence of such a registration. This registration includes the feather crown of a tribe's leader from the palaeolithic age to the cryptocurrency of twenty first century. The feather crown and the cryptocurrency make the people involved in its emergence to be bound by its implications. Similarly, there are numerous registered objects that permitted the creation of social reality among human species. These registered objects or documents in other word, exert implication on the members who are bound by them. This in turn explains the idea of Durkheim that social reality exists *sui generis* with its own properties and characteristics (Durkheim, 1938). Any change to the social reality can be brought in by making some change to the documents that created it. The dynamics behind the critical realist view of emergence of social reality is also not very different. There are always some sets of documents which underpin the social structures and some documents which

accompany the transition of social structures. In sum, various kinds of human interactions lead to the creation of social reality because they are registered. Any changes in the human interactions gets reflected in the social reality only if the documents are changed accordingly.

The theory of documentality enjoys an upper hand over other theories of social ontology because it explains the relation between human beings and human acts done collectively. The hunter gatherer man went for hunting to satisfy his need (hunger), and then kept a record of his activities for referential purposes, both for him and for future generations, which helped in continuation of hunting and improvement of the same. Similarly, governments of the modern nation states may ask the supermarkets to keep inventory of their products to keep a check on inflation of food prices, hoarding or promoting ensuring better food security and safety. In both instances, if not to mention similar instances that happened between the two time periods, the primary intention of documenting the human acts is to ensure the well-being and betterment of the society in general. Various theories on social ontology have succeeded in explaining nature of human beings and human activities but fail to account for the way by which human activities can lead to the emergence of a society. A society

consisting of diverse people cannot stay together if their activities cannot be recorded so that the recordings (documents) will have a binding effect on the participants.

On the basis of the above observations, I would enumerate three important facts about documents: 1) society cannot emerge if human acts are not documented because documents stabilizes them by means of inscriptions; 2) the purpose of documenting human acts is co related to the general well-being of society that the document begets because one of the main drivers that bring together people is the necessity for satisfying various needs; 3) the content of the document even if it is not carried out by a human person, is of human interest. As technology advances the techniques of recording advance as well, but the fundamental features do not change. Regarding the last observation, I would suggest the example of my bank account automatically paying a subscription charge to an online platform each month without me initiating the process each time but informs me about the transaction by leaving a receipt (document) of the payment. We could, therefore, make another important observation that the documents which accounts for the emergence of social reality, at the same time, become means to know about the same society formed by it. The capacity of a document to account for the

existence of a society would manifest its ontological value while its capacity to provide information about society would be of epistemological value. Here I would cling to the distinction of document in terms of weak and strong documents (Ferraris, 2012). Strong documents beget a social object, but weak documents might do it the same way. For instance, the train ticket a person used to travel is a strong document when it shows the agreement between me and the rail company for the exchange of a service. But the same train ticket would become a weak document when it is used in court as evidence to convict the person who used the ticket to travel to commit a malicious act. Evidently, the first case of the train ticket has an ontological value while the second case of epistemological value.

## **2.4 Digital Data and Documentality**

Digital data can also be considered as documents owing to the role they play in constructing or conditioning social reality following the rule  $SO = \text{Inscribed Act}$ , regardless of whether they exist on an online platform or an offline material medium (Ferraris, 2021). It is the record of an interaction between two human beings, human being and nature, or technologies of human interest. This character pertains to all sorts of digital data that were

taken under consideration by the law makers and policy makers of aforementioned documents. However, they can be distinguished as weak digital data and strong digital data following the distinction between weak document and strong document. The digital data that contains the record of a social act as its content, and at the same time does not create an obligation or promise is a weak digital data (eg. census data but is that record of something with a social value). Meanwhile, the strong digital data contains the record of a social act as its content and entails a promise or obligation (as digital money). Further, I would propose a category of digital data namely, mirrored digital data, which are the digitalised version of both weak and strong documents. For instance, the paper version of an identity card could be stored in the form of a digital data and could fulfil all the purposes of an identity card. Unlike the strong and weak digital data, the mirrored digital data always necessarily requires a corresponding non digital version of it. Digital data can be considered as social object not only because they are formed following the rule of the formation of any social object but also because it demonstrates the ontological and epistemological nature of documents.

All the three categories of digital data play the same role as that of documents in running the society. There are differences in

the way they play their part in constructing social reality and facilitating the continuous existence of social reality. The fundamental aspect in the production of digital data or documents, and its capacity to account for the social reality is yet another manifestation of the perennial nature of human society to construct social reality by means of recording or documenting. There is no novelty in the fundamental aspect, but the way the production of documents is done – digital – makes the difference. This difference has strong ontological implication on the social reality. As mentioned before, the purpose of documenting acts is to create stable groups of people for realising various sort of need satisfaction. The larger the number of the members in the group, the stronger should be the capacity of the document which account for the group to bind it together. It requires the 'omnipresence' of the document among the members, so the chances for an individual or a few of them to cheat on the others are less. To cite a concrete example, digitalization has significantly reduced the problem of individuals possessing multiple identity documents (Banerjee, 2015). Notwithstanding the fact that a central authority issues the identity documents, people managed to cheat on the system since the functioning of the government was decentralized in various parts of the nation and the network was not very strong.

The advent of digitalized networks prevented people from creating multiple identity documents from different centres. Yet another example, from another context though old, is way Christianity underwent a significant change after the printing press made the bible more available. People came to notice that the document that bind them together may not be interpreted as the way it is done by a small group clergy, but there are morals and values which makes the social group of Christians that are beyond the interpretation of a small group of clergymen who had access to the bible – the binding document of Christianity. Another example would be the RTI act in India which obliges the government offices to make available any document which had an impact on the society. Similarly, there are many examples that prove that availability of the document for the members of a society which the document account for, make it more just, thereby more functional. Digitalisation of the document fulfil this requirement both from the perspective of the people who created it and the perspective of the people who agreed to be part of it. It is evident then, that the digital data as the capacity to account for the social reality in a better way.

Therefore, firstly, digital data effectively reinforces the social reality better compared with the non-digital documents that had

the same role. It has good the capacity to reinforce the social organization in a better way compared to non-digital documentation method. Secondly, digital data permits to carry out social acts faster and easier. The use of ICT tools combined with the feature of recording has led to the emergence of new types of society like the society 5.0 (Hitachi, 2020). The birth of society 5.0 follows all the rules of emergence as it was not a planned collaboration of ICT and social dynamics. But its emergence lets one to infer the significant role of digital data as documents in forming social reality. Each time a citizen compile income declaration, pay energy bills, pay for parking lot, accept 'cookies' for using a website, book a ticket for a cinema, get a vaccination certificate or any such activity carried out online people engage in creation of social reality. The number of such activities increase due to the ease and speed at which they respond to the needs of human beings as social subjects. This tendency doesn't seem to stop soon, and therefore, it is worth reflecting digital data as documents underlying social reality. Having said that, I don't want to underestimate the vulnerabilities of digital data and its probable implication on social reality. In any case, the digital data involved did its part in creating and let continuing the existence of social reality.

All the three categories of digital data contain the information about the social acts as its content. Reciprocally, having a look at the digital data helps us to understand the society created them. Digital data, in this scenario, assumes an epistemological value as in the case of documents. The neo realist explanation of the distinction between ontology and epistemology perfectly explains this emergence of epistemological value of digital data from its ontology. We have the inscription of act which becomes an object (ontology) at first, and then an individual mind can learn about the object (epistemology). The recent development in the field of analytic sociology using digital data and digital methods testifies the epistemological value of data as documents (Spaiser, 2021). Researchers tend to increasingly rely on digital data from various sources to learn about social reality. The web provides researchers with plenty of data appropriate for research in various topics in social science. This includes inferring socio demographic characteristics the society (Hinds Joins,2015); representation of motherhood in public spaces (Zappavigna, 2016); friendship networks (Phan and Aioldi, 2015); climate change debate (Williams et al 2015). Although the topic of study is different from one another, the source of information on which each enquirer relayed is a matter of interest for digital

hermeneutics. The stable conclusions arrived at by the researchers shout out the epistemological aspect of digital data in understanding social reality. Digital data assumes this nature because it directly or indirectly accounts for the existence of social reality. The epistemological potentials of digital data have been effectively used by businesses for monetary benefits. The increasing number of emerging data driven businesses are not because of another reason. Businesses can learn about the opportunities by looking at the digital data at two levels. The first is looking at the data of private individuals as in the case of KYC technologies (Schlatt et al 2021), and the second is by gathering information about the markets at a macro level where information about a lot of people are evaluated. The epistemological value of data could not have come into existence if data did not ontologically account for the social reality.

The ontological and epistemological insights into digital data shows their documental nature fairly enough. At this point, it is worth mentioning that an equilibrium for right use of the digital data can be found in the ontological and epistemological nature of digital data. Information can be assumed from the digital data but it should not go contrary to the ontological principles underlying the digital data, which is the coherence of the society. The current

polemics around digital data is very much connected with the misuse of knowledge or information from the digital data for activities that have led to economic injustice, power imbalance or political incorrectness. The availability of the information about the use of digital data for the members of the society will become a deterrent for the people who used the information not to indulge in any malpractices. In other words, not only the people who has the tools and techniques to interpret digital data, but also the people whose data are interpreted also should be given a role in digital hermeneutics. But before that, it is necessary to outline a theory of interpretation based on the premises mentioned above.

The factor that facilitates the use of digital data through semantic approach to realise specific objectives is the documental nature of data, which I had elaborated in the prior section. The semantic approach towards data fails to recognise this documental aspect of digital data. It helps to understand the meaning of digital data but does little to understand the significance of digital data. The significance lies in the fact the documental nature of digital data i.e. it contains social acts as its content. As mentioned before social reality is constituted by the social objects, which in turn are formed following the rule  $SO = \text{Inscribed Acts}$ . Semantic approach by limiting itself to various theories of meaning fail to recognize

this documental aspect that gives significance to digital data. In the context of digital data, I would distinguish between the terms meaning and significance (or importance). The semantic theories of meaning are satisfied if the digital data unmistakably represent the actual text, artefact or state of affairs it refers to. Therefore, they address the question of meaning or veracity of a particular digital data, which in turn leads to the valorisation of data. But they fail to account for the nature of that value, and thereby its significance. I use the term significance to refer to the factor which adds value to digital data. For the moment I would identify the three factors described here with three variables: x as digital data; y as meaning of digital data based on semantic theories; z as the factor that gives significance to data. To cite a concrete example, the information about my credit card details present in an online platform is x; the accuracy of the correspondence of the credit card number to the original number is the semantic meaning, y; the capacity of the digital data to facilitate a data driven business is its significance or z. In other words, the digital data x contains the meaning y and the significance z. If x, unlike digital data, was a non-digital information, it would have sufficed to limit our investigation to the y aspect alone to understand it. But the factor that makes the digital version of the card x significant or important

is not the mere correspondence of the digital data to the facts it represents, but its potential to be compared with several other credit cards and their activities. This factor of significance (complementary to the factor of meaning) is the reason behind the popularity of digital data. It would become impossible for digital data to account for all the changes happening in the 21st century under the umbrella term 'digital transformation', in the absence of the 'significance' factor. Consequently, a logical representation of the entire proposal would like:

$$X = f (Y + Z) \quad (1)$$

If digital data X is the function (f) of y and z, then the competence of digital hermeneutics for digital data is to define the function (f). The function of semantic meaning has been prodigiously accounted by various semantic theories hitherto. Now it is necessary to explicate the function of the 'significance' factor. As mentioned in the prior paragraph, digital data are significant or important because it can be compared with several other digital data for various purposes. This nature of comparability of digital data may not be considered as the final reason for the significance of digital data. It could be further asked, why digital data assumes significance when compared to other data, or why at all digital data

possesses the feature of comparability. The answer can be found in the documental nature of digital data which was discussed in the prior section. Digital data existing online are social objects containing the records of social acts. As mentioned in the second section, society is formed when people act together to realise their various needs and keep records of those acts. Since digital data is a new social object formed on the basis of the need satisfaction of social subjects, it could be further capitalized for the realisation of several other purposes of social subjects' interest. This is the reason that accounts for the 'significance' factor of digital data. So, if function of  $y$  is semantic meaning of digital data, which looks like:

$$F (Y) = Sm (X) \quad (2)$$

Where  $Sm$  is the semantic meaning of digital data, and  $F (Y)$  is the function of semantic meaning from (1). Now, the function of  $Z$  is the documental meaning of digital data since it is the documental nature that allows digital data to assume significance or importance. It could be represented as:

$$F (Z) = Dm (X) \quad (3)$$

Where  $D_m$  is the documental meaning of digital data, and  $F(Y)$  is the function of significance from the (1). The digital hermeneutics which permits the completed understanding of digital data should be the combination of (2) and (3), which could be represented as,

$$D_h = F(Y) + F(Z) \quad (4)$$

which in turn can be represented as,

$$D_h = S_m(X) + D_m(X) \quad (5)$$

In short, (5) is the equation for the right understanding of digital data which propose through this thesis. But it should be specified that (5) is applicable exclusively to the digital data present on the Web. All digital data is not necessarily be present on the Web, and hence I distinguish between offline digital data and online digital data. For instance, a text to which I typed into a computer which never has been connected to an electronic network is an offline digital data, but it becomes online the very moment when it enters in any sort of electronic network. Although propensity of offline digital data to become online is high, it remains as an unrealized potential that prevents the application of

the (5) since it fails to assume any significance or importance. However, the current scenario of digital data under consideration offers little chance of the existence of offline digital data.

The equation (5) covers both the ontological and epistemological aspects of interpreting digital data. It appropriately addresses the distinction between digital and non-digital data which I had outlined in the first section. The binary nature, the existence of data in digital platforms, the spontaneous nature of emergence of data can be accounted in the ontological part of the equation. Meanwhile, the emergence of meaning by the comparison of digital data, the 'network' nature of the platform where digital data exists are accounted in the epistemological part of the equation. The semantic part of the equation explains the ontology of digital data, while the syntactic part of the equation explains the epistemology of digital data. Similarly, (5) is applicable to all the three kinds of digital data – strong, weak and mirrored – that I had outlined before.

The theory/equation would get clearer in the counterfactual approach towards the topic. The current problems around digital data management are the result of the wrong understanding of digital data. Digital data is considered as the recording of the acts

performed by people on digital platforms while its social nature is ignored. Therefore, most of the times digital data of people is considered as private property. Now, this private property is exchanged with the online platforms for the services they provide for the owners of the private property, digital data. Online platforms, in turn, capitalize on these private data and improve their profit margins. The problems like privacy litigation against such platforms by people do not stand trial since the latter has already sold out the rights of the private property to the platforms. The entire digital data management becomes unsustainable when people and systems ignore values other than the economic value of digital data. A right interpretation of digital data would bring to light the social value of digital data that could constitute the social epistemological value; its capacity to promote social welfare; its potential to promote sustainable economic models; its ability to promote desirable growth in AI technologies.

## **2.5 The Conception of Social Good Perspective**

If digital data as an entity conforms to the nature of a social object that accounts for social reality, then it can be considered as a social good. The social good approach towards data is inspired by other categorizations of goods proposed by Ostrom and her

followers. As it was elucidated in prior section, the present categorizations cannot fully capture the whole nature of digital data. But at the same time, data contains features of all those goods as well. The categorization that comes most closely capture the features of digital data was the commons-based approach. However, the vagueness in the concept of community and the length and breadth of the concept of digital data do not make it any better than other categories of goods. A solution is to conceive a category which is wide enough to capture the nature of digital data in its entirety. This condition combined with the nature of digital data as social object gives birth to the idea of social good.

Digital data can have the characteristics of public, private and common good. Data can be an excludable good if it is about the data cleaned and curated by a party investing resources on the process to gain returns for the investment. But if that excludability triggers negative disruptions in the society, it should be reevaluated, and data should be made non-excludable. The negative disruptions resulting from the 'winner takes all' model; limiting the benefits of data for marginalized people or research purposes are worth mentioning. On the other hand, data is always a non-rivalrous good since the consumption of a bit of data by A

does not reduce the possibility of the consumption of the same pieces of data by B.

The social, economic, and privacy aspects are not effectively addressed using the categorisation. The economic aspect is at large decided by using Ostrom's category of goods combined the contextual market dynamics. It does not sufficiently address the question of social aspect and the efforts done on the aspect by commons-based approach was futile. It is not only due to the vagueness in the concept of community as pointed out before, but also because of the aspect of privacy involved. The social aspect of data cannot be subsumed because it is the fountain from which all the value of digital data springs from. At the same time, the privacy aspect cannot be overlooked because it is part of the ontological basis and the use of data will have consequences on the individuals directly or indirectly.

Therefore, there is the need to conceive a category of good that can include the aspects of rivalry and excludability that can strike a balance between social and private aspect of digital data. The social good category serves the purpose. It is based on the ontology of digital data as a social object. It sufficiently addresses the privacy aspect when it views data as a piece of information,

and at the same time it recognizes the social aspect by virtue of which data creates social reality. It also provides space for data scientists with the  $Sm(X)$  part and social scientists and theorists with the  $Dm(X)$  part.

In a social good perspective, the data use should prioritise the positive impacts it can bring to the social reality. In a normal business scenario, the profit for the enterprenuer is the priority while the social benefits are secondary. The social good approach turns the tables: the social benefits should be prioritised over the private profits. The rivalry aspect of digital data is undisputable, but the excludability aspect is a matter of contention. There is a lack of criteria to decide when data becomes excludable and non-excludable. The social good approach does categorically endorse any side. However, it supposes that the capacity of digital data to provide social benefits should be prioritised over the economic gains it can bring. For instance, the result of a data driven business should be, more than sixty per cent, goods and services creating direct benefits to society. In this way, it will respect the social aspect and the individual aspect of digital data. In other words, the criteria to decide between the excludability and non-excludability is not decided based on market forces alone but democratic

processes whereby all the stakeholders enter into dialogue with each other.

The social good approach, unlike the private good approach that prioritise the privacy aspect of digital data, and the public or common good approach which prioritise the social aspect over the privacy aspect, gives equal importance to both the aspects. Privacy cannot be compromised as long as the content of the data is about individuals, organisations, or subject matter of their interest. But at the same time, the value of the same data cannot be independent of the social milieu where it is formed. Digital data exists in a continuum of a socio-privacy aspect. The digital hermeneutics equation (5) captures this continuum. The Ostromian distinction of goods does not recognize this continuum since one aspect always try to undermine the other. Evidently, such undermining tendencies have resulted in the negative disruptions on the social fabric. The social good approach brings down the amount of negative disruptions data driven initiatives cause on the social fabric.

Governing digital data with the right perception of its semantic and syntactic nature has the following benefits. Firstly, it helps to resolve the confusion in categorizing it as public, private,

common or club good. It should be considered as a social good in the context of its use in any sector because the very factor that allows the use of digital data is its social nature. Identifying digital data as a social good allow to recognize the social object that accounts for its existence – the individual or group who owns the data – with all respect to the privacy. This could not be justifiable in a reciprocal scenario, i.e. a privately owned object being taken away as a social good. In addition, it resolves the problems that the common based approach towards data fails to achieve (Tarkowski, 2024). Secondly, identifying digital data as social good requires obligatory steps from the institutions to recognise the equal importance of privacy aspect and the social aspect. The institutional interventions that take side of one particular aspect create negative impacts of data on society. At the same time, there are stakeholder interventions to address this issue, but their mandate is not strong enough to resolve these issues. The case of data intermediaries is an illustrative example. Data intermediaries are considered as initiatives by enlightened civic society members to organize and address the mildew in the data governance from a privacy perspective. The social good perspective that identifies data as social object calls for proactive regulatory measures and data governance framework than efforts by a few data

intermediaries, given impact of digital data on the social reality. It obliges the governments to come out of its passive status as a protector of privacy while taking regulatory measures, but as a proactive facilitator of value creation by digital data. It could effectively use the already existing data intermediary framework with some alterations to achieve this task. This in turn would benefit the data intermediaries as well, by making their business model sustainable. Thirdly, the social good based approach promotes the need of participation among all stakeholders in managing digital data (Sadoveski et al. 2021; Birhane et al. 2022). Digital data has become a valuable resource that influence all walks of people's life, and therefore it is necessary to ensure their participation in its governance.

The concept of social good cannot be realized if the practice of data governance does not change accordingly. There should be a practice that strikes the right balance of the privacy and social aspect of digital data for producing social, economic, and intellectual benefits to the society. Contextually, the principles of the social sustainability elaborated in the first chapter can bear torch light for the initiatives that seeks to strike this right balance.

Participation is not an option but an obligation, without which the social value of digital data would be misused by the data users while the data subjects remain obsessed with the semantic value. It also resolves the current problems centred around participation in the sector (Samson & Fay, 2024).

### **3. SOCIAL SUSTAINABILITY AND VALUE OF DATA**

The conception of the digital data as a social good would allow the application of principles of social sustainability proposed in the first chapter. The theoretical clarification proposed in the section two becomes a way to overcome the conflict between socio-economic value and privacy aspect become realised when seen through the framework of socially sustainable development. Applying the principles of equity, participation and multipillar nature of social sustainability in order to use data for the capability development of people would help in resolving the present issues found in data governance.

#### **3.1 The Social Sustainability Principle and Data Management**

The socially sustainable way of managing the new resource, digital data can be done by using the concept of social

sustainability defined in chapter one. *Social sustainable development is the development which promote the capabilities of all the members of a group and, at the same time, preserves the ecosystem which facilitated the promotion of those capabilities.* The definition presupposes two conditions: 1) the resource should ensure the capability development of all members of the group; 2) the conditions that promote such capability development should not be compromised.

The data governance and management framework at present do not completely satisfies the first condition. The services provided by online platforms to the consumers in exchange of their data is not as valuable as the cumulative value of the data collected from them. Consequently, the possibility for consumers to develop their full capabilities using their own data is not realised. Online platforms have the means to use the data for their purposes, and improve their capabilities. The capacity of online platforms to use the data resource allow them to increase their capacity to get social (eg. influence political opinion) and economic (eg. wealth generation) advantage. In other words, the capacity to use one resource make them able to use other resources as well. Although it is quite normal that the capacity to use a particular resource would help in using other resources'

exploitation, but the unjust and unequal distribution of the capacity to realise would prevent sustainable development in the society. Contextually, the edge which the online platforms possess over online users to exploit the data resource resulted in unsustainable development in the sector.

People and organizations are increasingly aware of the problem and there have been several attempts to resolve the issue. However, the incomplete understanding to digital data has prevented fruition of any attempts in that context. The commons-based approach and the implementation of it via data intermediaries that were consulted in the section two is an illustrative example. The digital hermeneutics equation provides a correct understanding of digital data that would pave grounds on which equitable and just management of data resource for capability development can be built on. The equation which captures the socio-economic and privacy continuum makes it mandatory to design data governance framework in a way that permits capability development of all stakeholders involved. The private and the public good based approach outrightly places a single party over other in terms of capability development using digital data. The common based approach initially promises an equitable ecosystem for capability developments, but does not

remain resilient to the risks of a single party taking advantage of others. These incomplete understanding of digital data combined with the market dynamics do not speak wrong about the status quo since it fails to explain the reason behind the unjust data governance framework. The combination of the two factors results in a lack of obligation for ensuring an equitable capability development of all stakeholders related to the data resource. On the other hand, the social good approach based on (5) makes it obligatory for all stakeholders to recognise the socio-economic and privacy continuum, and streamline the data governance and management framework according to which they work. On its basis, to ensure capability development is not an option, but an obligation. The social good approach necessitates to reframe the data governing practices for recognizing the role of data subjects. It will therefore, result in several disruptions in the business practices and resource utilization. It is necessary to make sure that these disruptions result in constructive changes, and at this point comes the relevance of the second condition of socially sustainable development.

The reframing of data governance practices will have both negative and positive disruptions on all stakeholders involved in the process. However, it should not bring down the general welfare

deriving from the exploitation of data resource. Historical evidence testifies that violent means to bring in structural changes will have more negative consequences than positive consequences. For instance, consider the response to poor labor conditions generated during the time of industrial revolution. The violent take-over of the means of production taken place in Russia resulted in the revolution which not only failed to deliver its promises to working class, but also resulted in less democratic regimes of managing industrial capital. Meanwhile in Britain, more institutional intervention to change the status quo of labour condition by means of passing laws and other measures resulted in a more peaceful and constructive transformation in the industrial sector. On a same note, the social good approach should bring in constructive changes. It should be able to preserve the ecosystem that promotes value generation from the digital data. If it favours data subjects more under the guise of privacy to share their data less, or favours data users and data holders more under the guise of improved value generation, the ecosystem collapse. In the former case, the data users will invest less resources to make use of digital data, thereby shutting the doors of innovation and growth in the sector, while in the latter case, the unjust practices in the field of data governance continues. The very

purpose of the conception of the social good based approach is to avoid this problem. The measures put in place to realise the capability realisation of the stakeholders should not go in contrary to the systems that allowed the development of the resources that allows for the capability development.

The two conditions for the socially sustainable management of digital data can be realised if the three common aspects social sustainable development is taken into consideration. A combination of the principles of equity, participation, and the multi-pillar approach will render the data governance framework capable of realising the two conditions of social sustainability.

### **3.2 Equity**

The current model of governance does not permit the equitable distribution of the socio-economic value generated by digital data. It has led to the emergence of a 'winner takes all' model where a few tech giants who hold the technology and resource take advantage of the data resource (Pistor, 2020; Pfothenauer et al. 2022). The model prevents equitable access to other SMEs and potential business ideas to realise their objectives since the current model result data silos (Beaulieu & Leonelli, 2022; Verdegem, 2022). The sustainable use of digital data should not

allow the data to be concentrated on the hands of a few layers in the industry (Madison, 2020; Micheli et al., 2020). The rise of big tech companies has resulted in the data concentration in few hands adversely affecting a fair competition in the tech sector. Several countries have considered to alter the competition policy in the wake of this market concentration (Birchi, 2025).

The private good approach towards data leads the private stakeholders to take lion share of data leaving behind the data subjects with less or no value. The public good approach on the other hand privileges the public institutions to capitalize on data more than other stakeholders. Neither the common good approach manages to provide a solution for the equitable distribution of data's value. In the private good approach, the capabilities of a particular group of individuals are prioritized over the capabilities of several other individuals and the society itself. Meanwhile, in the public approach, the capabilities or well-being of the society is gained at the expense of the capability development of several other individuals. The common good approach seems to continue this inequity due to several other factors.

The equitable distribution of the value digital data consists in its use for ensuring the capability development of all stakeholders

involved, and the protection of the environment that permits that capability development. A contradictory way of data governance may continue to generate value in the society by means of various data driven initiatives but may not result in a socially sustainable growth.

### **3.3 Participation**

Participation is another component that ensures the effects produced by the socio-economic value derived from digital data would result in the socially sustainable development. The Ofqual exam results show that the data governance policies which do not give enough participatory grounds for data subjects may disempower the latter (OSR, 2021). Participation will give voice to the needs of all stakeholders concerned with digital data, and therefore their interests will be reflected in the data governance measures. Consequently, the value would help in the realization of the needs of all the stakeholders. Participatory approach towards digital data allows the responsible use, collection and management of digital data (Ada Lovelace Institute 2021). The concepts like data stewardship gives hope to put in place participatory ways of data management (Open Data Institute 2022). The multi stakeholder approach towards data governance exist in its initial

form. The OECD council on health data governance developed by the Committee on Digital Economy Policy and the Health Committee, the former Working Party on Security and Privacy in the Digital Economy (renamed in 2019 as the Working Party on Data Governance and Privacy), and the former Health Care Quality Indicators Expert Group (OECD 2022) is a paradigm in this direction. A more direct involvement of data subjects in the management of data is found in the Data Governance Framework for New Zealand, where the indigenous Maori community closely involved. This policy feedback process is particularly relevant within the data governance discussion since it will allow obtaining the most value from data while protecting people from harm (The Digital Trade and Data Governance Hub 2022). Therefore, public consultations on the design of policies and regulations could support transparency and stakeholder engagement while fostering the social license of the process (Micheli et al., 2023). Micheli et al stands for participatory and democratic decision making for gaining insights from digital data for better policy making (Micheli et al., 2020).

The participatory governance of data, in opposition to the concentrated control of data can be conceived in three ways – individualized control of data; shared control of data; and

individualized and shared control of data (Cooper et al. 2023). The concentrated control of data is the most used way of data governance where a single individual or group will have command over all the data acquired in the particular data ecosystem. In the individualized control of data the individuals have authority over the choice between use and reuse even after they share their data. In the shared control model of data governance, a group of representatives from the data producers will decide on the matters of use and reuse of data. A combination of the two ways of governing data is found in the way data is managed under data cooperatives (Cooper et al. 2023).

There are several benefits for promoting a participatory management of digital data. The participatory approach towards data management will ensure that the respective data driven initiatives will cater closely to the needs of the people (Pfothenauer, Laurent, Papageorgiou, Stilgoe, & Jack, 2022). The participator approach would help in resolving the problems like 'filter bubble' or 'echo chambers' which are the results of a 'monolithic' or single party management of digital data (Persily, 2017). The lack of participation in the development has led to its failure to deliver some of the social benefits promised. It was expected to reduce the "bourgeois public sphere problem" through its mechanisms

(Habermas, 1989). However, it has never be completely free from the voices of white, upper-middle class, conservative men, resulting in the limitations to the realisation of its social benefit (Schradie, 2019). The participatory approach towards data will help to address the question of transparency, trust and fairness in data governance. These are the basic themes that facilitate better data governance and management. For instance, the EU documents on data governance consistently uphold the FAIR principles – findable, accessible, interoperable, and reusable (Wilkinson et al., 2016). Infusing the idea and practice of participation is a powerful method to put in place the FAIR principles. The proposal like unfairness test is some of the methods that would encourage more participatory methods of data governance (DA, Article 13). The proposal like that of smart contract found in the art. 30 of the Data Act offers some practical solution to realise. A social good approach will help to realise inclusivity, education and ecological/environmental (Cheney et al., 2023) aspects in the data governance methods.

The participatory governance comes with its own risks. It will lead to a slowdown in the growth of the value generated from data since collective decision making would take more time. Similarly, it would reduce the incentives for the individuals who invested

resources on capitalizing the data. A lack of investment implies reduction in the value generation. Participatory approaches towards data governance by means of multistakeholderism and top-down regulation; technical decentralization; digital constitutionalism has proved to be beneficial in the right management of digital data (Bhuler, 2023). There are several examples of participatory form of data governance resulted better socio-economic effects: Kenya's M-Pesa; India's eKutir; Ghana's Farmerline; (Bangladesh's SOLshare; Brazil's Nubank; Indonesia's Halodoc; South Africa's Zenzeleni; Germany's GemeinWerk; Barcelona, Spain and Salus Coop, Spain; Driver's Seat, USA. These case studies prove the fact that notwithstanding the differences in legislation and cultural contexts, participatory means of data governance can ensure more sustainable governance of digital data. Therefore, the universal framework for data governance definitely include participation as an essential element. The participatory approach by that follows a bottom-up model would adequately address the social needs that could be catered by data driven initiatives, which at the same time private players in the market might not address sufficiently (Taylor et al. 2022).

However, the relatively less value generated from the participatory way of data governance would be more sustainable.

It would ensure that the socio-economic value benefits all the individuals concerned. Moreover, there will be innovations of better quality the data driven businesses. For the moment, the innovations in the data driven businesses represents the ambitions of a few numbers of stakeholders. It would take a different turn if the innovators must satisfy more variety of needs, that is, all the participants involved in the data management. Consequently, it would lead to sustainable technologies as well.

### **3.4 Multi Pillar Approach**

As discussed in the first chapter, a multi pillar model approach towards sustainable development consists in sufficiently addressing social, economic and material aspects of any given resource. On contrary to other resources, the material costs and consequences associated with digital data is not paid much attention. Even this particular chapter has focused major part of its arguments on the social and economic side of digital data. Therefore, this particular section would emphasis more on the material aspects connected with digital data.

The paradigm of scientific literature centred around the environmental implications of data centres. The growth of digitalisation in the form of telecommunications, e-commerce,

cloud computing, and IoT (Internet of Things), has resulted in a significant increase in data generation and storage requirements. Companies and States around the globe invest in the development of data centres to respond to the hike in need for data storage capabilities. The development of critical digital technologies like the Internet of Things (IoT), artificial intelligence and big data, and blockchain that are necessary for the both parties require commitment to invest more on data centre development.

The primary concern from an environmental perspective of data centre is energy requirements. Some data centres have energy requirement equivalent to that of some mini cities. Energy requirement in Europe is already a matter of discussion in the context of sustainability. The ambitious strategy namely the European Green Deal is that aims for carbon emission by 33 per cent by 2030 and carbon neutrality by 2050 worth mention in this context. The energy requirements of data centres cannot be considered out of the context of such initiatives. Apart from the material costs associated with the energy requirements data centres, the pollution caused by data centres should be taken into serious consideration. There should be more technologies that can reduce the pollution caused by these data centres. Emissions from data centres are as important as the emissions happening during

the generation of energy to run data centres. Similarly, the material costs of digital technologies and data required to be evaluated in terms e-waste and other electronic gadgets produced year by year.

It is necessary to take into consideration the material cost of data governance and data driven technologies to evaluate the net effect or welfare brought by the digital technologies.

### **3.5 The Effects of Social Sustainability on Social, Economic and Privacy Aspects of Digital Data**

It will help the proper recognition of social and economic value of digital data. Addressing digital data as a social good will be an initial step in resolving the tension between the two views. Usually, they are considered as two exclusive views on digital data. The use of data to fuel the profit margins of enterprises excludes its use for promoting social benefits. The primary reason for this exclusion stems from the view of data as a private good. As illustrated before data need to not be necessarily considered as a private good given the fact that it will not exhaust if shared among parties. On the contrary it would promote competition and more innovation in various data driven sectors. The social ontological nature of digital data is the factor that permits its capitalization for

economic value generation. Therefore, it is necessary to admit that 'social' force underpinning any kind of data. The social good approach towards data recognizes this 'social' force underpinning various kinds of data and help in resolving the conflict between economic and social context between data.

The equitable distribution of the socio-economic value and the participatory way of data governance will bring down the problems concerning the privacy aspect of digital data. Among the several reasons people feel that their privacy is at risk when their data get governed in a non-transparent way. This black box of nature of the data governance increases the privacy litigation surrounding data governance, negatively contributing to the growth in the sector. The participatory approach towards data governance would reduce the non-transparent black box of nature of data governance. It would allow people to share more data, thereby improving the quantity and quality of data for data driven initiatives, than contributing to the increase of privacy litigation that leads the sector to stagnation.

The privacy aspect of digital data can be addressed by contextualizing it in the collective good argument. The popular argument of the sector, that is the common good perspective on

digital data, stands for the sacrifice of some personal privacy for the greater social good of the society (Coyle et al. 2020). Studies show that right measures to protect privacy will permit reuse of digital data to produce social value (Coyle 2020). The social good approach could make large strides on this direction. On contrary to the common good approach it does not risks undermining the privacy aspect contained in digital data. On the contrary, it brings to light the role of individuals in making digital data valuable. Although the value generated by digital data is dependent on the degree to which it is comparable with several other data, the fact that each unit of data might contain private aspect necessitates to give proper importance to the latter. The social good approach offer space of recognizing this private aspect.

The management of digital data can be considered as a paradigm for the application of the social sustainability theory formulated hitherto. Digital data assumed prominence to the point which it sometimes gets identified as the new oil. However, the mismanagement of this newly found resource has produced destructive impacts on social, economic, and environmental levels. Especially, social sustainability has been damaged by dint of the spread of misinformation; biased algorithms; digital divide; mismanaged digital economy etc... Among various factors, the

mismanagement of digital data has played a role in these undesirable developments in the field of digital technology. Therefore, sustainable management of digital data would promote the development of sustainable digital technologies, and thereby sustainable societies. The sustainable management of data should protect the communities and their values (Purtova, N., & van Maanen, 2024).

The idea of social sustainability envisaged in the first chapter identifies human capability development and the preservation of the ecosystem that facilitates the same as conditions for socially sustainable development. So firstly, in order to evaluate whether digital data is managed sustainably, it is worth investigating whether that digital data management promote human capability development. Although digital data has fueled the growth of digital technologies that improved human capabilities, a significant number of people were excluded from benefitting from it. Currently, digital data management practices are at large decided by a few online tech companies, downplaying the role of the regulators and the people whose data are at question. This status quo improves the industrial capabilities of the tech companies and the digital technology capabilities but hinders the capability development of the people who contributes their data. The status

quo in turn, creates the undesirable elements like the increase of wealth gap; sustenance and spread of vested interests; growth of liberal paternalism; manipulation of democratic processes etc... that damages the social fabric.

A solution to this situation is to install the concepts of equity and participation into digital data management practices, so that, R&D in digital technologies assure the capability development of all stakeholders. The present power structure that gives a few tech companies or online platforms to decide on digital data management practices should be restructured to empower the regulators and the people whose data are in question. Equity in the field of digital data management refers to the shared ownership of digital data. Equitable distribution here is not about taking data away from online platforms to give back to its owners or the platform users because individual data (semantic data) assumes value only when compared with another data (syntactic data) (Ferraris 2024). Therefore, instead of depriving online platforms of their data which would in that case benefit neither the platforms, nor the people who provided their data, principle of equity to should be applied to make sure that the benefits of digital data resource is enjoyed by all stakeholders. Meanwhile, participation in digital data management refers to reinforcing role of

stakeholders in realizing equitable distribution of digital data resources. Each stakeholder in the system – the tech companies, the regulators and the people – a say in deciding the way the concerned digital data is managed and used.

Digital data is an ideal resource to which the concept of sustainable development conceived in chapter can be applied. The fundamental reason for human beings to live as a society is to satisfy their various needs by making use of the resources available in an optimal way. The society therefore should be able to nurture the capabilities of the individuals who constitute the society. At the same time, nurturing of the capabilities of individuals does not lead to the exploitation or collapse of the society that permits.

As evident from the prior two sections, digital data has the value to nurture the capabilities of individual persons. However, if it does not nurture the capabilities of all the individuals who are concerned with those resources, it would lead to the collapse of the society. The socio-economic value of digital data has the potential to influence of the society. A socially sustainable management of the resource lies in bringing down the destructive

influence and promoting the constructive effects. A possible solution to avoid destructive influence is by ensuring the use of data resource for the capability development of the all the individuals without conflicting the continued existence of the society. There are two ways to facilitate this way of using the data is by ensuring the participation of all the stakeholders in the process of data governance and an equitable distribution of the value derived from the data resource.

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## ***CHAPTER 3***

**WHY DPIS REQUIRE A DOCUMENTAL  
THEORY BASED APPROACH?**



Innovation and development in digital technologies have significantly increased in the past two decades. Public and private organizations have initiated several projects to facilitate digital transformation in various sectors. The efficiency of digital technology in delivering goods and services for public benefits is an impetus to continue in that direction. There are multifarious paradigms for the digital transformation happening around the globe. The advent of digital public infrastructure (DPI) is one among them. Analogous to the classic infrastructure like roadways, buildings, canals, railways etc..., DPI enable the delivery goods and services through digital platforms. The design, development, and implementation of DPIs have no one size fit all nature, but it is increasingly context dependent. However, a common point of agreement between all DPI initiatives is to assure public benefit or increase the socio-economic welfare. It is necessary to understand the components of DPIs in order to deliver the public benefit. This chapter seeks to investigate the role of data in the functioning of DPI, and a theoretical background for the former's curation for bettering the latter. The huge success of initiatives based on digital technologies is largely due to their data driven nature. Data, in its turn manages to become that force because of its nature as a social

object. Unlike the information theories which limits its understanding of data as pieces of information, the documental theory captures the social nature of digital data. The understanding of data as a social object would oblige a multistakeholder participation in design, development, and implementation of digital data; user centric approach; data empowerment and privacy of data subjects; institutional intervention to address inequities emerging from data driven initiatives.

In its ambition provide theoretical advice for the practical implementation of DPI on the basis of a broader understanding of data, this chapter is divided into three sections. The first section investigates the importance of data for DPIs around the globe, and the social ontological principles underpinning it. The second section focuses on the interpretation of digital data from the viewpoint of the documental theory. The third section further elaborates the documental theory of social ontology to prove the way by which it justifies viewing data as a social object. It outlines how the conception of data can help DPIs to deliver its promises to increase public benefit or socio-economic welfare.

## **1. DIGITAL TECHNOLOGY AND SOCIAL WELFARE**

Although a thorough technical system, the affinity of DPIs to social ontological principles are undeniable. This affinity cannot be underestimated for the simple reason that they are designed and deployed for the benefit of society. However, it is necessary to identify the right theory of social ontology which could offer betterment of DPIs through its right interpretation. This section fulfils this require for an apt social ontological theory for bettering DPIs, after outlining details about DPI in general.

### **1.1 Digital Public Infrastructure (DPI)**

Digital public infrastructure refers to an ecosystem of technical and non-technical components that facilitate diverse kind of digital activities in human society (Clark et al. 2025). The technological components can be further divided into hardware and software parts as found in information technology sector. The hardware part includes electronic gadgets, databases, energy supply etc..., while the software part includes various applications, data, computer languages, digital services, products etc... The non-technical aspect of DPIs include laws, regulations, institutions, & governance frameworks, public oversight, accountability, feedback loops, digital skills & literacy, ICT industry etc... A right combination

of all these components would bring benefits to the public as the way traditional infrastructure bring benefits to the society.

Most of the prominent definitions of DPIs agree on the fact that its fundamental purpose is to deliver goods and services for public benefit as an end goal (Eaves & Rao, 2025). They argue that the technological and non technological aspects of DPIs should converge to result in public benefit. The insistence on interoperability, privacy by design, inclusion, sustainability etc... found in various definitions are on account of DPIs responsibility towards public benefits. Digitalisation of goods and services has been beneficial for public all around the world. Governments around the globe have delivered several services like e-serviceportals, e-gov applications; digital registries for social protection, business, credit, agriculture; health-sector interoperability and data exchange standards; information systems for digital tax or human resources etc... (Yang et al. 2024; Ozili et al. 2025) Undeniably they have increased the well-being of the general public.

However, implementation of a DPI is different from digitalisation of the delivery of goods and services. DPI has the wider ambition of facilitating digitalisation of numerous sectors

while 'digitalisation' may refer only to digitalizing any specific sector (Clark et al. 2025). DPIs should, therefore, be conceived as the foundational building blocks that drive digitalisation in several sectors. The building blocks of DPI requires to be interoperable, open, modular and minimalist design. Consequently, DPI will be able to scale to most possible sectors with more beneficiaries.

An unavoidable ingredient for DPIs to scale up for delivering public benefits is digital data. Data in the context of DPI refers to the information about the individuals and organisations for whose benefit the former is created. Data speaks for its owners because they show their needs and aspiration. The success of DPI adoption depends on the public trust over it in the context of data sharing. Therefore, it becomes an imperative for DPIs to take care of the technical, legal, and operational aspects of data (Eaves et al. 2024).

Data sharing is a fundamental aspect for DPIs. Unlike sector wise digitalisation initiatives, DPIs aims at the transformation of goods and service delivery in benefits all sections of society. It does not limit to specific sectors like health, education, taxation, etc... but the greatest number of sectors possible. It is about improving the general welfare of the society. And the success of the DPI

depends on the inclusion of most possible sectors. Successful DPIs managed to bring in more stakeholders to accelerate their net benefit to the society. For instance, the Uruguay Digital Agenda of Uruguay was a multi-stakeholder process with representatives from government, academia, the private sector, and civil society organizations which allowed the initiative to accommodate most possible sections of the society (Desai et al 2022). Similarly, the Smart Nation and Digital Government Group of Singapore too took the holistic approach necessary for the DPI that culminated in its success (Woo, 2018). More the number of beneficiaries, more will be the success rate of DPI since it manages to cover a greater number of sections of society. It also implies higher volumes of data and consequent requirements for responsible data stewardship.

The need to deliver benefits to society at scale explains the reason behind the omnipresence of the three most common factors found in any DPI – digital identity; digital payment; data sharing (Clark et al. 2025). They are essential to include all members of the society under the welfare promoting initiatives of DPIs. All of the three factors, especially the last one in particular, is closely associated with data. Data by virtue of its content fulfils the need for digital identity for safe and secure interactions of various

subjects in the society. For instance, the e-signature carries a fourfold function – (1) identifying the signer, (2) attributing the signature to the signer, (3) recording intent to sign, and (4) assuring the integrity of the signed data and protecting against tampering – without which a transaction would not be safe and secure (Tullis et al. 2024). Digital identity includes cards with chips or QR codes; PINs, passwords and one-time-passwords (OTPs); digital certificates; biometrics; and mobile applications and wallets etc... Similarly, the digital payments are also essentially transaction of data in a from a more ontologically informed way (de Soto, 2003).

DPIs are essentially the container of digital data represents the activities took place in the society. In other words, it creates the *digital twin* of the society by virtue of the data about the social entities involved in transactions using DPIs. The aspect of data sharing receives particular attention in the context of this essentiality of data for DPIs. Successful DPI models have managed to establish robust data sharing mechanism to sustain their DPI ecosystem. In India, for instance, the DEPA outlines the guidelines for data sharing that promote varied uses of data as well as the protection of data privacy (NITI Ayog, 2023). It includes provisions like the creation of a framework for third party “data fiduciaries”

to facilitate consent-based data sharing on behalf of an individual, and with the legal obligation. The design and development phase of DEPA involved lengthy and complex procedures with the participation of stakeholders from government entities, private sector, academia, and CSOs working on technology, privacy, rights, and development. The European Union's Data Governance Act is also an example for a well curate data regulation framework (Bravo, 2022). Given the importance of data for DPIs, data regulation frameworks steal away a large share of attention of the latter's creators. Failures in data management in the form of data breaches would risk public trust in DPIs to impede their proliferation.

The possibility for DPIs to deliver a greater number of public benefits is possible if more sectors are included in its radar of service delivery. Inclusion of more sectors means the inclusion of data concerning those sectors into the DPI ecosystem. This in turn necessitates more complex data regulatory framework for managing the whopping amount data both in quantitative and qualitative terms. The advantage of having better data governance practices will get reflected in the services tailored out the data driven initiatives. For instance, the DPI ecosystem namely X-tee platform covers more than 1700 services which implies that data

of individuals and organisations in 1700 contexts should be managed (World Bank 2022). The DPI ecosystem has managed to curate a data bank which offers quality data for the conception of new services by using and reusing the data transparent ways. Similarly, multi-country frameworks such as the European Union's eIDAS and EU Digital Identity Framework (EUDIF) implies the creation of interoperable data sharing frameworks without which transactions will not take place among individuals and organisations.

The data related aspects that stifle the scaling up and effective implementation of DPIs is yet another factor that points towards the importance of data. The lack of data quality, accuracy, and accessibility, avoid unnecessary restrictions that could stifle innovation, algorithmic bias etc... are the factors that becomes detrimental to DPIs in the long run (Saar, 2023). For instance, the projects like the European Open Science Cloud and the AI4EU platform of the EU stems from the motivation to curb down the problems for effective data sharing that spurs innovation (Gelvanovska-Garcia et al. 2024).

The COVID crisis was a time that tested the utility of DPI for delivering public benefits. The CoWIN platform, built using an

open-source platform DIVOC (Digital Infrastructure for Verifiable Open Credentialing) facilitated the massive vaccine drive took place in India (Kumar & Veer 2021). Similarly, in the health sector, Brazil, for example, processing data locally at edge devices enabled healthcare providers to offer real-time diagnostics and telemedicine in to infamously underserved populations (Silva et al. 2022).

Data is important for DPI for delivering its potential to provide multiple development outcomes in terms of public benefit. DPI has a mandate to substitute the traditional siloed approach to digitalization that excludes several parties (both individuals and groups). Digitalization was heralded as a solution to make the life of citizens easier, but the siloed approach has prevented its effective functioning (OECD, 2024). DPI based digitalization, on the other hand, has succeeded in making digital services in various sectors to serve the respective population better served by leveraging on their data without compromising security and transparency. For instance, in the finance sector, the G2P payments – financial transfers from government to people – has been revolutionized to permit more than 865 million people to open their first financial institution account to be served by the government fund (Demirgüç-Kunt et al. 2022). Data played a vital

role in implementing the DPI based G2P payments while saving both time and costs. On a same note, in Singapore, the the Singpass consented data-sharing service facilitated the eKYC procedure that reduced the time to complete digital transactions by 80 percent.<sup>1</sup>

The success of DPI in fragility, conflict, and violence (FCV) affected countries also owe a lot to the role of data. Data driven interventions on society leveraging the capacities of technology are gives efficient results. Data allows policy makers to get a more realistic picture about the needs of the population under their target intervention. In Mozambique, a combined birth registration and ID registration exercise for internally displaced persons across the conflict-ridden province of Cabo Delgado allowed the target population to access better social services.<sup>2</sup> So as the Diia app and ecosystem in Ukraine which leverage DPI to provide a single access point for nearly 120 public services.<sup>3</sup> The mobile money has been

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<sup>1</sup> <https://oecd-opsi.org/innovations/singpass/>

<sup>2</sup> <https://rimap.unhcr.org/countries/mozambique>

<sup>3</sup> <https://digitalstate.gov.ua/news/govtech/ukraines-digital-transformation-is-making-international-headlines>

instrumental in delivering social assistance payments in the Grande Anse in Haiti.<sup>4</sup>

The nature of the most essential standards like ISO 8583, ISO 20022, SWIFT MT etc... which used for the working DPI too underscores the importance of the data (Clark et al. 2025). These standards are necessary to carry out the exchange of electronic information between various domains. Policy makers pay much attention in choosing the standards according to which smooth and secure exchange of information can be taken place in a DPI ecosystem. Although exchange of data between domains in a DPI ecosystem follows the rules created on the basis of information exchange principle found ICT, data in itself has much more to it than mere pieces of information. The following section seeks to investigate the actual nature of data that makes them important for DPIs. Evidently, data plays a significant role in the betterment and utility of DPI but it is necessary to identify the 'force' that makes data permits data to do all that it is doing to the DPI eco system.

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<sup>4</sup> <https://reliefweb.int/report/haiti/transforming-lives-through-social-protection-programs-latin-america-and-caribbean>

## **1.2 Data, Document Theory, and DPI**

Data has proved to be an important component for several initiatives way before it has been used in the context of DPI. Data driven initiatives have found more success in various sectors in comparison with their non digitalized versions (Allen et al. 2025). The sea of sectors ranges from agriculture, health, education, small scale businesses to space exploration, advanced manufacturing, complex service sector industries etc... Both public and private enterprises consider data collection and data use as among their fundamental building blocks. Even if the enterprise may not have well stated plans to transform their activities as data driven, they still collect the data envisioning a more data driven future. The growing interest of enterprises to transform their activities as data driven paved way to the emergence of consultation services for data management and governance to permit the most possible efficient use of data (Machljankin, 2024).

As mentioned in the prior section, data proves to be an important factor that decides the success of DPIs as well. This is because the content of the data describes better the actual status of any sector it represents. The enterprise who needs to make an intervention on any particular sector receives a better description

and could streamline the intervention accordingly if it possesses the right data about the sector. Even though there are problems like biased data that reduces the qualities of any interventions, data driven intervention still enjoys more efficiency than the non-data driven ones. The content of the data essentially contains the knowledge that makes its perceiver more insightful about the respective sector. Data becomes a source of knowledge by virtue of its nature as a recording of information about people, places, events, actions etc...

The capacity of data to bear recorded information assumes the nature of documents than mere pieces of information. Documents are recordings of information which emerged in human societies as the latter grew more complex. The popular understanding of document consists in seeing document as any piece of paper which bear some sort of information. However, the studies centered around the 'document theory' that gained academic interests discuss the complex nuances of documents (Buckland, 2018). Consequently, document got an interpretation that is complex enough to cover all the things it represents. Suzanne Briet, for instance, has described document as evidence in support of a fact and could be any physical or symbolic sign,

preserved or recorded, intended to represent, to reconstruct, or to demonstrate a physical or conceptual phenomenon (Briet, 2006).

Therefore, beyond the shallow understanding of documents as pieces of paper containing some sort of information document theorists brought to light the actual nature of documents. Not only books, articles, and letters, but also music, pictures, and sound recordings etc... can be considered as documents. In a wider canvas, museum objects, animals in a zoo, or a landscape could be categorised as some kind of documents (Greneresen, Kemi and Nilsen 2016). Documents can include such wide variety of things and states of affairs because they are essentially created by human beings who keeps track of their activities throughout the centuries. It is more than information for the same reason because information does not allow for complexities – ontological and functional – that documents can provide. For the same reason all documents contain information, but all information may not assume the nature of all sorts of document.

Data is among the recent types of documents in human society. Data satisfies the three essential aspects of a document – physical, cognitive, and social (Lund 2004). Documents cannot exist without a physical medium which bears the information that

it represents. It could range from clay tablets, papyrus, paper, microfilm to any medium that bear digital information. The nature of documents to exist on some physical medium is the fact that provides it with functions that mere information cannot achieve. It allows documents to be used in many ways like writing, printing, copying, digital manipulation etc..., and consequently letting people to do things with documents. Data requires a physical medium to exist and resembles the nature of a document in that regard. Secondly, the information contained in data represent entities or state of affairs of interest to its creator or perceiver. Consequently, it satisfies the cognitive condition for being a document. Data produces meaning with respect to the context in which it is created or evaluated. Thirdly, data fulfils the social aspect criteria for being a document. Documents are ontologically related to society since the latter may not exist in the absence, so as the former does not make sense in the absence of the latter (Ferraris, 2012). The information contained in the data becomes useful for the data users by virtue of its social aspect. If the information has been detached from the society, no one would have used data for making interventions in the sector which the respective data represented.

The foundational blocks of DPI include the physical layers like data centres, internet connections, gadgets etc... as essential factors because it has to support data storage and data exchange. This underscores the documental nature of data from the standpoint of its physical nature. Meanwhile, the information provided by data for carrying out various data driven initiatives satisfies the cognitive criteria of documents. Digital identity is among the three essential pre-requisites for any DPIs for being functional. Digital identity validates the individual who bear it in the particular social context. It is the entry point for any individual who needs to be a beneficiary of the advantages brought in by DPI. Apart from digital identity, the variety of data types across different sectors provide the respective information which becomes information for planning for the corresponding sector. Data exactly replicates the cognitive value found in documents in this regard. Finally, the cumulative value of data testifies for its social aspect. The value of a unit of data increases when it is compared or put together with several other data. The value dynamics behind big data lies in this possibility of data to be compared with or put together with other data. The dependence of data on other data for its value generation in a DPI ecosystem proves the social nature of data. The cumulative value of data in turn is dependent more

explicitly on the fact that the information bore by data is about the social reality it represents. Even if the content of data is not about a person or a group, the fact that the content of data is of interest for a person or a group adds the social value to data. For instance, the data about climate change issues contain information about the nature, but human beings are interested because it is something that matters to human race. As long as data contains the information that is of interest to human race, it will continue to satisfy the social criteria for being a document.

Similarly, data in the DPI system satisfies the interpretation of documents by the collective of scholars namely Roger Pédaque as well. According to Pédaque a document is a mediation device— an informational object whose significance is constructed and maintained through its use in social contexts (Pédaque, 2003). They are not merely as static objects but as dynamic entities situated within social practices. It is articulated that any document involves three primary dimensions – seen (form), read (content), and understood (medium). The physical aspect of document includes its layout, structure, and material support. Digital data may not be very pronounced as the classic entities that assumes the status of document. However, the differences in the perception of digital data owing to its respective nature justifies an attempt

to outline its 'physical' nature. The form of data changes according to the format in which it is stored. The data held by platform x, may not be perceivable to platform y, and therefore, not perceivable. In this case, data assumes the form of physical objects that offer some kind of resistance that let perceiver to perceive the latter's objectivity (Ferraris, 2014). One among the hurdles that prevents the smooth exchange of data is the differences in their form that does not let all perceivers to perceive them. The read (content) aspect of document is very evident in data as no data exists without some kind of information it represents. The understand (medium) aspect of document refers to ways in which documents function as media within societal frameworks, encompassing how they are used, interpreted, and the roles they play in communication and meaning-making. Data in DPI very well suits this category since society is the factor that define purpose for data. It is been used for delivering goods and services in a better way to people and thereby improve the public benefits.

Documents have these three aspects by virtue of the fact that they are created by human beings, although the platforms on which they exist are not necessarily so. A document can be created intentionally by an agent or it could be created by attributing the

nature to a material platform (Tricot, Sahut and Lemarié 2016). This aspect of creation gives documents perceivability, readability, and interpretability. On the same way, data is also created by the activities of human beings on various online digital platforms. They may not be created intentionally, but as a by product of the activities someone does on the web. However, the use of data unintentionally produced on the web for the sea of several other purposes shows that 'attribution' aspect found in several documents. For instance, the energy bills paid online by the users could become a data which can tailor the efficient energy use practices for them. The users may never have an intention for improving their energy use behaviour while paid their bills online. On the other hand, the e-signature created by an individual using a PKI (public key infrastructure) is purely intentional. Likewise, the data in DPI falls in either of the two categories resembling the intentional and attributional aspects of documents.

Documental nature of data is the factor that allows the conception of meta data, anonymisation, techniques like adding noise to preserve the privacy etc... Paul Otlet isolated facts from authorial discourse so that each item of information "has its own identity," enabling granular citation, recombination, and cumulative science across disciplines (Frohmann 2008). He

conceptualized documents as representations of facts about the world, serving as elements within a vast, organized system that could collectively mirror the world itself. Data need not necessarily be connected with its authors for making use of it. Moreover, the projects which use data in a way not permitting to trace back to the individual represented by it is more appreciable in the DPI ecosystem. The nature of a possible detachment between the author and his/her document, as it resembles in data, allows for better data use in several instances. There are, however, exceptions as in the case of digital identities.

Above all, data contains the nature of a document as something not limited to the category of texts. Document scholar Donald F. McKenzie has extended the scope of documents by considering it a non-abstract object without any form of writing. Data, with its myriads of forms and formats, suits into this category. The missing out of this factor risks considering data as mere text, and consequently to the fallacy that considers it as mere information. The fallacy would then generate approaches that would seek to interpret data using concepts from the philosophy of information. Such interpretations hinder the potential use cases of data. As successful DPI infrastructures around the world have pointed out, data has the potential to be functional in various

contexts to deliver public benefits than to remain as static bunch of information.

## **2. THE ROLE OF DOCUMENTALITY THEORY**

The section revisits the principles of social ontology guiding this thesis, and which were discussed the prior chapter, in the context of DPI. It not only proves the validity of social ontological principle proposed before but also gives opportunity to make DPIs more efficient. In particular, data governance in the context of DPIs require a forward looking and analytically coherent social ontology. It explicates the philosophical principles underpinning the data that provides it with value. DPIs can play a pivotal role in the realisation of webfare. The concept of webfare can capture eclectic welfare measures based on digital technologies powered by the web.

### **2.1 Documental theory of Society in the Context of DPI**

The documental nature of data allows DPIs to use them for delivering goods and services efficiently. DPIs are different from other traditional infrastructures likes roads, building, water canals, railways etc... because of its use of data which in documental in nature. The capacity of data to bring both positive and negative disruptions in society by virtue of its documental nature requires

an interpretation based on the documental theory of social ontology.

Documental theory of social ontology explicates the role played by documents in the creation of the society. Thinkers have spent considerable amount of intellectual labour to identify the ontological basis of society as evident from the myriads of theories in the field (Epstein, 2025). Earlier thinkers like the Thomas Hobbes proposes the idea of social contract as the basis for the emergence of society. People come together to agree upon certain shared ways of life which culminates into society. Meanwhile, Samuel Pufendorf of the same period notes that it is not necessary to have an explicit agreement from the side of members of society to be part of it or form it. People could be unaware of the practices they are involved while acting as members of a society. There has been also attempts to draw parallel between natural order and social order in a way that social order is an imitation of the natural order or identifying God as the source of the former who's also the creator of the latter.

More refined attempts to investigate the ontology of social reality is found in later thinkers tend to base it on the mental states of individual persons. For instance, J S Mill considers society as an

aggregate of human minds. Similarly, several scholars based their theories on mental properties of individual persons as the ontological base for society. However, this 'individualistic' approach has been challenged by the 'holistic' view of social ontology. For instance, the idea of World Soul proposed by Hegel leads to identifying social entities as fundamental, independent, or autonomous entities than something resulting from the aggregation of individuals. The nature of debate between the 'individualistic' approach and the 'holistic' approach seems to assume the nature of the problem which may not let to arrive at some concrete conclusion (Epstein, 2024).

On the other hand, the intentionality theory proposed by John Searle offered a better explanation although it tends to fall into the category of 'individualistic' approach. The theory of intentionality sees social reality or society as the aggregate of social objects. Social objects follow the rule – any natural object Y becomes a social object X, in the context C, which is determined by the collective intentionality of a group. However, it fails to account for social objects that does not have a corresponding natural object during the time of its existence as in the case of debts (Smith, 2012).

The documental theory of social ontology overcomes the problem of social objects which do not fit into the category of Searlean theory. Human beings started to live in groups since they find it easy to meet various kinds of their needs. They used to keep track or record of their activities which allowed them to realise or satisfy their various needs and better them as the population grew. The complexities of the recordings and traces increased along with the timeline of the species, their population, varieties of their needs and activities grew. These traces or recordings are essentially the documents that defined the formation of human societies. The habit of human species to document their activities, especially the ones they did collectively, provided them with a reference point which kept them together in groups. It was not the collective intentionality of the people but the externalization of it in the form of documents led to the emergence of society. Moreover, the documentality theory does not seek to arbitrate between the 'individualistic' approach and the 'holistic' approach. Society is neither a 'given' as instructed by the holistic vision, nor a collective of individual human minds as instructed by the individualistic approach. Society is the result of documents which records the activities of human beings on course of realising their

myriads of needs, and according to which they started to organize their individual and collective way of life.

The concreteness of the documents in terms of form, content, and medium allows the creation of social objects which account for the social reality. The absence of documents would have rendered human race in continuous beginnings without history, progress or functionality, both in collective and individualistic terms. The being of a social object is accounted by the document underpinning it. For instance, an individual person who fulfils the criteria to be a natural object with the blood and flesh transforms into a social object like a citizen by virtue of a document issued by any nation state which in turns depend on another hundreds of documents for its existence. Undeniably, there is a collective intention involved in the formation of any social object like a state or a citizen. However, the collective intention will not be realised if they are not externalized into certain documents. This is evident from the fact that any object that falls into the category of social objects will have its being dependent on some sort of document.

Data in DPIs plays significant role in influencing the nature of the social reality by virtue of its status as documents. Data that

represents the digital identity of citizens, for instance, is a paradigm of data creating social objects. On the other hand, the browsing history of an individual person represents a minute part of the social reality to which that person as a social object belongs to (Ferraris, 2012). The relation of data to the social reality is explicit in both of the cases. Data found in the DPIs around world can be categorised into either of these categories.

The capacities of DPIs for creating far reaching consequences than the classical infrastructure is due to the presence of data with the documental nature. For instance, the direct benefit transfer (DBT) initiatives which are part of the government to people (G2P) transaction of government aid has proved better for delivering social welfare (Gandhi, 2025). The traditional means of benefit transfers had several drawbacks like leakages, corruption, malpractices etc... The digital identity and digital payment methods of the DPI painted a more accurate picture of social reality. Consequently, the DBT reached to the target groups who are in most need of it, overcoming the traditional hurdles like leakages that prevented the transfers. DBT is one among the several instances which shows how DPI system can fulfil one of the basic mandates of human societies – need satisfaction. DPIs, by virtue of their data driven approach furnishes the actual status of the

social reality in the most representative way possible. Although the problems like bias persist in data driven system, it is apparently a better way of bringing changes to social reality.

## **2.2 Documentality and DPIs**

Social reality is directly related to functioning of DPIs and DPIs shape the nature of social reality. The documental theory of social ontology becomes a bridge between the two things when it explains the documental nature of data. Social reality here refers to the rules, regulations, institutions, governance practices etc... that constitute the society. A proper organization of the social reality is necessary for developing DPIs that can deliver public benefits efficiently. These non-technological factors play an important role in the designing of the technological aspects. For instance, a revised law on access to information, the adoption of a law against cybercrime, and the new data protection law were crucial in the implementation of DPI in Jordan.<sup>5</sup> The civil society organizations (CSOs) were important in realisation of the initiative. Meanwhile, Commission Report on Data Availability and Use that preceded the Consumer Data Right framework was crucial in

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<sup>5</sup> <https://www.biometricupdate.com/202502/jordans-digital-public-infrastructure-requires-more-security-trust-people-centricity>

Australia.<sup>6</sup> Further, unlike the development of traditional infrastructure, DPIs require more close user participation during its design and implementation phase. Participatory design mechanisms are necessary for ensuring user adaptation which is essential in deciding the success of the DPI. Shaping of the social reality in tune with DPIs is a common trait found in successful DPIs around the world. Mauritius' National Open Data Policy, which mandates the creation of Open Data teams within each ministry; Singapore's Digital Readiness Blueprint for enhancing digital skills and better compensation for digital talent; Australia's Consumer Data Right (CDR) which gave better agency for data subjects are examples of non-technological interventions that led to the creation of digital infrastructures that improved welfare of their citizens (Desai et al. 2022). There are several other instances where right political interventions supported by strong political will has brought (World Bank, 2024). In any case, shaping of social reality has been pivotal in deciding the successful implementation of DPIs.

On the other hand, there has been tangible impacts on the society by DPIs. People have extensively benefited from services

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<sup>6</sup> [https://oia.pmc.gov.au/sites/default/files/posts/2020/12/inquiry\\_report\\_-\\_data\\_access\\_and\\_use.pdf](https://oia.pmc.gov.au/sites/default/files/posts/2020/12/inquiry_report_-_data_access_and_use.pdf)

built on DPIs more efficiently in comparison with their respective traditional modes. It can bring in desirable changes like inclusion, equity, welfare etc... to the social reality. It would tune the nature of society in a way making it better place living space for people. For instance, the GOV.UK OneLogin allowed over 6.2 billion to access over 50 types of government services and rated the app with a 4.8 star in app stores.<sup>7</sup> It shows that people are satisfied with the services on contrary to the usual dissatisfaction that people undergo while receiving traditional bureaucratic procedures. Similarly, the EU Digital Identity Wallet allows EU residents to store and share a wide range of attributes held by public bodies, for example, name, address, tax information, the right to apply for social benefits, student qualifications, and the right to drive in more efficient ways.<sup>8</sup> The government-based registry Cadastro Único of Brazil has allowed the government to support low-income households by several government welfare schemes (OECD, 2024). The Big Data Platform at the Kenya Agricultural and Livestock Research Organization (KALRO) of Kenya has served over 6.5 million farmers access diverse digital

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<sup>7</sup> <https://www.sign-in.service.gov.uk/about>

<sup>8</sup> <https://ec.europa.eu/digital-building-blocks/sites/spaces/EUDIGITALIDENTITYWALLET/pages/694487738/EU+Digital+Identity+Wallet+Home>

services, and has fostered several innovations, including location-crop-growth stage specific digital climate advisory services, crop-livestock-pasture selector, and digitized Good Agricultural Practices (GAP) advisory services.<sup>9</sup> Similarly, several other interventions from the side of the DPIs have render societies better place to live in terms of the welfare.

The two-way influence between social reality and DPIs seem to increase in the course of time given current state of affairs. The numerous digitalization missions initiated by governments and other organisation signals this probable increment (Yang, 2024). Documental theory of social ontology of society would provide insight to streamline the mutual influence in more efficient way. It provides a holistic understanding of digital data by explicating its nature as a social object, and not as mere information. Data governance mechanisms based on the view of digital data as social object would obligate DPIs to fashion themselves in a way to deliver better social welfare. The current research gap in the field of DPIs in relation to data governance fill the sector with issues related to privacy, data silos, data monopolization etc... (OECD, 2024) The current understanding of data as mere information

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<sup>9</sup> <https://kadp.kalro.org/home>

hides the its actual dynamics which allow data to create both positive and negative disruptions in the society. A social object-based perspective of data would allow enough room for features like inclusion, equity, sustainability, openness, user-centrality, and interoperability. Documental interpretation of data ensures privacy of people and the possibility of their use for socio-economic benefits to realize these features. The cause that permits the two-way influence between the social reality and DPIs is the documental nature of data. A right understanding of this cause would allow policymakers to shape it, and produce desirable effects. The nature of data as a social object is an imperative for stakeholders to used data for purposes that are beneficial to the society.

DPIs can continuously ensure the right dynamics between the individualistic and holistic aspect of society. It explains how the needs of individuals require them to work in groups for its satisfaction, and recording their collective and individual actions to create social reality. However, in functional terms, the tension between the individual and group persists. The tension between individual privacy and use of data for socially beneficial purposes is a paradigm for this tension. Documental theory recognizes the role of each individual in shaping the social reality, and at the same

time the necessity for the individual to contribute in shaping social reality which he/she constitutes. The current data governance models simply replicate the already existing whole-and-part tension by parting either too much with the part or with the whole (Evren et al. 2022). Documental theory recognizes the continuum of the part-whole reality that influence and inform each other to constitute the social reality. Consequently, it recognises the need for continuous institutional interventions with participatory methodologies for the preservation of that continuum. The success of DPIs to a large extent will be determined by its capacity to strike the right balance between the part-whole continuum. Therefore, it would be ideal for DPIs to be streamlined on the basis of documental interpretation of social reality. It does not subsume the role of individual under the shadow of society because without the individual data the no data driven initiatives would exist. At the same time, it makes the use of data value for social value because a contrary situation would lead to the misuse of data that will cause negative disruptions in the society.

The rules and regulation that govern the creation of digital identity, digital payments, core data registries, data sharing systems, digital notifications, digital post, and single digital gateways could be streamlined in the light of documental theory. It

obliges and justifies prioritising the bottom to top approach to top to bottom approach. The latter has been proved a less efficient method of policy making in terms of the outcomes in several scenarios (Hudson et al. 2019). DPIs in particular, are more prone to fail if policy makers adopt a top to bottom approach while would emerges as successful in case of a bottom to top approach. The policy recommendation to take a multistakeholder approach while designing and implementing DPIs underscoring this proposal. Documental theory can inform guidelines for the nature of interaction between these stakeholders so as to decide the importance given to each of them. Moreover, it decides the principles according to which decisions should be made in terms of privacy protection, equity, inclusion, openness.

Documental theory can fulfil the mandate of DPIs to remain user centric. Integration of human centric design into DPIs will make it effective, efficient, and user-friendly, and consequently encourages its adaptation. The importance given to data subjects in documental theory by virtue of the former's role as social subjects encourages human centric design. The actual state of affairs that see data as information sidelines data subjects to give undue importance to data users and data regulators. While data users are interested in promoting their own interests such as profit

maximization using data, data regulators – with their restricted view of data as information – limits their role in conceiving frameworks that protect privacy. Documental theory, on the other hand, introduces data subjects as agents who has more say on the question of data governance. They are neither considered as data producers for data users, nor reduced as vulnerable population to privacy breaches as seen by data regulators. Instead, they are given active role in data governance systems where they can decide the purposes of their data's use, and equitable recipients of their data's benefits. There are already paradigms of this kind as in the case of data-based credit lending which allow data subjects to gain financial benefits based on their data (Leonardo et al. 2024; Chioda et al. 2025). A more holistic and wider view of data under the documental view would allow the scaling of such initiatives to scale up to other sectors than their limited application in the financial sector. It provides a user centricity where the delivery of goods and services will be conditioned in the best interest of the society because the basic constituent of the society – data subject/individuals – are empowered.

Further, the documental theory offers a point of reference to decide the nature of scalability of DPIs. Scalability is an important feature for all types of DPIs both qualitative and quantitative

terms. On the same note, international co-operation is very important for DPIs for improving their capabilities. Digital co-operation becomes a common point for nation-states to collaborate between them as in the issues like tackling down problems like climate change, global poverty, nuclear energy etc... Constructive use of digital data would allow the socio-economic welfare of every nation-state. Cross border collaboration for data exchange can increase that socio-economic welfare (Campmas et al. 2022). Consequently, it becomes necessary for having a common theoretical ground agreeable for nations of various socio-cultural, political, and economic contexts to interact each other. The documental theory suits the purpose since it provides the basic interpretation of the social reality which is common regardless of the differences between nation-states. This would enable to streamline the rules of data exchange between countries which often poses a hurdle for DPIs to interact cross borders. The fact that data is a social object and it should be used for the benefits of the society in the best way possible without compromising individual interests seem an agreeable for all social contexts as a starting point for policymaking in international context.

Documental theory can also offer a solution for finding strategic investment and funding for DPI design, development,

operation, and maintenance. Governments and private parties would require invest large amount of money for building and maintaining DPIs (Clark et al. 2025). A probable way to find out funding would be to creates debt to find credit for financing DPIs. However, the debt driven development turns out to less sustainable, and adding up to the global issues of the decade (IMF, 2022). Although debts are not disadvantageous in itself, it would better to set it aside if there are some other means for finding capital. The documental interpretation of data offers means to conceive strategies that allow to use data for funding DPIs. The inequitable business model in the data driven sector let a few tech companies to earn huge amount of money while the data subjects, whose data fuels the growth the tech companies, are left behind. The perception of data as a social object would obliges the social systems to put in place mechanisms to overcome this problem (Ferraris, 2025). Unlike other raw materials used for businesses, data, is closely tied with the social reality and social subjects as explained in the prior sections. Therefore, it's value distribution needs to be aligned more with the principles of social equity. Data monetization for DPIs funding can deliver the imperative to used data for promoting social equity.

A practical solution to realize the two ambitions – equitable distribution of data value and funding for DPIs – would be to conceive entities that can put in place effective data management. There are already entities like data collectives, data cooperatives, data unions, data trusts etc... which act as stewards of data management. An idea to create a similar entity which could both generate monetary value and promote social equity is not far from reality. Platform cooperative and data cooperatives can be considered as the forerunners in this regard. (Loi et al. 2023). A strong political will and right institutional intervention would allow for the creation of such entities that can provide sustainable financial resources for the DPI than debts. The capital generated through this means may not be as high as traditional investments like venture capital, crowd sourcing, angel funds etc... However, the conception of non-traditional investment sources based on data would encourage the fine tuning of data management practices and sustainable source of capital formation.

The documental interpretation of data makes the improvement of social welfare using data an imperative than an option. The novel approaches like the *webfare* are pioneers in this line (Ferraris, 2024). The emergence of various kinds of data intermediaries signals the need for reframing the current data

governance and data management practices. However, they are considered as 'desirable' practices to address the inequitable and inefficient practices in data exchange, but not as mandatory obligation to promote equity and efficiency in data use. The members of the society have the right to receive welfare benefits on the account of the *prosumption* activities that they have done in the web (Ertz et al. 2025). Any failure to recognise this right would eventually culminate in wealth inequality and power imbalance as seen in the present status quo of data driven sectors. DPIs required to be designed in a way to redress such problems and makes the improvement of welfare based on digital data an obligation, not an option.

However, the implementation of an obligation should not risk an arbitrary ruling. It would not resolve the problem but simply transfer the agency of promulgating inequity and power imbalance from one party to the other. The multistakeholder approach in designing and implementation of DPI would avoid the risk of coercion. It reminds of the need for the collaboration between various government departments, public-private partnership, close collaboration with academia and industry, engagement with civil society and non-governmental organisation for developing DPIs. The dialogue between these and other probable stakeholders for

improving social welfare requires the common language – data exchange. Each stakeholder will have its own institutional interests to promote and protect. But data becomes the instrumental common factor for all stakeholders to attain the final end of public benefit. Therefore, it is necessary to decide the nature of that language under the light of the documental theory which best captures the social nature of data.

The qualitative and quantitative expansion of DPIs would require standard development organisations (SDOs) to stipulate standards for safe and secure use of DPI based products (Gamalielsson et al. 2017). The accreditation bodies like ISO, IEC, ITU, ANSI, ASTM etc... needs to be informed about the social nature of data to decide upon international standards. The data regulation framework based on view of data as information has produced profound differences in the data governance practices. The view of data as a social object would enable to transcend these differences because privacy is a concept with deep regional difference while society and social welfare has relatively less differences. Therefore, it would be better to conceive accreditation standards to DPI based products on the basis of their capabilities to deliver social welfare. Consequently, the documental theory

would be a point of reference for accreditation bodies while evaluating DPI based products.

### **3. DPIs AND SOCIAL WELFARE**

This section outlines how DPIs can be a practical means to put into practice the principles of social sustainability discussed in the first chapter, and the digital hermeneutics of data governance discusses in the second chapter. The practical means to bridge the two theoretical framework would offer clearer vision of the concept of data, as well as an improved socio-economic welfare schemes. Moreover, it becomes a pole star for emerging DPIs to organize themselves on the basis of the principles of equity, participation, and multipillar nature of sustainable development.

#### **3.1 DPIs and Social Sustainability**

DPIs have managed to put in place initiatives that improve social sustainability. It combines digital technologies with socio economic endeavours for delivering better goods and services. However, they can be further streamlined to improve the efficiency and sustainability.

It conforms to the definition of social sustainability proposed in the first chapter for a great extent. It allows to improve the

capabilities of individuals using digital technologies. People can access goods and services in a better way in comparison to the non digital counterparts of the same goods and services. There are advantages for individual users in the sectors of health, education, and social welfare. DPIs are instrumental in distributing the advantages of digital technologies to most possible number of individuals than limiting it to any particular individual or a group. Similarly, it creates an ecosystem where individuals and a group can continue to improve their capabilities by using digital technologies.

### **3.2 Equity**

Digital public infrastructure has contributed significantly to improve the socio-economic equality which in turn ensures social sustainability. It allows more access to the resources to various goods and services for a greater number of people. Lack of accessibility to resources become a problem that fuels inequality. Access of to resources would allow people to make use of them to realise their capabilities. For instance, an individual who has an enterprise based on digital technologies would be able to compete to big techs only if basic digital infrastructure is provided for him/her. The inequality in the tech sector may impede new

entrants' growth and sustenance. There is a necessity for the creative destruction of the old technology products for letting new ones enter into the society (Aghion and Bune, 2021). DPIs solve this problem to a great extent by letting new players entering into the market.

There are more direct cases where DPIs promote equality. The direct benefit transfers (DBTs) are paradigm of such intervention. It facilitates more secure and efficient G2P transactions. Direct benefit transfers are highly criticised in terms of corruption that involves leakages of funds and non eligible people benefitting from them. Both cases put axe on to the fundamental aim of DBTs, that is, reducing the inequality. The DBTs powered by DPIs address both these issues to great extent. It cuts off the unnecessary intermediaries between the government funds and brings the benefit straight to the people.

Moreover, the very concept of the equity which is different from that of equality requires more efficient system for its implementation. The diversity found among human beings may not allow individuals to make the available resources beneficial in uniform ways. In the light of the capability approach, which was mentioned in the first chapter, the variability in human capabilities

to convert resources into meaningful functioning requires more personalised methods of resource distribution. DPIs with the potential data based interventions can implement better equitable ways of resource distribution.

### **3.3 Participation**

The UNDP report illustrates that digital collaboration of private and public entities renders services in the field of financial services, healthcare, and government data sharing, leading to broader societal benefits. Public policy makers can enhance their policy making while private stakeholders of any sector join them in the process. The policies become better informed when the collaboration is done with the private sector as seen in several case. Multilateral institutions – ranging from various UN agencies, the World Bank and several other multilateral development banks, to privately led organisations and donors such as the World Economic Forum and other private entities joined to promote DPI initiative across the world. The UNDP and International Telecommunication Union (ITU) launched the High Impact Initiative on DPI in September 2023 enhancing DPI partnerships with the private sector and community-based organisations in 100

countries, integrating intermediaries into local digital ecosystems to provide broader, more inclusive services (Ford et al. 10)

Similarly, most of the components are open source and the users can modify them as the way they require it. This would give voice to members of the society to propose their own ideas for the society. For instance, if a person does not accept the status quo of online marketing can propose his own way of doing it by using the DPI. In the absence of the DPI, the same individual will have to undergo complicated bureaucratic and resource related troubles realise the proposal. That in turn, reduces the scope for the individual's participation in the society.

The UNDP report compiled with the Digital Public Goods Alliance and Dalberg Advisors shows that DPIs has improved the financial inclusion of people. The same report describes about the improvement in judicial systems as well. It testifies the fact that DPIs can improve the socio-economic condition of people by facilitating their participation in the social change process. The creation of adequate infrastructure to ensure participation in the economy would improve the welfare of people. For example, as of August 2024, Brazil's instant payment system Pix had approximately 168.15 million registered users, including 153.11

million individuals and 15.04 million companies. The Central Bank of Brazil reported that over 40 million previously unbanked people began using Pix as their primary financial tool, following its launch (Ford et al. 2019).

### **3.4 Multi-pillar approach**

DPIs become an apt ground for all the pillars of sustainability to interact each other. The principal areas of SDG goals addressed by DPIs testifies the multi-pillar approach. The increased economic resilience and job opportunities, reduced poverty and extreme poverty (SDG1); enhanced service delivery to women that promote gender equality (SDG5); improved access to financial services better the conditions for decent work and economic growth (SDG8); use of standardised measurement, reporting, and verification systems and connecting carbon registries can result in a reduction of CO2 emissions promote climate action (SDG13) (Ford et al. 2025). The omnipresence of digital technologies in various walks of human life allows them to become instrumental in deciding the sustainability of the corresponding sectors.

The use of digital technologies for environmental sustainability delivers better results when compared to the traditional interventions in the field. Interventions based on

advanced technologies would help in identifying the troubles related to climate change and the respective solutions for fixing them in a more efficient way. They can fulfil the necessity of swift intervention required in the context of climate emergency.

DPIs can facilitate initiatives from the side of private entities and individuals to come up with solutions for climate change. The increased discussions centred around the theme sustainability has raised the public consciousness about the matter. Especially, the young people actively get involved in enterprises that would reduce the problems leading to a climate emergency. DPIs can provide the foundation for realising such initiatives. For instance, an application for tracking climate change in southern part of Europe might require to transfer their data to a laboratory in Northern Europe for its analysis. A well-developed DPI can facilitate this transfer of data in a more secured and cost-effective way. Similarly, the use of digital technologies for carrying out businesses and other services would enable the streamlining of supply chains. A data-based delivery of goods and services would help in the reduction of carbon footprint by enterprises. It reduces the wastage of resources to significant levels, and promote the most efficient use of resources in furnishing the goods and services necessary for people. The efficiency found in the data driven

enterprises gets reflected in their contribution towards the reduction of climate change.

DPIs contribute significantly to improve economic sustainability. The UNDP with the Digital Public Goods Alliance and Dalberg Advisors found that DPI based initiatives will boost GDP growth of 1.1-1.4 % by 2030 in LMICs (UNDP, 2022). Individual companies and people also benefit largely by the services provided DPIs. For instance, an entrepreneur with a good business idea has to spend less capital on software and hardware products that are already built as open source as part of any DPI project. The entrepreneur in that case not only has to spend less on such capital but also use the his capital for diversifying his products. Moreover, good DPIs in place will incentivize more investments and enterprises. This in turn would generate new players in various sectors by bringing down the monopolistic tendencies of markets. Regardless of the any sector, the initial players in the market tends to enjoy the first mover advantage which sometimes prevent the entry of new players that damper the competition. DPIs can solve this problem to a large extent by facilitating the new entrants easily.

The success of a digital public infrastructure is not solely dependent on data governance. However, it plays a significant role in deciding the successful designing, development, and implementation of DPIs. Therefore, it is necessary to have a proper understanding of data in its role to assure public benefit. *Documental theory* interprets data in a way that it can realize the goal of public benefit by shaping DPIs for socio-economic welfare. It fills the research gap which obscures the real nature of data under veil of information theories. Although data contains the information about the individuals and groups it represents, the force the factor that allows multiple use of data is its social nature. Recognition of the social nature of data provide a theoretical foundation for the standardisation of data across diverse range of organisations

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# ***CHAPTER 4***

## **DOCUMENTAL INTERPRETATION OF INDIA'S DIGITAL REVOLUTION AND THOUGHTS**



The chapter tries to interpret the India's digital revolution through the optic of documental theory of social ontology and the economic theory based on the role of inclusive democratic institution in promoting prosperity. The chapter is divided into three sections: the first section describes factors and infrastructure that led to India's digital revolution, and its consequences; the second section brings the philosophic and economic theories mentioned before to interpret the changes; the third section tries to draw some common principles from the two sections, in way that those principles can be used in other nations or groups of nations.

## **1. DPIs AND SOCIAL WELFARE**

This section zooms into a particular case of DPI that has managed to reflect the theoretical framework discussed in the first two chapters and the practical one presented in the third chapter. It looks more specifically into the components of the DPI, India Stack. There are paradigms of the essential components of any DPI around the world. Focusing attention on particular case will help to streamline the theoretical arguments by reducing the risk of overspeculation. The section also consults the benefits of the DPIs on the socio-economic realm. However, the particular case of

country might not be exactly replicated elsewhere though a little amount of inspiration is granted.

### **1.1 Digital Public Infrastructure of India**

India's digital revolution started around the year 2015 with the advent of the various components of its DPI built in collaboration with public and private sector. It included the digital public platforms that are non-rivalrous, non-exclusive digital networks and the digital public goods that are open source, open data, open AI, software that are used as per the guidelines stipulated by the regulators (Carstens, A., & Nilekani, N. 2024). The DPI ecosystem and the digital goods and services of India is commonly known as the India Stack. The India Stack adopted a foundational building block approach to ensure that various DPIs are interoperable and scalable according to the changing needs. Especially, India built its foundational DPIs in a way that it can be used by both private and public entities to come up with innovative ideas and it ensured data security and privacy in designing digital public goods. It consists of three layers: unique identity (Aadhaar), complimentary payments systems (Unified Payments Interface), and data exchange (DEPA). The DPI mechanism should be least prone to any sort of risks since other ecosystems like the India

Stack would be built on it as the former is the foundational structure. India's DPI achieved this by making itself: equally and non-discriminably accessible; built mostly by open-source software; transparent. Government had to make sure the authenticity and flexibility of the DPIs since, unlike the GovTech, DPIs have a larger scope than service delivery of public institutions to citizens. A strong government intervention was visible in creating facilities on top of the DPI. The establishment of National Information Utilities by working with the Reserve Bank of India and other banks is an example of this sort (elaborate how this reduced the problem of monopoly rent). The following paragraphs explicate some of the major components of India Stack (both DPIs and DPGs).

The combination DPIs, DPGs and other components that account for India's digital revolution is called the India Stack. It consists of three main layers, namely, the identity layer, the payment layer, and the data layer. The three-layer model allowed the smooth flow of people, money, and information in India which became beneficial for the citizens. India has managed to render the three layers as interoperable and scalable to the most extent from the very beginning. The three components form the basis of all the DPIs in the world, and therefore it is important their nature

decides the success of any DPI. The country has managed to streamline the nature of these components in a way that it turned out to be success as explained in the following paragraphs.

**Aadhar:** The word Aadhar, one of the important foundational aspect of India's digital stack has seen the collaboration of both private and public entities in its implementation. Only one of eight of an Indian had proper identity in the year 2008 (Alonso et al. 2023). Aadhar consists of the following mandatory information about an individual: name, date of birth, gender and residential address, the face and biometrics. Later, a 12-digit number is issued corresponding to this mandatory information as an ID. Aadhar accounts for the identity of more than 1.2 billion people and acts as the base on which various platforms like verification, digital signature and payments are built on. The Aadhaar ID used over a 900 million times a month for various authentication purposes (D'Silva et al. 2019).

**DEPA:** Data Empowerment and Protection Architecture (DEPA) is a framework designed to enable individuals to control their personal data better and facilitate its secure sharing with third-party institutions (Prajapati et al. 2020). The digital footprints left by individuals by means of their activities on digital

platforms make them 'data rich.' But for allowing individuals to harvest the value or richness of data requires three conditions or 'building blocks': enabling regulations, cutting edge technology standards, and new types of public and private organisations with incentives closely aligned to those of individuals, and DEPA is intended to realise these conditions. DEPA replaces the traditional ways of data sharing that involved bulk printout notarisation and physical submission, screen scraping, username/password sharing, and terms and conditions forms led to blanket consent, with transparent granular, revocable, auditable, and consent-based methods by promoting sustainable public-private collaboration in the field. It is neither like the US way of giving private companies an upper hand, nor like the Chinese way of putting the state as a Leviathan nor the GDPR that over emphasise the privacy individual persons, but a virtuous mean that satisfies all the stakeholders. It has been successfully implemented in the financial sector with the involvement of the Ministry of Finance, the Reserve Bank of India (RBI), Pension Fund Regulatory and Development Authority (PFRDA), Insurance Regulatory and Development Authority (IRDAI), and Securities and Exchange Board of India (SEBI) as public stakeholders and as private stakeholders. The success of its application in the financial sector

encourages its adaptation in other sectors like health and education.

**Account Aggregators (AAs):** Account Aggregators (AAs) the so-called consent managers would not have been realised in the absence of DEPA. They are the data intermediaries that facilitate data sharing between individual persons, public and private enterprises under the supervision of regulators, following the guidelines specified in the DEPA. In order to facilitate the sustainable ways of data sharing the financial sector, a non-profit collective of Account Aggregators namely, the DigiSahamati Foundation, also known as Sahamati was established to support financial institutions to adopt technical standards. Add a pic with reference. Financial Information Users (FIU) would use the data of an individual only if she gives consent to the Financial Information Providers (FIP) such as banks share her individual data. (Sahamati, 2025)

**UPI:** The Unified Payments Interface (UPI) is an instant payment system developed by the National Payments Corporation of India (NPCI) in 2016. In April 2009, The NPCI, is a not-for-profit initiative of Reserve Bank of India (RBI) and Indian Banks' Association (IBA) set up under the provisions of the Payment and

Settlement Systems Act, 2007, for “creating a robust Payment & Settlement Infrastructure in India” (Alonso et al. 2023). UPI allows users to link overdraft accounts, pre-authorize transactions with mandates, and view invoices within the application. It can be enabled in feature phone users, who does not have internet access, thereby improving the financial inclusion. After six years of its inception, UPI accounted for the 68 per cent of transactions happening in India which amounted to 8 billion per month in the year 2022 Alonso et al. 2023. UPI is essentially an interoperable protocol that allows anyone to build an app that facilitate payments, which in turn include five members: the central switch, a bank and payment system provider (PSP) for the remitter and the beneficiary (Chauhan et al. 2025).

**IDEA:** Indian Digital Ecosystem for Agriculture laid foundation for the AgriStack of the country which involves the participation of public and private stakeholders for the benefit of the farmers of the nation. It enables the creation of a federated famers’ database that is interoperable, privacy protected, data quality ensured. The database along with other AgriTechs in the DPI would focus on six major aspects of the sector: crop planning; cultivation; supply chain; market; data exchange (Agristack). The government by signing various MoUs (Memorandum of

understanding) with over ten companies among which includes Microsoft India, Amazon Web Services, Cisco, for providing the technology for realising the welfare of agriculture sector. Each company involved in the project would provide various solutions among which include: Cloud service to store data; facilitate 'agtech' start-ups; insights on weather forecast, cropping patterns, disease management, soil quality; dissemination of R&D from research institute to the farmers etc...(Beriya, 2022).

**NDEAR:** The National Digital Educational Architecture was created with an ambition to implement the National Educational Policy among others (NDEAR, 2022). The platform would facilitate digitalisation of text books; placing QR codes on them; digitalisation of assessment records; making data related to teaching and evaluation interoperable; data sharing for drawing insights in the sector etc... Similar to other DPIs, NDEAR also work in a decentralised way taking into consideration of the needs of student, teacher, parent, community member, and administrator. The main building blocks of NDEAR is built across twelve categories namely; open standards and NDEAR portal; federated identities; reference data; infrastructure; technology; governance; administration; content; learning; apps and solutions; open data and analytics; eco system sandbox. The entire infrastructure built

with particular emphasis on the four characteristics: universality; scalability; freedom of choice; portability and convenience.

**ONDC:** Open Network for Digital Platform is an open network where buyers and sellers can exchange goods, services and payments through various platforms/application as long as they are interoperable. The open network, on contrary to the one platform system where buyers and sellers should conform to the monolithic specifications given by a single monopoly, provide an opportunity for a level playing for all stakeholders in the field of commerce. Therefore, the fundamental principles of ONDC includes decentralization, openness, and greater user utility (ONDC & McKinsey, 2023). The essential condition that permitted the birth of ONDC is the development of Beckn protocol.

Beckn is an open protocol that enables a network where buyers and sellers can carry out their commercial activities digitally. In other words, as the way the http protocol allows exchange of information in the world of Web, Beckn protocol allows the exchange of goods and services in the Web. On contrary to the monolithic platforms that command the entire digital market place, Beckn protocol as a digital open infrastructure facilitates an unbundled and decentralised digital market that allows a level

playing. The key features of the protocol that made it sustainably scalable includes openness that made it non private and proprietary; standardisation of specifications that made it interoperable; redundancy via Beckn Gateway; end to end communication without any centralised intelligence; layered design. A consumer in the Beckn Network by means of a Beckn charged app could make a request for a particular good or service via a Beckn Intent message, and the Beckn Provider would deliver the good or service requested via the app.

**Digital Public Goods:** Digital Public Goods are the open-source softwares that permits the realisation of DPIs. The major DPGs of India includes Sunbird, Beckn, Mosip, DigiGOV, DIGIT among others. DPIs facilitate solutions individual and societal needs through apps/solutions, and therefore a wider stakeholder participation in terms deciding the rules of its governance, dissemination, use, and alterations, meanwhile DPGs may not require such an elaborate stakeholder participation. However, the DPG should be essentially open to all members of the society who abide by the regulations of DPIs.

**Other significant conditions:** Along with advent of GPIs and GPGs, there are other important factors that had accelerated

the digital revolution of India. Firstly, the private telecom company Jio announced an internet data package which disrupted the entire telecom sector and consequently made internet very cheap in India. As a result, the consumption of online goods and services tremendously increased. The high mobile penetration and data consumption made DPIs and DPGs at home for Indian citizens. Secondly, the Central Government implemented a demonetization that took the legal tenders of high value from the economy. It has led to an increased traffic in the digital payment system because of the scarcity of currencies. Thirdly, India was already rich in terms of human resource in the sector of computer science, and had IT companies in the private sector that are renowned globally. These companies and other start-ups played a vital role in the implementation of several DPIs and DGPs.

## **1.2 The Consequences of the India Stack**

### **1.2.1 Economy**

A pronounced benefit of India's digital revolution is found in its economic productivity growth (Kotera and Xu, 2023). It testifies the promise that the use of DPIs would improve the GDP growth rate of low- and middle-income countries by 1-1.4 per cent (UNDP, 2022). Digital Public Infrastructure boosted the growth and well-

being of India's economy. India got transformed from a non-formal economy to formal economy with 8.8 million new taxpayers registered for GST within the period between 2017 and 2022. India's digital economy grows 2.5 times faster than the general Indian economy (Gajbhiye et al, 2022). The revenue gains of both public and private sector entities increased. The digitisation of revenue administration improved the tax income of the government and reduced the problems of tax evasion. The use of DPI has permitted cost effective transactions in the economy. For instance, the digitisation of the 'know your customer' KYC procedures led to the cost reduction from USD 12 to US 6 cents attracting clients with lower income to use the bank services (Alonso et al. 2023). Innovation and investment in the private sector have increased in the private sector. The interoperable nature of data allowed private firms to capitalise on them, and at the same time banks avail loans for the companies with good industrial performance on the basis of data, without risking the underwriting of loans. It also promoted best practices in the business where the buyers would buy goods only from the sellers who report GST so that the former can receive input tax credit. The PFMS has facilitated GST transactions that amount to 9 million a day via the RBI. The advent of firms like Zerodha or Upstox

might not have been made possible in the absence of the digital revolution. With over 4.5 million individuals and companies, the UPI accounts for 68 percent of all payment transactions by volume, allowing smaller merchants to further expand their customer base, document cash flow and access financial services. India's stock market too has seen significant improvement in the context of DPIs since it has made trading easy and fast respect to the former times. This in turn has made the country's stock market more resilient in the outflow of foreign investment. The implementation of aadhar has given an impetus to the tax revenue collection since it was a more evolved and more efficient form of the PAN or tax code in India. The DPI like UPI which is used by both individuals and MSMEs now account for 75 per cent of the payment transactions making the economy formal. The interoperability and front-end solutions of the UPI has made it possible for private companies like Googlepay, Phonepe, and Paytm to use it. The Open Credit Enablement (OCEN) mechanism that works under the AA principles allowed the MSMEs to access more credit compared to former times when credit access for MSMEs were very limited. Standing Committee on Finance observed that less than 40 percent of MSMEs avail credit from formal financial systems and instead

depend on costly and unreliable sources of credit (Alonso et al. 2023).

The National Highway Authority of India that implemented the Electronic Toll Collection by means of FasTag, a Radio Frequency Identification Technology, not only improved the monitoring the data of road usage, but also, find income to improve the road infrastructure. As per now, 98 per cent of the toll collection in India is done via FastTag reducing the problems like the leakage of the collected money. Consent based sharing of data allowed consumers to find less costly and better goods and services, which in turn fuelled healthy competition in the market. Also, public and private sector innovators can significantly lower transaction costs by use DPIs to create and exchange value since they don't have to build their own digital infrastructure. The flexibility of online transactions will improve the amount of transactions in the platform as evidences by 12 billion transaction took place via UPI a three year period while only 5 billion transactions took place in the same period.<sup>10</sup> More than the value of goods and services exchanged with these transactions, the

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<sup>10</sup> <https://www.npci.org.in/>

number of transactions provide a valuable data to further plan the economy.

The lack of verifiable identification, low levels of financial literacy and inclusion, and the absence of historical financial data had prevented people from using various financial services in India (IMF paper). According to Global Findex database there is also a strongly positive relationship between the proportion of population with an ID and those having bank accounts.<sup>11</sup> Only one out of three people had a bank account and 9 per cent of adult population used payment cards, while in 2017 it was x amount of bank accounts and 34 per cent of the adult population had a payment card. Since 2011 financial inclusion in India has more than doubled and digital payments increased by 12 percent in 4 years (Carstens, A., & Nilekani, N. 2024). The improvement in financial sector facilitated by the DPIs also promoted some sustainable developments like reduction of gender gap (female ownership of bank accounts rising from 26 to 77 percent); rise in the number of e-wallets while traditional financial institutions shrunk. Further, the platforms like UPI have contributed in improving the financial literacy of people. Moreover, the Aadhar and the Aadhaar-based KYC procedures also

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<sup>11</sup> [https://data360.worldbank.org/en/dataset/WB\\_FINDEX](https://data360.worldbank.org/en/dataset/WB_FINDEX)

offer financial inclusion, more robust anti-money laundering (AML) / combating the financing of terrorism (CFT) checks to the banking system than before (BIS p2).

The use of DPIs in fiscal management led to the creation of entities like Single Nodal Agency which promote cash flow between the federal government and the state governments. The MoF saved around USD 1.2 billion because of utilising the SNA for resource transfer.

One of the reasons for the heavy benefits of DPIs is its cost effective infrastructure, for example, the open-source software, open-source hardware, and minimal design makes Aadhar the most cheap identity projects in the world, at the same time pave way to effective value creation (Atick, 2016). Aadhar further allowed the banks to use e-KYC for carrying out its activities with customers, and this lowered their cost of compliance from Rs 1,000 (USD 12) to Rs 5. (US 6 cents) (Hariharan, 2016). Similarly, the AA framework not only reduced servicing costs to access financial services but also enhanced the availability of financial data. The numbers – 0.5 million new users in the AA in a single quarter and over 4.5 million companies and individuals – testifies how it has benefited the Indian economy.

### **1.2.2 Health**

An emblematic example of the use of DPIs comes from its use during the time of pandemic for the purpose of vaccination. The CoWIN platform not only instrumental for quick and efficient distribution of vaccine in India but also other countries like Indonesia, Philippines, Sri Lanka and Jamaica benefited from this platform. The platform was helpful in overcoming the challenges of a large population; internal migration during the time of vaccination; illiteracy etc... The interoperable nature of the CoWIN platform allowed the people to book slot for vaccination, download the certificate etc... even over WhatsApp by using the CoWIN APIs. Further, the Digilocker facility allowed people to store their vaccine certificate on an interoperable platform.

Apart from the services offered during the time of pandemic, over 92 million patients have been served by the platforms like The National Telemedicine Service, eSanjeevani, and so as the number of beneficiaries of e-pharmacies tripled (FICCI, 2020).<sup>12</sup>

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<sup>12</sup> <https://esanjeevani.in>

### **1.2.3 Education**

The Digital Infrastructure of Knowledge Sharing (DIKSHA) managed by National Council of Educational Research and Training (NCERT) coordinated the activities in the education system of India which has 22 languages as medium of instruction; 60 educational boards; each state with its own unique curriculum. NCERT has created an education ecosystem with textbooks that link QR codes to relevant digital content, online courses with digital credentials, assessments, quizzes, and chatbots. By virtue of being built on open-source technology the DIKSHA platform allows state and union territories to tailor curriculum for their students without compromising their unique identity. With a staggering number of 8,900 courses provided; 200,000 pieces of content across 30 Indian languages; 11,500 contributors; catering to over 60 educational boards across the country, DIKSHA platform has seen sixty billion learning minutes in usage and 135 million course completions, with a reach of approximately 180 million students and 7 million teachers. Moreover, the building block approach of the platform allowed The Department of Personnel Training's Integrated Government Online Training modules by Ministry of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy, Ministry of Health and Family Welfare and Ministry of Sports and

Youth Affairs are hosted on DIKSHA for COVID-19 training of doctors, nurses, and other health workers, which amount to more than 1.7 million individual training in number. Further, the hybrid learning opportunities allow struggling students with better care and attention (Dynarski, 2017).

#### **1.2.4 Governance**

In the sub section DPI, we discussed government's role in creation of the infrastructure and ecosystem for India's digital revolution while this subsection will discuss how it positively affected the governance. Digitization has reduced one of the most infamous social evils in India – corruption. The cash transfers from government treasury account to the beneficiaries' accounts during the time of pandemic managed to resist the problems of corruption and leakages that the households managed to enjoy its full benefit. Similarly, among the welfare measures of the government the PDS system for distributing groceries for lower income household infamous for the amount of corruption it contains. DPIs reduced the it as well? On a similar note, the Direct Benefit Transfer (DBT) system introduced in the year 2013 capitalized on the India Stack to bring benefits of various welfare measures directly to the bank accounts of the beneficiaries. Currently, with the Public Financial

Management System (PFMS), 54 percent of DBT payments are channelled through Aadhaar linked accounts and 46 percent through bank accounts. The effective implementation of DBT was made possible by the the Jan Dhan financial inclusion initiative; aadhar; the mobile phones and internet. During the time of pandemic, funds were transferred to more than 500 million beneficiaries in two weeks of time using the DPIs – e payment and digital ID – under the the Pradhan Mantri Garib Kalyan Yojana (PMGKY) (Jain et al. 2021). The government has efficiently utilised the already existing databases, thanks that they were digitalised, to implement the fund transfers (Una, Verma, Bazarbash, and Griffin, 2023). Well-targeted transfers significantly improved the welfare of Indians during the time of pandemic when their labour income was *sharply* reduced (Arbatli Saxegaard et al. 2023). The DPIs used for DBTs were usable also to various other small schemes that proved benefits to people saving higher costs of creating another payment platform for the former. Using the DBT mechanism: PMGKY delivered cash transfers to 320 million beneficiary bank accounts in three months time; nearly 72 percent of all households of 236 million households enrolled in the PDS database received food rations; 80 million household received cash subsidies for buying LGS. Above all, at least 80 per cent of poor

household receive at least one benefit under the PMKGY, and the DBT and JAM ensured the satisfaction of beneficiaries. The online mode of fund transfer promoted fiscal transparency. For instance, more than 8000 schemes of fund transfers are currently monitorable and the beneficiaries get personal update on the benefits they are eligible for.

Further, there are areas of governance other than welfare benefits distribution which were positively affected. The biometric attendance system allowed to remove 'ghost employees;' ensure public auditing of government officials; reverse the burden proof of the life pensioners. A country like India with more than 22 official languages and a thousand dialects faces severe problems in translating government policies into words and actions. The Bashini Platforms, which is boosted with AI technologies has offered a concrete solution to the linguistic hurdles in good governance. The DigiLocker facility implemented by the Government is the platform where it deposits the various kinds of certificates like the driving license, birth certificate, university certificate etc... Citizens can download these certificates from DigiLocker avoiding long queues.

India's digital revolution based on the documental dynamics of social reality offers some lessons for implementing similar policies elsewhere. Evidently, the diversity of various nation states might not permit an exact copying of the Indian case. However, the already ongoing digital transition and transformation in various sectors in countries like Estonia, etc... give good reason to draw some general principles in making those transitions more sustainable.

Firstly, India did not limit the competence of documents to account for social reality, but they were made an effective way to address the question of citizens' need satisfaction. People found the documents generated before and during time of the digital revolution useful since they were among the channels through which people received welfare benefits. A method that effectively couple documents with welfare distribution allows people to perceive the state as an entity of providence than as an entity that triggers surveillance and subservience. This method also helps in continuously reminding people about the foundational motivation of any nation state – stay united to address various challenges and needs. Further,

Secondly, the ecosystem that promoted India's digital revolution offered plenty of action for both private and public stakeholders along with its citizens. This mechanism has allowed the exchange of good traits of each stakeholder to improve the efficiency of the functioning of the ecosystem. Each stakeholder had well defined roles which coincided with the general purposes but never crisscrossed. The public sector provided the policies, rules and regulations for the new developments with least vested interests, while the private sector implemented the recommendations at scale which the public sector fails to do. Further, each stakeholder became a watchdog of the other leading to the increase in trust and transparency. However, the environment was not of mutual surveillance or competition, but of collaboration and improved competitiveness. The partnership of multiple stakeholders has necessitated a more just and equitable ecosystem. The public sector could not ignore the demands of the private sector and citizens since their absence would not allow the implementation of public sector's policies at scale. The private sector, at the same time, could not by pass their social responsibilities since they were bound by the digital public infrastructure (DPI) policies put in place by the public sector and under citizens' scrutiny. The citizens were incentivized to

participate pro-actively in the transactions of the ecosystem since their privacy was well protected and welfare measures were justly distributed.

Thirdly, combining the dynamics of documental nature of social reality with digital technologies the mutual reinforcement of the two factors. The veracity and the efficiency of functioning of documents are accelerated when they are operable on digital platforms, both online and offline. For instance, before its online availability, it was difficult to curb down the problem of false passports. Combining the development and dissemination of digital technologies with the nature of proper documents would make the former more sustainable and useful. For instance, the high volatility of cryptocurrency would be reduced if they are connected with the already existing documents in the financial and formal economic sector, thereby making rendering an optimal and sustainable use of the blockchain technology.

Finally, the ecosystem not only encouraged effective creation of documents and its use to distribute welfare measures, but also created ground for productivity growth. Distribution of welfare benefits not necessarily culminates in productivity growth although it might catalyst productivity. The productivity growth is more

dependent on the investment in various sectors of economy. The combination of documents and digital technologies in India has led to the creation of new businesses, business models and thereby investments. The contribution to the GDP from India's digital revolution amounts to two per cent.

## **2. DOCUMENTALITY AND INDIA'S DIGITAL REVOLUTION**

This section fundamentally tries to see India Stack through prism of the social ontology discussed throughout this thesis. The documental theory of social ontology exhaustively captures all the changes happened in the socio-economic fabric of India post digital revolution. Evaluating a theory in the context of more practical scenario offers a chance to validate its veracity as well. The fact that the interpretative tools of digital hermeneutics have helped in understanding the dynamics behind India's digital revolution offers consensus for the theoretical framework mentioned initially of this thesis to proceed to an applicative level.

### **2.1 A Documental Interpretation of India's Digital Revolution**

India's digital revolution is an apt exemplary of the interpretation of the social reality based on the documental theory.

Documental theory refers to the fact that human beings construct social reality by means of various documents. The theory can be better understood in juxtaposition with Searlean notion of the formation of social reality. According John Searle, social objects, constituents of social reality, are formed following the rule X becomes Y in the context of C. However, later thinkers have pointed out the inability of the theory to give a comprehend interpretation of social reality as it fails to account for negative social entities like the debt (Smith, 2012). The theory documentality proposed in the first part proposes an alternate which sees social objects as inscribed objects, or the equation  $SO = IO$  (Ferraris, 2012). The proponents of documental theory of social reality shifts the onus of the construction of social reality from collective intentionality to the registration of collective intentionality. The theory of brings to light the omnipresence of registration throughout human history in constructing social reality since it stabilizes the collective intentionality. The process of registration that begets documents prevent any of the member from withdrawing her intention at own will and thereby disintegrating the social reality. Nevertheless, the evolution of social reality suggests that it is not a static, even if the collective intentionality is stabilized by documents. But it is, at the same

time, important to note that the social evolution or change happens through a documented process whatsoever.

There is a two-way dynamic to the documental nature of social reality. Firstly, collective intentionality gets stabilized by the formation of documents, or it can be synthesized as:

*(1) Collective intentionality → documents → social reality.*

Secondly, the documents can shape or condition the change in the collective intentionality that would beget other set of documents, and their corresponding social reality. Or in a synthesized version:

*(2) Documents → collective intentionality (Documents<sup>n</sup>) → social reality.*

Human beings come first before the emergence of any social reality. Later they come together as group because being in organized in group allows individual persons to better address their material and spiritual needs. The will of these individual people to come together as group is what becomes their collective intentionality, and the registration of this collective intentionality as documents becomes the basis for social reality. This entire

process is summed up in (1), according to the documental theory social reality. Meanwhile, the version (2) accounts for the changes and evolution that happens in social reality. Later alterations in the social reality are not only conditioned by changing human needs but also guided by the precedent documents. It is not necessarily the case that the version (1) happens first, and the version (2) happens later. Both are omnipresent in the rise and evolution of social reality in the context of hysteresis. But I have distinguished the two dynamics to bring forth to light the role of human needs along with documents in constructing social reality. Documents are necessary and essential in constructing social reality, but they are not sufficient for the same purpose. This is evident from the fact that many documents do not stand the criticism, protest, and resentment of the common people even if the people in authority to formulate the want to endorse it. Therefore, human needs and documents go hand in hand in the construction of social reality. This in turn would decide the nature of social reality. The nature of social reality formed on the basis of the dialectics between human needs and documents can be explained both from a political and an economical perspective.

At the same time institutions play a vital role in deciding the nature of social reality by means of producing various documents.

Acemoglu et al. (2003) investigated the reasons for the difference in the prosperity between different countries and identifies the institutions play an important role in deciding the nations' prosperity or welfare. On the context of colonialization and post colonialization, the study finds that the inclusive institutions and extractive institutions put in place by colonizers led to prosperity and hardship of the colonialized nations respectively post-independence. Institutions are one of the important social objects that constitute social reality, which in turn is ontologically based on documents as well. Therefore, one can rightfully assume that the nature of documents would decide the nature of institutions, and thereby the consequences of the institutions. The inclusive institutions contain the features like property rights, political participation etc... while extractive institutions lacked them. According to the study of Acemoglu et al. the reason for colonializers to choose between extractive or inclusive institutions for their colonies was their mortality rates. The places where the mortality rates were high for the settlers an extractive approach was implemented, the places otherwise, have seen an inclusive approach. In other words, the very basic need found in all creatures – the need for survival – decided the selection of the institutions that determined the social, economic, and political

reality of the colonized nations. This situation is a paradigm of (1) by the fact that the collective of intention of the settlers to establish institutions by means of documents was at large conditioned by their basic need for survival. Later, by virtue of (2), the institutions persisted by means of the production of documents already established until the need factor comes into play. The need for better survival rates conditioned the nature of the institutions that the settlers put in place, and this in turn had far reaching consequences on the nature of the need satisfaction of both settlers and the colonized. The nations that had inclusive institutions prospered in the following decades, while the countries with extractive institutions seen more hardships. Under the guise of this historical events, the economists concluded that institutions play vital role in deciding the prosperity of the nations.

The two factors – the documental theory of social reality and the role of institutions ontologically depends on documents in determining the prosperity – well interpret India's digital revolution and its consequences. The consequences have happened in the social, political, and economic realms of India. The first step in the direction comes with the efforts of the central government to provide a national identity card, namely, Aadhar to its citizens. Aadhar documented the collective intentionality of over 1.2 billion

people with different cultural identities, language, religion, history to form a single nation – the Republic of India. A common identity document assumes special importance for a country immensely diverse like India, and does not have a shared history apart from the collective movement against the British colonialization. The Republic of India after its formation in the year 1956 has issued various kinds of ID documents to identify the population who proclaimed their collective intentionality be a unique state. However, the variety of the ID documents did not help much to identify efficiently an already diverse population, and cater their needs. Aadhar managed to solve these two problems – a common identity to all the people and a means to identify and deliver various needs of the people.

The first function of Aadhar – a common identity – played a pivotal role in reinforcing sense of identity of Indian citizens at least passively. The ID documents prior to Aadhar have given the citizens an identity, but did not provide them with a shared identity. The variety of ID documents that Indian citizens possessed emerged from the documents like the Constitution of India and others reminding us of (2). But it might not adequately remind them about the fundamental motivation that led to the formation of the Republic or the (1) dynamic of documental theory. In the

aftermath of the National Movement, leaders of the movement were convinced that India as a nation can prosper better if stayed united and therefore architected the Republic as it is today. But the artifacts like the Constitution thus created and ID documents prior to Aadhar did not took the message of unity to the micro or individual level. Aadhar as an ID document has been instrumental in formally carrying the sense of shared identity and the need of staying united mentioned in the constitutional documents to every citizen. However, Aadhar need not to be given full credit for India's unity and indivisibility because the nation managed to survive united even when its peer nations, after their independence or formation, has undergone notable political instability. The initial investment on education system, universal adult franchise, free and fair election, protection of democratic rules etc... have contributed the longevity and well-being the Republic of India. Nevertheless, the role of documents in facilitating all the above-mentioned good traits cannot be overlooked, and this chapter does not elaborate more on it since they fall beyond its scope.

So, the factor that makes Aadhar peculiar is the possibility it offered to create further documents and the corresponding institutions on top of it, which in turn led to the welfare and economic growth of the nation. After its implementation in the year

2016, Aadhar became an effective means through which the state identified the needs of citizens and delivered the corresponding essential goods and services. The lack of identification means is an important hurdle for nations in delivering welfare benefits to its citizens. Aadhar not only resolved the lack of identification means, but also made sure the efficient distribution of welfare benefits. The uniqueness of Aadhar identity that comprises even the bio metrics reduced the corruption, leakage and other fraudulences that happened during the distribution of welfare benefits. In sum, Aadhar not only provided people with an identity, but also, by effective welfare benefit distribution reminded them of the need of staying united as one republic nation.

The two functions of Aadhar – providing an ID and deliver welfare to the people of the nation – was further boldened when it was coupled with the digital technologies. India moved a step forward in the direction of becoming a welfare state with the collaboration of public and private stakeholders and citizens by leveraging advantages of digital technologies. Aadhar from the very conception phase was meant to be an ID document operable both online and offline modes. The online operability of Aadhar and the wide use of it accelerated the further the (2) dynamics of documental theory i. e. it led to the creation of several other

documents. Each time an operation was carried out, a new document was created since the particular operation was recorded. A strong data privacy framework incentivized citizens carrying out operations using the Aadhar especially on online platforms. Apart from the transaction documents, the whole ecosystem necessitated the creation of various entities for its smooth functioning, which in turn was based on strong documents because the stakeholders involved diverse public and private stakeholders, and documentation was the best way to ensure trust and transparency for their collaboration.

Finally, Aadhar, its digital operability and the creation of associated documents were converted into productivity growth. The state designed the infrastructure not only as a framework that provide identity to its citizens; provide welfare measures; formalize and regulate their transactions, but also to improve the value of goods and services in various sector and thereby the human living conditions. This is evident from the sectors of governance, education, health and economy in general.

### **3. SOCIAL SUSTAINABILITY AND INDIA'S DPIs**

Although India Stack has improved the well being of the people living in the Republic of India, there is still room for

improvement. The design, development, and deployment of the DPI were neither based on the principles of social sustainability defined in this chapter, nor on the digital hermeneutics. This section illustrates the traits of those theoretical aspects found in India Stack. Given the fact those traits has been deliberately plugged in to the DPI, its use in the latter phase would improve the latter's quality significantly.

### **3.1 Social Sustainability**

The success of 'Digital India' initiative proves the definition of social sustainable development proposed in this thesis apparently true. The initiative sought to make use of the opportunities of digital technology for improving the welfare of people. Digital technologies have been employed to manage both human and non-human resources for bettering the living conditions in the society. At the same time, digital technologies in itself turned out to be valuable resources that should be managed through proper policymaking. In the first case, where digital technologies were used to manage resources, there have been effective utilization of resources with respect to the norms of sustainable way of their use. Meanwhile in the second case, where the digital technologies themselves were the resources, the

policies made for their management took at most care to bring the resources to the least advantaged people of the society. The fundamental aim of the government of India in bringing in a digital revolution was to make India a developed country. The development envisioned by the policy makers was long sighted as it is evident from the nature of the India Stack DPI. The building block approach with the nature of scalability engrained in it proves that initiative was put in place with for long term benefits.

The developmental steps taken in the context of India Stack seems to conform with the principles of social sustainability. It improved the welfare of individual members of the nation, and at the same time preserved the ecosystem that assured the well-being of the group and the individuals. The various sectors consulted in the first section to identify the benefits brought in by DPIs explicates the positive impact of digital technologies in the life of individual people. For instance, the digital identity card allowed the marginalized people to access the benefits of government welfare measures with much ease in comparison with the past procedure of welfare delivery. The benefits produced in the health sector also had a positive impact since people with unique health conditions received services accordingly. From the perspective of individual persons, more number of individuals were

brought into the radar of DPI based services. For instance, it is highly probable that people without a smart phone would get out from the beneficiaries of DPIs. But, the India Stack DPI had provision to include feature phones in the delivery of goods and services based on digital technologies.

The government had created a proper ecosystem before making of digital technologies as an instrument to deliver benefits and managing digital technologies as a resource in themselves. It was well protected in a way that no single player – whether it is public, private or individual – take advantage of one another. The implementation of DPI has allowed many new kinds of vocations and entrance of new service providers. The design of the DPI did not let a single player to dominate the sector or prevent other entrants from entering the sector as it is seen in the cases where DPIs are absent.

In short India Stack managed to develop the capabilities of individuals and preserved the ecosystem that facilitated that development. The three conditions: equity, participation and multi pillar approach, described in the prior chapters were present in the design, development and deployment of India Stack. The

realization of a holistic sustainable development based on digital technologies was result of this combination.

### **3.2 Equity**

India's DPI has managed to put in place an equitable distribution of resources among its citizens. India has suffered largely the problem of inequality which still persists in the society. It has historical, cultural, institutional and several other reasons. Digital technologies has become a means to overcome this problem. Although there are large quantities of socio-economic inequalities found in India, the DPI has considerably reduced many of them. The country has got relatively a fair amount of both human and non-human resources. The task therefore, is to find out optimal ways to distribute these resources equitably.

The advancement in the economic sector testifies the way by which people from most possible sections of society have been given benefits. The normal boom in tech sector leave a few tech companies more prosperous while leaving large sections of society underserved. The ideal situation would promote tech based new businesses, and at the same time helps trickle down the benefits of digital technologies to all sections of the society. New start-ups

like Zerodha, which would not have been possible without the DPI shows the businesses can benefit from DPI. At the same time, the direct benefit transfers bear testimony for the use of DPI for ensuring welfare of marginalized people. Both the cases demonstrate the ways through which digital technologies as a resource which can bring welfare to the society.

India stack has offered methods to address the current problems which cause inequality in the society. For instance, the possibility to open new bank accounts helped people to access the benefits and support provided by the government to catch up with the well-off section. There is a directly co-relation with the ID cards and the number of bank accounts globally. The inception of the digital identity Aadhar has allowed people to easily start a new bank account. The legacy systems that provide welfare measures do not turns out to be successful as the DPI based initiatives perform. India Stack was designed in a way to deliver the support for marginalized sections in the society in relatively better way possible.

DPI has managed to create an ecosystem where equitable access to health, education and other governmental services. Health services are very expensive in India and the poor people do

not manage to access the it. Moreover, many of the people who live in remote villages may not be able to access the health services. These reasons that prevent people from equitably accessing health services were reduced largely by the technologies provided by India Stack. For instance, the telemedicine.

The developmental activities based on digital technologies was made sustainable by letting more number of people beneficiaries of the same. Equal access to the benefits of digital technologies permitted this trickling down of benefits to marginalized people.

### **3.3 Participation**

The design, development, and dissemination of India Stack had ensured the participation of various stakeholders. Both private and public parties worked hand in hand to realize the India Stack DPI. The public parties took the initiative to make the policies while the private party put in effort to realize the policies. However, there has been no watertight compartmentalization of the tasks. The collaboration between both has helped to overcome the usual problems created by the top to bottom way of policymaking and implementation. The close interaction with the private sector allowed the newly implemented DPI not to be alien to the day-to-

day needs of businesses and common people. Moreover, it has successfully overcome many of the drawbacks of legacy systems in delivering goods and services.

The factor of participation was not only limited to the initial phase of setting up the DPI but also created an ecosystem where people can participate in decision making. The open-source nature of the software infrastructure would allow individuals and businesses to build their own models of enterprises. It means the socio-economic reality built out of the DPI did not represent a set of well of group but gave voice to many people. India Stack has managed to avoid the risk of letting the initial players from becoming dominant in sectors whatsoever.

### **3.4 Muti-pillar approach**

The digital transformation exemplifies the multipillar approach required for sustainable development. India Stack managed fairly well to satisfies the social and economic aspect of sustainability. The close link with equitable economic progress with social welfare enabled a uniform growth in both sectors. The inception of digital identity Aadhar provided more visibility of the nation's citizens. Several government welfare schemes have not reached them due to the lack of proper identity. Moreover, the

capacity of individuals to autonomously improve their life situation was obscured due to the same reason. Similarly, other DPIs were created with a primary intention of improving the quality of life of citizens. Consequently, the platforms like COWIN in the field of medical care and DIKSHA in the field of education has delivered better and inclusive service for citizens. The economic pillar of sustainable development was addressed by the payment layer of India Stack namely, UPI. The unified payment system incentivized faster and transparent transactions. Moreover, the possibility to make use of the economic transaction data for generating fiscal credit further encouraged well performing SMEs. The DPI has created possibility for the marginalized and the downtrodden for participating more actively in the economic activities. The impact on the environmental pillar is based on the capability of India Stack to exchange methods that are based on fossil/carbon fuel, paper-based work, physical transactions, etc... The tech-based solution will have corollary problems like e-waste generation, greater energy consumption, costly investment. However, the presence of an already existing DPI can reduce the amount of such damages to a great extent (Chawahan et al. 2025)

The Indian case of digital public infrastructure development shows the concrete example of digital technologies to make life of

people and society better. The current model of design, development and deployment of digital technologies worldwide may not produce socio-economic welfare. Although they may contribute to productivity growth and wealth creation, their benefits would remain limited to some small group of people. Any argument to rethink about this pattern is usually confronted by the fact that institutional intervention may slow down the growth of the sector. On the contrary, the case of India Stack proves that a collaboration with public and private stakeholders enlarge the use cases of digital technologies using open source, scalable, and interoperable system can increase productivity growth and socio-economic welfare.

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## **CONCLUSION**

Digital technologies show no nice of withdrawing its influence on human life, but on the contrary, they continue to ensure the presence to new areas of humankind day by day. Digital technologies has an essential role in determining this influence exerted by digital technologies. Therefore, it would be helpful adjust the norms of data governance and data management to determine desirable influence of digital technologies. The current norms of data governance fail to cop up with the profound influence of new digital technologies on humankind. Consequently, new initiatives of based on digital technologies governments, institutions, organizations, and individuals struggle to find out way from the disruptions created by the former.

This thesis argued for a framework that recognize digital data as a social object, and consequently as a social good. The perception of data as a social good will permit a holistic understanding of data. It manages to capture the dynamics of social disruptions produced by data driven digital technologies produced in society. Understanding data as information not only makes their governance difficult but also impedes the possibility to use them for constructive interventions to make the society better.

Regulators and policy makers had struggled in the past two decades to capture the essential nature of data. The transition from GDPR norms to the DGA in the Europe is a paradigm for it. The GDPR regulation emphasized more on the privacy aspect of data in the context of data governance. Although privacy of data subjects should be categorically protected, they should not prevent the constructive use of data. It led to an austerity in data driven enterprises in Europe compared to other parts of the globe. The DGA regulation came out as a solution for it when it emphasized the aspect of 'data altruism.' The DGA sought to address the social aspect in a better way which reduced many of the bottlenecks in the context of data governance. However, there is much to be done in the context of data governance and data management. The theory of social sustainability and digital hermeneutics proposed in this thesis provides a guideline for further streamlining the norms of data governance existing across the world to derive the best possible welfare from digital technologies.

The digital hermeneutics and social sustainability, in their turn, requires an interdisciplinary approach. As evident from the arguments of the thesis, the watertight compartmentalization of disciplines should transcend their boundaries to address the question of digital. The all-pervasive nature of digital technologies

necessitates the collaboration of various disciplines to best deliver the welfare of technology to people.

Humanists and technologists find themselves knowledgeable and ignorant at the same time in the context of digital technologies. The nature of technology, especially new digital technologies, demands the collaboration of both parties overcome their ignorance by sharing their knowledge. As in the case of sustainable development, where ignoring one among its pillars leading to a distorted picture, the separation of social and human sciences in the course of development of technology would results in its distortion. The collaboration may seem difficult in beginning given the difference of intellectual background. It is necessary to find out a 'common language' that permits the interaction between technologists and humanists. The equation that encapsulates the social and informational aspect of digital data proposed in the chapter is an attempt in this regard.

A theoretical framework of social sustainability and digital technologies is a prerequisite for ensuring long term welfare. The collaboration between humanists and technologists would prevent the problems coming from quick fixes in the context of welfare. Welfare measures put in place by governments around the world

have been mostly driven by debt. This has strained the capacity of governments and institutions continue providing welfare to people. On the context of an advent of digital data as value bearer, this problem could be solved.

The present data governance models offer a little to nothing in providing direction for the use of data value to socio-economic welfare. There are several examples around the world where socio-economic benefits have been produced using data. However, the amount of such welfare schemes remains insignificant on comparison to the actual potential of data. The collaboration between the technologists and humanists according to the principle of social sustainability and digital hermeneutics will helps to increase the amount of welfare schemes fueled by data value. Among the various interests, the collaboration can also look for the ways by which ethical and secure modes of data exchange for promoting socio-economic welfare. The newly discovered renewable resource of twenty first century, data, requires an effective management for its proper use. It would definitely be a time consuming process but it is worth planning for the governance and management of data in this mode. The worth comes from the long-term benefits it can bring to humankind.

The principles of social sustainability and digital hermeneutics in this thesis need to be tested and improved in practical contexts. The theoretical framework to encourage an interdisciplinary approach for better management of data for using new digital technologies to improve socio-economic welfare is an apt option for DPIs. Digital public infrastructure growth will increase in the coming decades given the popularity of digital technologies. They have to be finetuned to overcome the possible pitfalls and accelerate potential benefits. The successful models of DPIs already contain the traits of the theoretical framework which this thesis has provided. Although such DPI developments do not contain explicit reference to 'social good', 'digital hermeneutics, or the exact definition given to social sustainability, the design, development and dissemination of the former prove the veracity of the latter.

The application of the theoretical framework to DPIs and other data driven initiatives will exposes the former's drawbacks if any. The definitions for tehconetp discussed in the thesis have been made exhaustive to the most possible extent. Therefore, it is unlikely that there would some sectors which turns out be resistant towards the application the theoretical framework. However, being more exhaustive may risk lacking clarity in implementing concrete

action. A continuous test and verification is required to update the theoretical framework and its arenas of practical implementation. To sum up, this thesis is not a conclusion of an argument but a proposal of an informed hypothesis which would offer constructive promote constructive disruption, and improved welfare.