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**Towards a Theory of Value as a
Commons: Production and Organisation
in Times of the Digital Economy**

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Ühisvaral põhineva väärtusteooria suunas: tootmine ja korraldus digitaalmajanduse ajastul

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List of Publications

- I Giotitsas, C., **Pazaitis, A.**, & Kostakis, V. (2015). A Peer-to-Peer Approach to Energy Production. *Technology in Society*, 42: 28–38. **ETIS 1.1.**
- II **Pazaitis, A.**, Kostakis, V. & Bauwens, M. (2017). Digital Economy and the Rise of Open Cooperativism: The Case of the Enspiral Network. *Transfer: European Review of Labour and Research*, 23(2): 177–192. **ETIS 1.1.**
- III **Pazaitis, A.**, De Filippi, P. & Kostakis, V. (2017). Blockchain and Value Systems in the Sharing Economy: The Illustrative Case of Backfeed. *Technological Forecasting & Social Change*, 125: 105–115. **ETIS 1.1.**
- IV Bauwens, M., Kostakis, V., & **Pazaitis, A.** (2019). *Peer to Peer: The Commons Manifesto*. London: Westminster University Press. **ETIS 2.1.**
- V **Pazaitis, A.**, & Bauwens, M. (2019). New Roles of Citizens, Markets and the State for an Open-Source Agricultural Revolution. In: J. L. Vivero Pol, T. Ferrado, O. De Schutter, & U. Mattei, (Eds.), *Routledge Handbook of Food as a Commons* (pp. 70–84). New York: Routledge. **ETIS 3.1.**
- VI **Pazaitis, A.** (2020). Breaking the Chains of Open Innovation: Post-blockchain and the Case of Sensorica. *Information*, 11(2): 104. **ETIS 1.1.**
- VII **Pazaitis, A.**, & Drechsler, W. (2021). Peer Production and State Theory: Envisioning a Cooperative Partner State. In M. O’Neil, C. Pentzold, & S. Toupin (Eds.), *The Handbook of Peer Production* (pp. 359–370). Hoboken, NJ: Wiley & Sons, Inc. **ETIS 3.1.**
- VIII Kostakis, V., & **Pazaitis, A.** (2020). Who Creates Value? Insights on Value Theory from *The Last Dance*. *Halduskultuur: The Estonian Journal of Administrative Culture and Digital Governance*, 21(1): 76–85. **ETIS 1.1.**
- IX **Pazaitis, A.**, Kostakis, V., Kallis, G., & Troullaki, K. (2020). Should We Look for a Hero to Save Us from the Coronavirus? the Commons as An Alternative Trajectory for Social Change. *tripleC: Communication, Capitalism & Critique*, 18(2): 613–621. **ETIS 1.1.**

Appendix

- X Bauwens, M., & **Pazaitis, A.** (2019). P2P Accounting for Planetary Survival: Towards a P2P Infrastructure for a Socially-Just Circular Society. A joint publication of the P2P Foundation, Guerrilla Foundation and Schoepflin Foundation.

Author's Contribution to the Publications

- I The author of the thesis contributed to the theoretical framework, in particular the parts focusing on theoretical interpretations of the commons, as well as to the documentation of the empirical work, the presentation of the methodology and adaptations undertaken of the structure and narrative, required during the peer review process.
- II The author of the thesis conducted the case study research and was responsible for the development of the narrative and the presentation of the case, including outcomes and conclusions. As first author, the author of the thesis was included in the main correspondence and was responsible for the revisions of the manuscript required during peer review.
- III The author of the thesis was mainly responsible for the design and structure of the research, coordination of the roles and contributions by the other authors, and the presentation of the case study narrative, results and conclusions, while acting as corresponding author and coordinating the revisions of the manuscript.
- IV The author of the thesis participated in the initiation and design of the book structure and contributed to all chapters, in particular in the sections related to political economy and theory of value, and the presentation of case studies. The author also contributed to the design of the figures and infographics, and was largely responsible for final revisions of the manuscript and correspondence concerning copy-editing and proofreading.
- V The starting point and central argument of this paper was largely based on the prior work of the second author. The author of the thesis was the principal responsible for the adaptation for academic publication, and consecutively, the design and write-up of the paper and the development and presentation of the narrative, as well as the coordination of the revisions and correspondence with the editors.
- VI The author of the thesis was solely responsible for the research design and development, the conduction of interviews and case study research, the write-up and revisions of the manuscript and correspondence.
- VII The main idea and research design were conceived jointly by the two authors. The author of the thesis was responsible for the coordination of the research structure and development, write-up and revisions, and acted as corresponding author.
- VIII Both authors had equal contribution to the development of the research and write-up of the manuscript. The author of the thesis was responsible for the analysis on theory of value and the concept of value as a commons.
- IX The author of the thesis drafted the first version of the manuscript, contributed to the following versions with feedback and review and acted as corresponding author.
- X The author of this thesis participated in the research design and coordination which were mainly conducted by the first author, and was largely responsible for the documentation and presentation of the cases and theoretical analysis, while also coordinating correspondence and administration of the research project.

Abbreviations

CBPP	Commons-Based Peer Production
FOSS	Free and Open-Source Software
ICT	Information and Communication Technologies
TEP	Techno-Economic Paradigm
P2P	Peer-to-Peer

Introduction

1 Aim and Focus of the Thesis

The story of this thesis begins with Luca, a merchant in 14th-century Venice. As a responsible merchant, he starts his day by looking into his books. Trade is complex and drenched in uncertainty: travel arrangements, identifying suppliers and customers, matching supply and demand, price negotiations; a series of critical decisions that need to be made quickly, based on imperfect information. Two basic entries in his books, debts and credits, make his life easier. All the complicated reality of commerce simplified in two questions: “what do I get?” and “what do I give?”. Luca is a successful merchant, probably unaware of how much his own simple and quantified reality would influence the meaning of life for the generations to follow; yet not much more unaware than we are today.

Fast-forwarding to the early 21st century, the starting point of my study and professional track has always been a pursuit to make sense of my own reality, driven by an intuitive longing to change it. I began with my bachelor’s studies on international economic relations, which, riddled with the ills of mainstream economics, contributed next to nothing to this pursuit. My short but dense tenure as a consultant in the private sector was highly edifying in regard to this failure. I experienced first-hand the vast divide between economic and business practices preached by management textbooks and policy reports, and actual societal needs: a divide so consistent that it seemed to be more intentional than accidental.

Afterwards, I found promising grounds in the field of technology governance for my master’s degree and, later, PhD studies. Despite the previous disappointments, I was still striving to make myself useful through the broader domain of economic studies. The rich and historically routed approaches of heterodox economics have been key to the prospects of my research endeavours. An Other Canon of economic thought (Reinert & Daastøl, 2004; Reinert, 2019) provided the analytical tools to understand the current reality and function of capitalism, but also to acknowledge and analyse emerging forms of economic and social organisation with post-capitalist interpretations, such as commons-based peer production (CBPP).

Benkler (2002; 2006) coined the term CBPP to describe a cluster of productive and organisational practices, initiated in the social web, that are not covered by standard economic prescriptions. CBPP constitutes a distinct mode of production based on patterns of sharing and open participation that result in sophisticated digital innovations, spanning from free and open-source software (FOSS) and the free encyclopaedia Wikipedia to open design and open hardware in the physical realm. These innovations are not exchanged as commodities, but freely shared as commons, managed under the rules and norms of the community that co-produces them. A critical mass of human ingenuity and creativity is engaged through smaller and larger self-identified contributions, driven by diverse motivations and incentives beyond individual monetary gains. The new form of “digital commons” and their impact on the digital economy caused a resurgence of a rich body of knowledge and documentation on traditional commons (Ostrom, 1990), hitherto left outside of the economic discourse.

In this perspective, my doctoral work engaged with the political economy of CBPP, employing the methods and practices of heterodox economics to analyse and understand an emerging phenomenon in its own real-world setting. Initially, the main research question asked how contributors to CBPP projects could create livelihoods and

sustain their operation (II; III). Various case studies were explored, featuring interesting solutions for mutual coordination, assessment and allocation of contributions, resources and rewards in collaborative systems (II; III; IV; VI). However, any attempt to theorise upon this contributory activity from an economic perspective fell short in addressing questions pertaining to the value of those contributions.

Even worse, the more sophisticated and integrated those systems of coordination and distribution (III; VI; X), the stronger a tendency of steering contributory activity, otherwise driven by diverse motives, towards efficiency and optimisation in terms dictated by markets. A powerful structure, hidden in the very socio-technical layers that enabled CBPP, appeared to determine contradictory economic outcomes.

The incisive diffusion of Information and Communication Technologies (ICT) has enabled a radical reconfiguration of the way people interact, communicate and coordinate their social and professional realities. The digital economy and new forms of production have surfaced, based on creative and collaborative contributions not primarily driven by “rational” calculated gain or utility. Simultaneously, an intensifying social and ecological crisis, alongside the chronic devastating psycho-social impacts of daily professional life in most parts of the “First World”, have sparked enthusiasm for these fresh forms of activity – and living – in which people find meaning. A world beyond the cold sphere of quantification, efficiency and optimisation seems possible, yet its value cannot be realised.

Therefore, the aim of this thesis is an in-depth exploration of the concept of value amidst turbulent times. There is a deep intuitive relation between value and social organisation (Prichard & Mir, 2010; Harvie & Milburn, 2010; VIII). Value is an abstraction of meanings and subjectivities inferred from human actions, while the way people organise and administer their social and economic life reflects the concrete interpretation of these relations. All nuances aside, the concept of value appears to have been rather well-established for most of the last few centuries (III). However, the rapid organisational changes and challenges of our time call for critical questioning of established views and assumptions in order to unveil the conditions that may formulate our future perceptions.

Hence, this thesis explores the contours of a theory of value as a commons. Such a theory can provide the grounds to (a) harness the benefits of the digital economy for the broader and most vulnerable parts of society, and (b) embody the conditions to address the climate crisis. The main research questions concern the intersection of value and organisation in the digital economy, including:

- What is the digital economy and how is it related to new forms of value creation? (Section 1.1)
- How is value perceived within the economic system and how is this perception manifested in the organisation of people and things and the relations amongst them? (Section 1.2)
- How is new value validated and how does this influence the various agents involved? (Section 1.3)
- What is the scope and contribution of the concept of value as a commons? (Section 3.1)
- What are the elements of an alternative theory of value stemming from new forms of value creation? (Section 4)

To explore these questions, the following sections attempt to position the relative concepts and current developments in perspective. The development of this introduction follows a narrative-based approach, which may have a descriptive starting point of “what is”, but moves to a normative interpretation of “what should be”, pertaining to norms, institutions and structures; directions of future research, technological advance and public policy; and evolutionary social imaginaries and perceptions.

1.1 The Digital Economy

The broad diffusion of ICT in all sectors of the economy and society since the invention of the silicon microchip in the 1970s has signified a process of rapid transformation across all layers of human activity. New clusters of technologies have spread from industry to everyday life, with many small innovations, like the personal computer and smartphones, as well as new infrastructure and interfaces, like the internet. In essence, the ICT revolution has formulated a new “common sense” of how production and life is administered and coordinated, which Perez (2002) calls a “Techno-Economic Paradigm” (TEP).

The unseen capabilities for human communication and coordination at scale, effectuated by ICT, illustrate the new logic of flexible production. The previous paradigm of mass production, driven by the automobile industry and based on cheap oil and raw materials, is gradually being replaced (Perez, 2002). The imperatives of scale and standardisation, closed structures, and fixed design and planning give way to variety and adaptability; open, network-based structures; and agile, flexible design strategies that build on the capacities and potential of ICT.

A new model for productivity has come to characterise the current drive of creativity and living, an age that sparked scholarly imagination, encapsulated in terms such as the “Network Economy” and “Digital Economy” (Tapscott, 1997; 1999), the “Information age” and the “Network Society” (Castells, 2011; Van Dijk, 2012; Kostakis & Bauwens, 2014). All these terms, despite their variance in scope and focus, illustrate the paradigmatic shift in the way we perceive the fundamental factors of living: a new era of human civilisation.

Subsequently, new social imaginaries have begun to form around the capabilities and potentialities of ICT. The barriers of entry in information production have been slashed to near zero, as potentially anyone with an access to a low-cost personal computer can participate. With information presented as “the fundamental source[s] of productivity and power” (Castells, 2011: 21), a broad distribution of the fundamental means of production has spawned visions of an open, participatory future where anyone may have agency in influencing the design, production, and distribution of the fruits of technological advance for a freer and fairer society.

Along the lines of these insights and imaginaries, the present thesis places its analysis at the time of the digital economy. This context is restrained neither to economic activities conducted in digital environments, nor to economic affairs mediated by ICT. Rather, it comprises a broader vision of an economy and the subsequent forms of society and living informed by the capabilities and potentialities of the ICT-driven TEP. Moreover, “digital economy” is consciously chosen from the various terms encountered, as it emphasises the specific features of the (potential) transformation brought about by the ICT revolution that are of interest for this thesis, as explained below.

Kostakis (2019) illustrates how digital qualities can be better understood through the prism of modularity, described as “the degree that standardised parts or independent

units are used to construct a more complex system” (5). Modularity, and thus digital properties, are highly dependent on shared knowledge and protocols for the various components to be interoperable and fitting. Hence, a significant potential of the digital economy relies on sharing capacities.

Indeed, ICT has enabled hitherto unseen capabilities for human communication, coordination and information-sharing. Successful platforms like Google, Amazon and Facebook largely rely on information-sharing and the shared social activity of users to assign relevance to information and social content (IV). Benkler (2002; 2004; 2006) identified these qualities in early forms of internet-based collaboration long before the platform economy saw opportunities for profitability.

The phenomenon Benkler (2006) terms CBPP is a new modality of production based on autonomous contributions by loosely affiliated volunteers, with no-pre-defined roles and structure. They are based on – and eventually produce – shared resources and relations, administered according to rules and norms developed by the participants, i.e. commons (Ostrom, 1990; Bollier, 2014). The success of FOSS projects and Wikipedia has demonstrated the potential of CBPP *vis-à-vis* hierarchical command or price-incentivised coordination.

Successful CBPP projects have heavily influenced the underlying rationale of early surges of the digital economy. CBPP extends the relations defining the ICT-driven TEP to additionally encapsulate the broader social and technical elements embedded in the production and diffusion of ICT through the system. Open hardware and open design formulate manifestations of CBPP in the physical realm, materialised in open collaborative spaces like hackerspaces or makerspaces (Kostakis et al., 2014; Niaros et al., 2017). These hybrid practices, blending online and physical forms of sharing and co-production, have been shown to posit significant potential for learning, community-building and innovation, which further diffuse the commons-based expressions of the ICT-driven paradigm (Niaros et al., 2017).

Since the early practices of the social web and hackerspaces, developments in the digital economy have been ambiguous. Market-driven forms have quickly caught up with harnessing the same attributes of ICT exhibited by CBPP. Successful business models have defined new forms of profitability based on advertising and mass customisation, outcompeting legacy firms and effectively monopolising the respective sectors.

Yet CBPP continues to advance and still dominates certain arenas. Wikipedia is still the top online encyclopaedia¹; FOSS runs all top supercomputers²; and the web server market is dominated by open-source servers³. Simultaneously, beyond the functional characteristics of the relative efficiency of P2P signalling and shared capacities (Benkler, 2002; 2004), CBPP also provides a vibrant “social context [...] and a set of social practices in which to inculcate and develop, some quite basic, social and political virtues” (Benkler & Nissenbaum, 2006). As these virtues often transcend the common assumptions around *homo economicus*, FOSS projects have gradually developed their own structures and business practices, allowing them to be sustainable while remaining loyal to community ethics before commercial ones (II; IV; VI; O’Neil et al., 2020).

Hence, CBPP has provided the means for post-capitalist forms of production to thrive within capitalism, along with a certain ethical and structural setting able to transcend

¹ <https://www.similarweb.com/top-websites/category/reference-materials/dictionaries-and-encyclopedias/>

² <https://www.top500.org/statistics/details/osfam/1/>

³ <https://news.netcraft.com/archives/category/web-server-survey/>

capitalism. Today's digital economy features commons-based and market-driven forms that co-exist and co-evolve across different layers in an ever-changing environment. Essentially, the direction towards the former or the latter is more a political choice than a technologically determined outcome of ICT.

The underlying dynamic of both Wikipedia's and Facebook's success is substantially similar, and characterised by peer-to-peer (P2P) social relations developed on participatory infrastructures (IV). The difference is that in CBPP these relations are freely guided through social signalling and create shared outcomes, while for-profit platforms deploy an opaque back-end manipulative interaction to maximise control and relevance for advertising purposes.

CBPP is a new form of organising productive capacities based on the commons. It is fundamentally a new pathway towards value creation. But to understand the value of CBPP we need a comprehensive value framework that is compatible with the practices and characteristics of CBPP. Is CBPP another way to manage scarce resources and foster profitability, or is it indeed something completely different, beyond the confines of corporate hierarchies and markets? To address this question, the following section focuses on the function of theory of value.

1.2 The Function of Theory of Value

Value is an abstract concept marked by ambivalence (III; IV). In daily life and business practice, it is used with an ease that indicates a common understanding. Yet there is no definitive or objective definition for value in economics. Rather, various interpretations operate within the context of different theories of value. Oddly, theory of value has been almost completely absent from recent economic discourse, even though it was once a central aspect of classical political economy (Mazzucato, 2018).

As may be expected, the concept of value alone has no consistent definition across different societies and eras (IV). The late David Graeber (2001) described value as a process or mechanism through which people assign meaning to their actions, incorporated within a broader social whole. Since the industrial revolution and the creation of political economy as a discipline of inquiry, value has mostly been related to actions encircling the exchange of things with one another, i.e. commodity production. The first systematic treatise of value in economics as a modern discipline is the labour theory of value presented by Smith (1776/1776). In Smith's own phrasing it becomes evident that the focus of the labour theory of value is, in fact, not at all labour as an action, but rather the quantity of labour a person is able to "purchase or command" (ibid: 47) in commodity exchange. Hence, labour in capitalism acquires meaning solely as an object of exchange (III). The human "toil and trouble" (ibid: 47) that produces goods and services is, in Smith's words, "the first price [...] that was paid for all things" (ibid: 48).

Even though Smith's labour theory of value *per se* was later abandoned in economics literature, the fundamental assumptions underpinning the social construction of value creation still hold. Article III provides a historical analysis of the concept of value in the history of economic thought, starting from antiquity and medieval philosophy; moving to Smith and the classical political economy; and then to neoclassical theory. Smith's proposition is arguably validated by a certain tension in the evolution of the leading strain of economic thought at different times, where the concept of value gradually loses its analytical significance for any relation outside market exchange. Human actions, physical and emotional toil, as Marx (1867/1867) observed, become abstract values, finding a quantifiable expression in commodity exchange. Eventually, value becomes

indistinguishable from price, and markets become the sole determinant of meaning in economic, and subsequently social, affairs.

A central role in this shift has historically been the development of scientific bookkeeping, born in the commercial centres of the Italian city states in the 14th century (Yamey, 1949), and most famously associated with Luca Pacioli's work in Venice in 1494 (Pacioli, 1994/1494). Sombart (1987/1916), in his seminal work *Der Moderne Kapitalismus*, historically examines the birth and development of capitalism, which largely shaped the Western economic system. His analysis focuses on a shift from a needs-based economy to one primarily satisfying acquisition. From this perspective, Sombart identifies the role of double-entry bookkeeping as key in instilling traditional artisans or craftspeople with the capitalist spirit and rendering objective the idea of wealth (Most, 1976). Double-entry objects serve the task of representing a complex system of needs and motivations in simple calculations, thereby fostering a general economisation, and thus fundamental change, of social life (Drechsler, 2000: 251).

Eddie & Murphy (1984) summarise Sombart's propositions in three main functions administered by double-entry bookkeeping: (a) rationalisation, through a mathematical logic that allows the quantification, systematisation and control of business affairs and resource allocation; (b) abstraction, by the reduction of assets and equities, as well as human and ecological dependencies, to numerical values, which clarify business aims based on a simple profit-loss result; and (c) depersonalisation, with the substitution of personal ownership and interest by capital accounts, which alienates the enterprise from its owners and allows for the development of the joint-stock company and, later, multinational corporations.

Any counter-position to Sombart's views has been based mainly on evidence raised to falsify the technicalities of his propositions, rather than presenting a coherent alternative hypothesis. For instance, certain strains of critique dispute that Sombart's interpretations are technically consistent with the pre-capitalist practice of bookkeeping (Yamey, 1949; 1964) or showcase earlier cases of double-entry (e.g. in the Roman Empire), which at the time did not evince capitalism (Most, 1972; 1976). However, these positions may, at best, weaken the descriptive validity of Sombart's argument, and do not challenge its real significance. Simply put, bookkeeping practices may have been present before capitalism, and various designs may have been presented before a dominant one was attained. Yet it is the specific combination of the capitalist dynamics and technical qualities of double-entry that co-evolved to unleash the potential of both: this was actually Sombart's point.

In other words, amidst a process of rapid industrialisation and increasing competition, the economic agents of the time procured these qualities from double-entry bookkeeping to cover the increased needs for accounting information (Littleton, 1933a; 1933b; Lane, 1977). The broad range of transformations taking place in the course of a transition to capitalism as a mature system certainly did not come about automatically with the invention of one single tool, nor can bookkeeping itself have possibly had one universal implementation and application at all times. Regardless of whether it was the chicken or the egg, double-entry bookkeeping has indisputably been instrumental in the development of the capitalist spirit and the way the latter has diffused and influenced economic practice and ethics. Capitalism has procured in double-entry bookkeeping a tool which activates its forces, while this tool proliferated capitalism out of capitalism's own spirit (Eddie & Murphy, 1984).

There is nothing “natural” or pre-determined in social and economic outcomes. If one sees technology as the human interface with the material world (Le Guin, 2004), double-entry bookkeeping is a powerful technological tool that regulates and shapes reality in a certain way. Different social groups invest in the potential of new technological innovations to foster their own interests (Feenberg, 2002), and a powerful emerging class of nascent capitalists saw their vision materialised in double-entry bookkeeping.

A fierce economisation of social life expanded by rendering land, things, actions, people and their relations into the new objects of acquisition and exchange. Simultaneously, economics emerged as a discipline “pure” from moral and value judgment, and economists deprived themselves of the analytical tools to examine value outside the sphere of exchange (III). Philosophical questions of value and justice were transformed to calculable matters of productivity, interest rates and growth.

Mazzucato (2018) has recently reinstated the significance of theory of value in economic affairs and policy-making by vindicating the classical economics debate on productive and unproductive activities. She graphically distinguishes between “makers” and “takers” in the global economy to debunk the financialised interpretations of value creation and to re-connect it to the productive economy. Mazzucato reframes the conventional understanding of economic affairs, demonstrating that innovation and value creation are not “natural” outcomes of market competition, but rather the result of mission-oriented policies and social mobilisation.

Beyond Mazzucato, it is pivotal to also acknowledge the embedded structures that attach value to any specific outcome before it is evinced, be it by private, public, or civic investments. Regardless of whether a mission is driven by the state or the private sector, today, success is always exclusively validated by market-based outcomes. No digital innovation could have been registered as successful before there was a market to validate that value was created. And all the unprecedented capabilities for human communication and information exchange effectuated by ICT end up, in this perspective, as nothing more than new pathways for things, people and relations to be acquired and exchanged in the market.

Conversely, in CBPP, value is not necessarily expressed in market exchange. In fact, the commons as an economic sector are external to – and often threatened by – the markets. In CBPP, value is collectively created and distributed through participatory practices, and shared outputs are used in new iterations (IV). Arvidsson et al. (2008) speak of a “crisis of value”, indicating a turning point in the way our value regime recognises new value and how it is created. The case can be made for a tentative transition of value regime led by CBPP, formulating a new basis for meaningful contributions to societal needs.

There is a wide heterogeneity of value created in the digital economy, but a significant part of this value remains unaccounted for in the current value system. Yet there was undeniably value in the innovations fostered by CBPP before new models of profitability could be developed in the digital economy. New value was created before it was acquired. A critical question, then, is: how can we understand value created by innovation that is not validated by market success?

1.3 The Value of Innovation

Sombart's views presented above have strongly influenced economic thought and the discussion of capitalist dynamics, with special reference to economic rationality in the enterprise as representative of capitalism. A large part of Schumpeter's work (1934; 1954), which substantially characterises contemporary views of innovation and entrepreneurship, is saturated with Sombart's understanding of the capitalist spirit (Reinert & Reinert, 2006; Reinert, 2019), summarised by Weber (2013) as the attitude of a rational and systematic pursuit of profit.

Following the Renaissance views on progress, this rational pursuit of profit is a virtue interwoven with exploration and the creation of new possibilities through innovation (Reinert & Reinert, 2011). The vision embodied in Renaissance innovation has signified a paradigmatic shift in our world perception, best illustrated by the change in the meaning of the word "innovation" itself, as Reinert & Reinert (2011:14) explain:

"Indeed, the very meaning of the word *innovations* changed, from being a potentially heretical activity – as when Roger Bacon was arrested for 'suspicious innovations' in 1277 in Oxford – to being the new carrier of human welfare and happiness when Francis Bacon wrote *An Essay on Innovations* a little more than 300 years later."

This anecdote speaks for more than the semantic nuance of a term. It embodies and demonstrates the transition from the medieval to the Renaissance perception of the human person. Innovation signifies the act of creation in the image of God as inherently virtuous, a duty even, that was hitherto considered serious heresy (Reinert & Reinert, 2011; Reinert & Daastøl, 1997).

A similar conceptual shift may be discerned through the understanding of innovation denoted by CBPP. Concepts such as "open innovation" (Chesbrough, 2003; 2006; 2008), "social innovation", "user-driven innovation" or "free innovation" (Von Hippel, 1988; 2016; Harhoff & Lakhani, 2016) have come to validate and further reinforce the understanding of innovative activities as fundamentally collective and synergetic. They justify participation, inclusion and social purpose as the means and ends of the innovation process. Simultaneously, they provide a more political connotation that also considers the accountability of innovations towards their users and the systems upon which they rely (VI).

However, these categories remain limited in scope and, more often than not, are only of marginal significance for the core of the innovation system, ending up almost void of any analytical meaning. After all, what sort of innovative product, process or service does not consider knowledge flows, user feedback or societal dependencies? All these aspects have long been elements of innovation theory. Yet, at the end of the day, innovation is validated solely by market success, or, very often, domination.

Conversely, CBPP is linked to more radical transformations in the way productive processes incorporate knowledge to create more socially meaningful outcomes. Hence, discussion on open or social innovation falls short of embracing the potential and necessary changes in the value creation process itself, especially amidst the ongoing social and ecological crisis.

By contrast, the term "commons-based innovation" (Coriat, 2015) is connected to recurring cycles of open input, self-organisation, and shared output that generate an enabling environment for human creativity to flourish, leading to sophisticated and adaptable innovations. A broad spectrum of CBPP innovations speaks to this potential,

from the GNU/Linux operating system, the Apache Web Server, the Mozilla Firefox web browser and WordPress content management system, to the RepRap open hardware 3D printer and open design technologies like WikiHouse (Priavolou & Niaros, 2019), as well as Farm Hack and L'Atelier Paysan, open-source agriculture communities (Giotitsas, 2019).

CBPP projects extend and reformulate the meaning of innovation. The dynamics observed by Schumpeter still hold, but profit becomes less prominent as a drive. CBPP innovations provide a new locus of freely circulating knowledge and learning beyond the confines of relations of exchange, along with shared rules for collective management (III; VI). The concept of commons-based innovation encapsulates all elements concerning collective creation, synergy, and social meaning that are inherent in innovation processes, but also institutionalises a framework fostering participatory democratic control and accountability on behalf of society.

However, the value of this form of innovation largely remains unaccounted for. Innovation, as conceived and appreciated in our times, is still tightly interwoven with capitalist production. Yet the essence of innovation embedded in Schumpeter's logic of entrepreneurship is associated with a function of leadership and novelty that may permeate the confines of the capitalist political economy (Ebner, 2005). It embodies a quality manifested in any historically conditioned institutional setting.

Commons-based innovation embodies these properties in order to mobilise knowledge, resources and relations in covering human needs and promoting social welfare. Just as Renaissance innovation unleashed human progress measured and evidenced by "the basic thought [...] of quantification" (Sombart, 1987/1916: 119), commons-based innovation opens up a sphere where progress may take place beyond measurement, evidence or data, rather being legitimised by human happiness (Drechsler, 2019a). Instead of price-signalling and profit drives, commons-based innovation is premised on direct social relations to reinvigorate a needs-based paradigm for economic affairs. Commons-based innovation generates value from innovation that is not registered in successful market strategies, but rather in meaningful social relations.

A systematic treatment of commons-based innovation challenges common aspects of innovation theory (e.g., appropriability regimes, market structure), while it integrates others (e.g., dynamic capabilities, technological diffusion, learning) such that creativity and novelty operate in social and ecological embeddedness and under community-defined values. The concept thus offers an outlook of technology that can address socio-economic change in direct reciprocity with sustainability.

But commons-based innovation is more than a new and more responsible paradigm of innovation. Just as Schumpeterian innovation changed the way human agency was perceived in relation to wealth creation, commons-based innovation opens up an alternative perspective in the way wealth is viewed for human prosperity. In contrast to medieval ethics that treated any sort of creative activity as potential heresy, innovation celebrated the Renaissance model of "Man the creator" (Reinert & Reinert, 2006), limited only by his own potential. However, this vision came with vices of its own, which we have increasingly been experiencing over the last decades.

In turn, commons-based innovation presents a post-Renaissance synthesis of the human person. Following the Aristotelian concept of *mesotes* (in *Nicomachean Ethics*, II (1999)), the virtue of commons-based innovation is found in dynamic balance between two opposite vices. It signifies a process of seeking genuine freedom in the practice of conscious moderation and self-limitation against extremities and suffering (Schumacher,

1959/1955). Yet, this time, the limits and their enforcement are not imposed by some divine order, but rather are part of human agency (Kallis, 2019). Limits, then, are no longer the cause of human suffering, but the contours of human freedom from it. “Man as creator” also becomes the creator of boundaries.

To sum up, an alternative view of innovation offers a dynamic perspective to theorise on elements of value in the times of the digital economy. Successful CBPP cases feature a series of product, process, organisational and institutional innovations that materialise these elements, making them visible through the way these innovations are developed, diffused, and further improved in new iterations. They demonstrate the way an alternative value system opens up potential trajectories of the digital economy based on the ethics and processes of CBPP. This dynamic framework of value in the digital economy manifested by commons-based innovation formulates the basis that informs the analysis of the various topics explored in this thesis, and sheds light on elements of value as a commons.

2 Methodological Approach

The main body of the thesis is composed of nine (9) publications, comprising six (6) articles in peer-reviewed journals (**I**; **II**; **III**; **VI**; **VIII**; and **IX**), two (2) book chapters (**V**; **VII**) and one (1) co-authored book (**IV**). Appendix 1 contains a study co-published by two non-profit organisations that summarises various insights and several cases pinpointing potential future research avenues. Publications **I**, **II**, **III** and **VI** feature original case studies, each with a specific theoretical framework, all demonstrating different dimensions of the overarching topic. Publications **V**, **VII**, **VIII**, and **IX** present analyses from various theoretical standpoints and illustrate future research trajectories of the respective subjects. Finally, publication **IV** integrates theoretical and empirical elements from all the other publications, integrating them under the scope of an emerging research sub-field.

The overarching subject of the thesis is the exploration and identification of theoretical elements for the concept of value in the digital economy. Value is an abstract concept, while the emerging context of the investigated phenomena of the digital economy is highly dynamic. Hence, the hermeneutical premise of this thesis is that theoretical concepts like value generally lack any specific meaning, unless they are incorporated in practical application (Drechsler 2019b).

Therefore, the thesis is based on qualitative data derived from case study research combined with participatory action research and interpretivist analysis. The aim has been to study and interpret the explored phenomena in their real-world setting and in terms most relevant to the participating communities, seen as prefigurative forms of future social trajectories. The cases study design is exploratory (Yin, 2003) and intrinsic (Stake, 1994), allowing for a narrative-based form of analysis to unveil the lessons and significance of each topic. The thesis covers a broad array of different domains, including governance and institutions (**II**; **IV**; **VII**), accounting, coordination, and distribution (**III**; **VI**), organisation (**VIII**; **IX**; **X**); and systems of social provisioning (**I**; **V**). The research has been designed to create a thick narration largely driven by participants' ethics, views and perceptions, with the role of the researcher focusing on facilitating and maintaining critical checks.

The data gathered stem from various sources, including interviews (**I**; **II**; **III**; **VI**), field research (**II**), and participatory research (**III**). Moreover, as most of the cases reviewed embrace and foster openness and transparency in their operations, there has been an abundance of online sources of internal documentation and outreach available (**II**; **III**; **IV**; **VI**) as well as secondary sources. Literature review and interpretivist analysis has guided the more theoretical pieces (**V**; **VII**; **VIII**; **IX**).

The role of theory has been instrumental in the analysis, synthesis and interpretation of the research data. All publications are based on a different body or diverse aspects of theoretical and analytical frameworks, from political economy and innovation theory to technology and society studies, organisation, anthropology, and critical studies. The theoretical diversity, combined with rich qualitative data from case studies, has allowed for the integration of a broad spectrum of existing and emerging heterodox and critical perspectives that draw the contours of an alternative theory of value in the digital economy. With the overarching aim of the thesis being a contribution to the construction of a new theoretical framework, rather than the employment of existing ones, diversity of perspectives was a necessary condition.

3 Towards a Theory of Value as a Commons

The digital economy sprang from a stream of powerful innovations that rapidly changed the way people communicate and coordinate their life affairs. In **IV** we approach the development of the digital economy through P2P, seen as a generic socio-technical relational dynamic inherent in human networks, further enhanced and effectuated by the digital revolution. P2P describes a capacity for effective many-to-many communication that fuels the digital economy. It is the type of social protocol that gave prominence to the early successful CBPP projects like Wikipedia, GNU/Linux and the Apache Web Server. These projects demonstrated how a swarm of loosely affiliated individuals, with no predefined structure or monetary returns, could create sophisticated products, potentially outcompeting corporate giants like Britannica, Microsoft and IBM respectively (Benkler, 2002; 2006).

On the societal level, a huge potential was unlocked for the creation of unlimited use value, based on the meaningful engagement of people, in ways conventional managerial practices could not explain or stimulate. But, simultaneously, this tremendous ability to match human creativity to information inputs with a fraction of the transaction costs (Benkler, 2002) has gradually led to the assimilation of P2P as mode of organisation from the margins of the economy to the core (**IV**).

Technology is ambivalent, and so is P2P. The very success of a P2P-driven pro-social digital economy based on open participation and sharing has conditioned its takeover by profit-maximisation, appropriation and exclusive control (**IV**). Thus peer production does not have a specific political economy. On the one side, proprietary platforms like Amazon, Facebook, and Uber use opaque technological architecture to extract and accumulate users' attention and sociality to maximise profits through data-driven market strategies. On the other end, distributed communities of contributors generate and aggregate shared knowledge and design capacities to create freely accessible artefacts and processes. P2P is the underlying dynamic of both sides, but with opposing socio-technical frameworks.

There is thus an ongoing struggle in the digital economy between profit-driven and commons-oriented forms of production (**IV**). Peer production creates global digital commons of software, knowledge and design (i.e., CBPP), and is concurrently exploited to aggregate user attention for capital accumulation. The very structure of the digital economy demonstrates this tension. From the internet infrastructure to various services and content creation, diverse motivations are employed, largely comprising commons-based components and relations, but also market-driven ones. The digital economy is ambivalent, and so is the value produced within it.

The eventual outcome of the tension between a commons-based and a market-driven value system is neither natural nor technologically pre-determined. The state and society have significantly formulated, and continue to formulate, the conditions in which this process evolves. But our economic institutions today largely frame a structure exploited by private interests. Despite the acknowledgement of society's contribution and risk-bearing (Mazzucato, 2013), the value of this contribution *per se* fails to be registered on the institutional level. Moreover, any such discussion largely revolves around redistribution, which conceptually validates the view that value is created in the private sector, even when public investments and societal contributions are recognised.

Contrastingly, CBPP practices and innovations shed light on elements of an alternative value regime. They illustrate value perceptions conditioned on norms and prefigurative

institutions that champion sharing and participation over acquisition; openness over control; and pre-distribution over redistribution (III; IV). Peer production has provided much more than a form of optimising human affairs over digital media. It is itself a unique mode of organisation for human affairs, with a capacity to maintain “coherence in the face of vanishing transaction costs” (Benkler, 2017: 271). It is a primary form of “structured human living-together” (Drechsler, 2001: 105) that formulates a social whole within which “actions become meaningful to the actor” (Graeber, 2001: 254), i.e. a new definition of value for a new form of social organisation.

Hence, this thesis explores the contours of a theory of value apt to acknowledge the value of the meaningful social relations underpinning CBPP in their own right: value as a commons (VIII). The view of value as a commons preconditions an inherently collective process in the creation, management, and actualisation of value, and places these conditions under democratic arrangements. It positions the social agents involved at the epicentre of the value system and generalises shared capacities for participation and shared meanings at all levels of the value creation process. It shifts away from a static perception of value, as something momentarily expressed in exchange, towards a dynamic view of value as something continuously contributed to, managed based on shared rules and norms, and aiming to generalise benefits for existing as well as future members of the community.

Value as a commons bears a recognition of the value of things and actions as meaningful within a certain space and time, environment and culture (III; IV). Productive relations and social provisioning are infused with the acknowledgment of the structural and unseen factors upon which they are based. The commons becomes a fundamental economic institution – and life form (Bollier & Helfrich, 2019) – that encapsulates these unseen factors, establishing their significance, contribution, and preservation.

3.1 Conceptualising Value as a Commons

As explained above, the scope of value in this thesis was initially approached rather narrowly, mostly pertaining to material affairs of the contributors to CBPP projects. However, it soon became obvious that the essence of the aspects in question expanded broadly, touching upon almost all spheres of human activity. The simple question of evaluating contributions to a collective effort derives its answer reflectively in the stories defining our value system. A complex web of value-sensitive relations is deciphered in the professional, personal, social and cultural spheres. The products we consume, the people we admire, the organisations that influence our perceptions, the things we consider important, the songs we sing and the movies we watch all convey images of the mechanism that assigns meaning to our social existence, i.e. our perception of value.

The spectrum of inquiries that is affected is thus very broad and exceeds the confines of a single thesis, or even a major work situated within a particular research domain. Hence, the aim of this thesis is not to construct a monolithic framework distilling these perceptions of value in different domains. It is, rather, a first approach of a dialectic process that begins with the tentative observation of transcendent elements of value in CBPP. The scope of the observation, thus, remains narrow, but the spectrum of the various elements examined is broad and transcending.

To begin, value as a commons defines the meaning of actions, things and the relations amongst them as inherently collective and embedded in certain social and ecological conditions. All that is valued is an outcome of collective action and is meant for collective associations between the agents concerned, human and non-human, through time.

With the commons seen as a distinct life form (Bollier & Helfrich, 2019), value as a commons is its distinct meaning of existence. Value as a commons is manifested in the generalisation of capacities for sharing and participation in common doing. Value is created when these capacities are improved, and destroyed when they diminish.

These capacities are expressed in the basic systems supporting human subsistence and well-being, such as food, shelter and safety, but also in rituals, norms and institutions allowing common relations and identities to be formulated in the first place. Value as a commons thus goes through the stories that define human co-existence and embrace shared visions of happiness and prosperity, but also shared suffering, as a condition transcending the self. Much like value in capitalism, value as a commons stems from material affairs, like the production of shared goods, but extends to an abstraction determining imaginaries and ideas that potentially guide the trajectory of human progress and civilisation.

Finally, value as a commons is regionally and chronologically pervasive. The capacities for sharing and common doing are directly pertinent to a certain space and time, but convey aspects of the past and the future in a synthesis that simultaneously takes place locally and globally. Especially in the age of ICT, limitations of time and space become less relevant from a functional point of view, and gain significance from a reflective one. They portray the commons as what Helfrich (in Bollier, 2016: 24) describes as “an important form of transpersonal rationality and coordination – a new category that describes the individual-in-relation-with-others” (**V**). Perceptions of personal and collective identities become confluent in the pervasive torrent of the commons.

A theory of value as a commons enables possibilities for value sovereignty (**IV**). Various perceptions and interpretations may co-exist and co-evolve, all pertinent to a diverse and inclusive model of the human person. Local biophysical conditions and community-defined values function as boundary objects, creating interfaces across different people, places, social systems and times. A tremendous learning potential opens up, pushing the frontier of human progress in an embedded, inclusive and generative way. Instead of a world divided into winners and losers, rich and poor, and other dichotomies of seemingly equal possibilities legitimised by competition, value as a commons sets a shared faith in the practice of commoning as an inevitable condition for any given possibility.

4 Elements of a Theory of Value as a Commons

The primary identification and analysis of elements of a theory of value as a commons focuses on CBPP in the broader development of the digital economy. These elements may shed light on the different aspects of CBPP, allowing them to become visible and acquire meaning. In the following sections, the primary elements arising from the research conducted for this thesis are briefly presented. Given the absence of a generally established theory of value, and also taking into account that many aspects and assumptions are often implicit and are not themselves objects of analysis in the relevant literature, the identification of the elements below is not based on any existing framework. Rather, it is the outcome of a reflective process analysing the different topics explored, employing the analytical approach presented earlier in this introduction.

The starting point of this process has been the identification of elements of value, unveiled in certain “points of tension” between the current dominant perceptions of value in capitalism and CBPP critically approached in the broader techno-economic context. Table 1 summarises a juxtaposition of these points of tension of elements of capitalist value against elements of a theory of value as a commons, while the successive sections provide further details. The construction of these categories has been guided by how value is created (Section 4.2.1); administered (Section 4.2.2); diffused (Section 4.2.3); established (Section 4.2.4); and morally justified for the broader political economy (Section 4.2.5).

Table 1: Contrasting elements of value in capitalism and value as a commons

Capitalist Theory of Value	Value as a Commons
Exchange: value is expressed in things in exchange	Commoning: value is a dynamic state of contributing to and caretaking of the commons
Labour: human toil as the “first price to be paid” for commodities	Contribution: diverse forms of reciprocity-based participation in commoning
Optimisation: value creation is validated by work productivity	Provisioning: value creation is validated by generalised social welfare
Growth: progress means more value registered	Post-growth: progress is reflected in human prosperity
Cosmopolitanism: humanity has one single self-image	Cosmolocalism: human imaginaries are embedded in universally effectuated local autonomy and emancipation

4.1.1 Rationality: Commoning

In the capitalist value system, rationalisation stems from the practice of exchange: value is expressed and manifested as a product of the exchange of things with other things (**III**; **IV**). Value as a commons rationalises *commoning*, i.e. the act of contributing to and benefiting from the commons. Commoning is figuratively synonymous with P2P, in the sense that it enables capacities for contributory activity to the commons (**IV**). In addition, commoning incorporates the community-defined rules and norms for P2P capacities, along with the clear definition of boundaries.

These principles guide the development of commons-based institutions prefigured by the various CBPP initiatives today to enable and support their operation (IV). CBPP is recognised as a mode of production and appropriate mechanisms are devised by the participating communities to render it autonomous and sustainable (II; III, VI). The emerging ecosystem of value creation comprises (IV) (a) productive communities engaging in CBPP; (b) commons-oriented enterprises that interface with markets to generate livelihood for the communities; and (c) for-benefit associations that facilitate cooperation and support the common infrastructures through democratic governance.

The value perceptions in CBPP communities are diverse and operate outside the sphere of market exchange. Yet CBPP communities maintain interfaces with the market and the state to generate livelihood opportunities for the community and expand its membership. These transactions are arranged by a structured framework based on the commons. Collectively developed and administered legal tools, such as commons-based licences, recognise the commons agency and protect them from predatory forces. The commons are defined as a distinctive part of the economy in its own right and can provide the basis for other economic forms to operate under the commons logic (II, IV).

New forms of commons-based innovation are fostered in these ecosystems, creating useful products and supporting services validated directly by user communities who also determine their design and production. Simultaneously, commons-based innovations convey the commons rationality for economic progress. Nascent roles and configurations for the administration of life are designed (V; VII) based on democratic accountability and participation. An emerging form of the state, described as the “partner state” (V; VII), operates to establish and generalise the commons rationality across all layers of economy and society.

4.1.2 Structure: Contribution

The most comprehensive framework of value, even today, is the labour theory of value. Despite the various nuances and contentions around the theory, the basic assumptions formulated in the 18th century by Smith (1976/1776) still hold. Work employs toil and sacrifice, which is the first price paid for all things produced in capitalism and are thereby deemed valuable (III). Put simply, work is a fundamental duty and right for the members of a society that grants them the freedom to enjoy the fruits of other people’s work.

In the digital economy, work, paid and unpaid, may take different forms. It becomes abstract (Fuchs, 2010), immaterial and affective (Hardt & Negri, 2000; 2004; Arvidsson & Colleoni, 2012), or virtual (Huws, 2003). Our occupation online hovers “ambiguously between work and play” (Huws, 2014: 11); this then reflects back to our offline activity as well. Yet the fundamental function of work as “proof of meaning” gains even more prominence in the ambiguities of the digital economy, expanding to all spheres of human activity and interaction, from the way we approach our leisure time, to caring for our family, to our social relations. The quantitative measure of our salary determines the degree and quality to which we are “worthy” of enjoying all aspects of life.

In CBPP communities, the focus is on contribution, which serves as the new structure of value (II; III; IV). Contribution may also be measured and quantified, but first and foremost comprises qualitative elements based on the sharing of resources, skills and capacities, time or knowledge, as well as norms and protocols of interaction (II; III; IV; VI). Being a contributor in a CBPP community marks a form of participation and belonging based on reciprocity towards the commons. Contributions enable and support the value of commoning in the same way that labour generates value in commodity exchange. It is a measure for meaningful social participation that encapsulates all the invisible aspects

of economic and social life that are often left unaccounted for, including care work, cultural activity and social development.

CBPP communities coordinate contributions stemming from diverse skills and motivations in open, transparent and self-managed systems (II; IV). The participation in productive processes, as well as the outcomes, are validated by social relations, which define the requirements of each iteration. There is thus a distinctive form of organisation that differs significantly from market-based entities or rigid hierarchical structures. Commons-based value regimes replace private ownership and control with collective self-management; hierarchical command of labour with P2P coordination; and profit with social sharing. Seed forms of commons-based accounting encapsulate the polycentricity, fluid coordination, and multiplicity of contributions of CBPP, crystallising new types of meaningful social relations, and making the accompanying value forms perceptible (III; VI). Yet value is administered through reflective mechanisms, based on transparency and trust, even when informed by objective measurement (II; III; VI; VII).

4.1.3 Social purpose: Provisioning

In capitalism, the endgame of every improvement, qualitative or quantitative, is always optimisation. Optimisation serves to rationalise all domains of human activity towards making work, the predominant activity in capitalism, more efficient, i.e. increase productivity. As the famous quote by Krugman (1994: 11) goes, “in the long run [productivity] is almost everything”. Productivity, defined as more output deriving from the same amount of work, has emancipatory elements, as it allows for greater abundance with less sacrifice. But the spirit of optimisation turns this emancipation into a mere opportunity to simply do more work. However, technological progress, organisational change and innovation have further significance outside the sphere of optimisation. They can be forces enhancing human prosperity by expanding the sphere of what is feasible, emancipating people from the pains of scarcity.

Value as a commons allows for the re-emergence of a post-capitalist needs-based economic model prioritising social provisioning over efficiency and optimisation, which mainly serve accumulation and growth. Provisioning entails the necessary systems of subsistence, such as food and shelter, to the basic systems of social care, including health and education, but also arts and cultural affairs. Economic organisation in CBPP demonstrates this needs-based design centred around social provisioning (I; V). Commons-based identities and ethics emerge, building coherent social relations around the commons (II; VI; VII). Hybrid organisational forms help to improve sustainability by creating livelihood systems and strengthening diversity (II; VI).

The prioritisation of provisioning over direct appropriation in CBPP manifests in the qualities inherent in digital content, where enclosure and control, as with intellectual property, cost more than they offer (Benkler, 2002). However, these properties are not native to the technological infrastructure. We have seen how opaque architecture, supported by regulation (e.g. Article 13 of the EU Copyright Directive: EC, 2019), can enforce property regimes on information content that allows optimisation for commercial interests. Hence, provisioning over profits is a form of creative resistance and political assertion of commoners for institutional change (IV; VII). The prioritisation of social provisioning as a social purpose in commons-based organisation is manifested on different levels, spanning from civil society to economic relations (II; III; VI), to the political sphere and the state (V; VII).

4.1.4 Progress: Post-growth

The idea of progress in capitalism is univocally incarnated in growth. The quality of being larger, faster, and stronger classifies those who made it and those who have not yet done so, often ignoring the historical impediments and interdependencies between the two sides. Reinert (2019) has shown how dualities like “rich countries” and “poor countries” are artificially spawned by historical factors, whereas either outcome is a question of those countries’ respective economic activities.

The perspective of value as a commons is congruent with a post-growth vision, posited as a narrative transcending the imperative of growth. Post-growth approaches, such as Degrowth, aim to overcome artificial dualities like economic progress and regression as a question of economic means and ends (IX). Human prosperity is prioritised over the attainment of any quantitative indicators and validates the purpose of economic activities. The commons embody a broad array of possibilities beyond a “one-way future consisting only of growth” (Le Guin, in Kallis & March 2015: 361; IX).

The commons are forms of collective action and togetherness conditioned to mutual and collective self-limitation, rather than perpetual expansion. They transpose pre-industrial elements of self-organisation into the future and demonstrate an alternative trajectory of technology providing for real human needs. Technological advance is thus interwoven with human-centric aspects of appropriateness or conviviality (Illich, 1973; Priavolou & Niaros, 2019; Pantazis & Meyer, 2020) and fosters forms of economic progress based on global digital commons in conjunction with the capacity for more localised manufacturing (Kostakis et al., 2015; 2018) that scales wide instead of upward (Giotitsas, 2019; Kostakis & Giotitsas, 2020).

After all, as mentioned earlier, there is no pre-condition, technological or otherwise, of commons-based domination in the digital economy. Hence, conscious political options and strategies are required (IV; VII). Post-growth offers an instrumental counter-hegemonic narrative, enabling the commons to eventually acquire relevance as a political subject (D’Alisa, 2019; Kiouпкиolis, 2019). It presents a model of progress that can guide commoners to build counter-power on the economic and political field (IV).

On the economic field, sharing capacities are advanced through “transvestment” (IV; Kleiner, 2010; 2016; Kostakis & Bauwens, 2019), which entails the transferral of value from the profit-driven modality to the commons-oriented one. Cooperative structures and reciprocity-based legal tools and support mechanisms enhance the resilience and economic sustainability of commons-based ecosystems. Likewise, on the political field, primary forms of political representation and deliberation, and a common(s) agenda are formulated as forms of resistance against the logic of quantification and optimisation inherent in growth (IV; VII).

A post-growth vision of progress may serve to synthesise political assertions from radical social movements and progressive political practice against forms of oppression historically rooted in growth, in the face of an intensifying climate crisis. The commons can be instrumental in this process by providing a post-growth field of political struggle from both sides. For social movements, the commons are functional alternative forms of production and organisation that create enabling environments for individual emancipation (De Angelis, 2017). Commoning may become an essential practice to reconfigure the relation of the community with the institutions of society, and to unite fragmented social movements in their respective political struggles. Simultaneously, for political practice, CBPP presents a viable mission-oriented approach for state-led policies and investments that can formulate the new post-growth progressive agenda (VII).

From publicly funded makerspaces to formal commons-based institutions, the state can further enhance the emancipatory spaces of commoning and renew the relationship between the political system and grassroots practice.

4.1.5 Morality: Cosmolocalism

Finally, value as a commons formulates a new moral justification for guiding human affairs at the global level; a new paradigm for the human person. The cosmopolitan view of capitalism asserts that all human beings belong to a single community, based on a shared morality and a shared future. Conversely, the shared morality of the commons is captured by the notion of “cosmopolitan localism” (Sachs, 1992) or “Cosmolocalism” (IV; IX; Schismenos et al., 2020)

Cosmolocalism speaks for local communities globally linked through networks of shared production and consumption (Manzini, 2015). It presents a new notion of universality based on a global network of co-existing local communities (Sachs, 1992). The Cosmolocalism vision is manifested in CBPP in the confluence of global digital commons of software, knowledge, and design, with local manufacturing capacities. The digital commons open up a sphere of abundant possibilities that can be harnessed according to respective local bio-physical limitations. Cosmolocalism thus encapsulates this synthesis of the Renaissance’s infinite creation of possibilities, with a post-Romantic emancipatory creation of boundaries. The divine duty of humanity to explore, invent, and perfect is assimilated into the shared duty to harness these qualities to primarily limit human suffering.

Cosmolocalism is thus more than a design form for digital production and coordination. It is a reconfiguration of universality and locality that reinvents space, communality, and social belonging, and invigorates the existential, social and political modes of being, based on shared innovation, equipotentiality and freedom (Schismenos et al., 2020). In contrast to the growth-oriented vision of civilisation by cosmopolitanism, cosmolocalism rakes up elements from the past, putting human needs over profit, and acknowledging local bio-physical limitations. It thus transcends conventional distinctions such as high-tech versus low-tech, global versus local, and modern versus regressive (IX). Cosmolocalism allows for a broadly defined future beyond economic growth: embracing diversity and building global solidarity alongside sovereignty and autonomy.

5 Conclusions: A Carrier Bag Theory of Value

This thesis has sought to formulate the basis of an alternative theory of value based on the commons. Through a multi-layered exploration of the emerging phenomenon of CBPP and the accompanying innovation and organisation paradigms in the digital economy, a list of primary elements has been identified, delineating the contours of the notion of value as a commons.

A complete and comprehensive theory of value as a commons would exceed the confines of this thesis. First and foremost, aside from a few notions and methods employed from political philosophy, sociology and anthropology, the main body of this work is located in the domain of political economy, with insights from technology and society studies, and the point of this thesis is *not* to provide a fixed framework informed by economic aspects alone. Rather, it is to explore and identify transcending elements within the digital economy that may inform future perceptions of value.

Pazzanese (2020) in the *Harvard Gazette* comments on a recent study by Alesina et al. (2020) where the authors employ evidence-based methods to demonstrate that the presentation of evidence, ironically, contributes little to changing viewpoints, especially regarding contested topics. Instead, stories and questions appear to be much more effective to this end. Further, on a topic such as value that is, by definition, embedded in the function of social imaginaries, no data or empirical evidence will ever be effective. Therefore, imaginaries come before data.

Free-market economics as a whole is a good example of this. Despite the lack of any serious empirical evidence for it – and the abundance of systematic evidence against it – the fundamental assumption of the self-seeking individual, *homo oeconomicus*, still greatly resonates with our personal experience (Chang, 2010). In social matters assumptions often become self-fulfilling prophesies. We thus need more and better stories to formulate these assumptions for value as a commons, from economics to public policy, technology, media and culture.

I introduced this thesis with the story of Luca, a merchant in 14th-century Venice. It is a story that, surprisingly, even today resonates with the average experience of daily life in capitalism. Whether it is the Wolf of Wall Street, Jeff Bezos, or the average Jane Doe, the assumption for our administration of life remains one of making calculated decisions, not much different from 14th-century Luca. Yet this story dismisses all the different qualitative factors not registered in Luca's books, spanning from family and friendly relations and factors contributing to the maintenance of an adequate physical and mental state, to the vital life-supporting systems of the planet. All these are cast outside the observed reality. Hence, value as a commons, much like the free market, is less an item of objective observation, and more a normative, transcending concept that can guide human perceptions. Still, the concept is informed by strains of current practice that illustrate potential paths for fairer and more sustainable production and organisation: The description of such strains of practice composed the main body of this thesis.

Of course, that is not to say that this or another socio-technical framework can simply design human vices away. Even if we assume that CBPP effectively deals with human greed, we still have arrogance and vanity to handle, judging from the famous Lorenzetti fresco in the Siena Town Hall alone (VII). Furthermore, stories may do the job of steering perceptions, but evidence, data and indicators, even when they do not present an objective reality, can still help to legitimise public policy choices (Drechsler, 2019a). They can facilitate the broad political consensus necessary for the long, incremental process

of institutional change required to establish the functional arrangement of an endless list of things – all the way from money and finance and the structure of government, to energy production and preservation of nature, to traffic, sports, and child care – in resonating with the social imaginary of value as a commons.

Theory of value has been almost completely absent from the analysis of economic affairs for the most part of the last few centuries. Subsequently, our understanding and interpretation of economic matters has been based on assumptions left unspoken and unchallenged. The discipline of economics has been deprived of the ability to analytically engage with its own underpinnings. The main aspiration of this thesis has been to reinvigorate the importance of theory of value through the concept of value as a commons, and to offer the contours of what might become an accompanying theory. The contribution of a theory of value as a commons may be multifaceted. It ranges from addressing practical and timely challenges of the digital economy, including the transformation of work and the design of sustainable production and organisation models, to a renewed vision for the economy and society as a whole; a new story to be told about human nature.

As Le Guin (2019: 33) puts it:

“It is the story that makes the difference. It is the story that hid my humanity from me, the story the mammoth hunters told about bashing, thrusting, raping, killing, about the Hero. The wonderful, poisonous story of Botulism. The killer story”.

Much in our current stories of progress is fashioned in such a heroic narrative: from mythic heroes, to the great explorers, the scientists and inventors, to the great heroes of our time, the entrepreneurs; all of which singlehandedly changed the route of history by “bashing, thrusting, raping, killing” their enemies. However, this story is sterile, and most importantly detached from the complex, collective reality of our co-existence. And it is also dangerous, as it only bears two possible ends: triumph or tragedy.

But the history of humanity is more than “the linear, progressive, Time’s-(killing)-arrow” (Le Guin, 2019: 36). It is complex and messy, and each era carries along the virtues and vices of older times and those yet to come. If we go beyond the heroic version of progress, technology and science are no longer weapons of domination, be it in caves, colonies, markets or war zones. They can become a cultural womb. A carrier bag full of the things we have in common: knowledge, tools, spaces; but also stories, songs, recipes, and human togetherness. The story of value is dissolved in the carrier bag of the commoners.

The vision of value as a commons begins with this process of distancing from pseudo-linear impressions of progress, from animosity towards civilization and prosperity, that dominates our current spectrum. History is a great melting pot, transcending elements from every step in a dynamic mixture. The ability to embrace diversity and multiplicity is structurally and culturally conditioned, and we need the stories that help us develop it.

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Abstract

Towards a Theory of Value as a Commons: Production and Organisation in Times of the Digital Economy

This thesis aspires to explore the contours of a new theory of value based on the commons. Its starting point is, on one hand, an ever-intensified social and ecological crisis that our current economic system fails to address, and, on the other, forms of creative resistance based on sharing and solidarity that illustrate tentative alternatives. The thesis builds its analytical framework upon three main pillars: (a) the context of the digital economy, approached as the broader array of techno-economic phenomena informed by the capacities and potential of Information and Communication Technologies; (b) the function of theory of value in guiding production and organisation by making certain elements visible in social and economic affairs; and (c) innovation, seen as the validation of new, meaningful ideas and practices that formulate the leading perceptions of human prosperity.

A number of case studies and accompanying theoretical analyses compose the main body of the thesis. The research demonstrates a set of emerging practices and organisational forms, explored under Commons-Based Peer Production, a new mode of production coordinated by self-managed communities of contributors sharing resources and co-creating innovations shared as commons. The analysis builds methodologically on the tradition of heterodox economics, employing exploratory and interpretive tools to shed light on transcending elements of value in the digital economy through commons-based innovations.

The main contribution of the thesis lies in reinvigorating theory of value in the study of economic affairs. Economics as a research field has over the last two centuries been largely deprived of the analytical tools to challenge the fundamental assumptions underpinning value creation, and has thus been unable to acknowledge forms of value that are of substantial significance within the economic system, and are further enhanced in the digital economy. In response, the concept of “value as a commons” is presented as a mechanism that defines meaning of actions, things and the relations amongst them as inherently collective and embedded in certain social and ecological conditions. Value as a commons is manifested in the generalisation of capacities for sharing and participation in common doing. In this perspective, value is created when these capacities are improved, and destroyed when they diminish.

A comparative analysis of the transcending dimension of the digital economy is conducted to identify post-capitalist elements of value as a commons, juxtaposed to the dominant theory of value in capitalism. In the absence of an established framework to analyse elements of value, a list of analytical categories is proposed, comprising rationality, structure, social purpose, progress, and morality, which are used to demonstrate transcending aspects of value in various domains.

The thesis concludes with a broader vision of human nature informed by the concept of value as a commons. A theory of value as a commons can contribute both functionally, and intellectually, to an alternative narrative embodied in the stories and questions that could guide a potential transformation of the social and economic arrangements of the future.

Lühikokkuvõte

Ühisvaral põhineva väärtusteooria suunas: tootmine ja korraldus digitaalmajanduse ajastul

Selle töö eesmärk on uurida uue ühisvaral põhineva väärtuse teooria põhiaspekte. Sellele on ühelt poolt pannud aluse üha süvenev sotsiaalne ja ökoloogiline kriis, millega meie praegune majandussüsteem ei suuda toime tulla, ning teiselt poolt need loominguilise vastuseisu vormid, mis põhinevad jagamisel ja solidaarsusel ning mida võime näha võimalike alternatiividena. Töö analüütiline raamistik toetub kolmele peamisele alustalale: a) digitaalmajanduse kontekst, mida vaadeldakse kui laiemat tehnomajanduslike aspektide kogumit, mis toetub info- ja kommunikatsioonitehnoloogia võimekustele ja potentsiaalile; b) väärtuse teooria mõju tootmise ja korralduse suunamisel, muutes teatud aspektid sotsiaal- ja majandusküsimustes rohkem nähtavaks ja c) innovatsioon, mida vaadeldakse kui uute sisukate ideede ja tavade kinnistamist, mis kujundavad juhtivat arusaama inimeste heaolust.

Töö põhiosa moodustavad mitmed juhtumiuuringud ja nende teoreetiline analüüs. Uurimuse tulemused näitavad, et on tekkimas uued tavad ja korraldusvormid, mida uuriti võrdsetel alustel ühistootmise põhjal – see on uus tootmisviis, mida koordineerivad end ise haldavad loomekogukonnad, mis jagavad ressursse ja loovad koos ühisvaraks saavaid uuendusi. Analüüsimeetodid tuginevad heterodoksetele majandustavadele, kasutades erinevaid uurimis- ja tõlgendusvahendeid, et vaadelda digitaalmajanduse kontekstis ühistootmise uuenduste kaudu väärtuse kaugemaleulatuvaid aspekte.

Töö peamine panus seisneb majandusküsimuste uurimisel väärtuse teooria taastatamises. Uurimisvaldkonnana on majanduses viimasel kahel sajandil suuresti olnud puudus analüüsivahenditest, mille abil vaidlustada väärtuse loomise põhieeldusi, ning seetõttu pole suudetud tunnustada teatud väärtusvorme, millel on majandussüsteemis suur tähtsus, mis tuleb digitaalmajanduse kontekstis veelgi enam esile. Lahendusena esitatakse töös ühisvaral põhineva väärtuse idee, mida nähakse mehhanismina, mis määratleb tegevused, asjad ja nendevahelised suhted olemuslikult kollektiivsena ning teatud sotsiaalsetes ja ökoloogilistes tingimustes esinevana. Ühisvaral põhinev väärtus tuleb esile jagamise ja ühistevgevustes osalemise võimekuste üldkättesaadavaks tegemises. Sellest vaatenurgast luuakse väärtust siis, kui neid võimekusi parandatakse, ja väärtus kaob, kui need võimekused vähenevad.

Tehtud on digitaalmajanduse kaugemaleulatuva mõõtme võrdlev analüüs, et teha kindlaks ühisvaral põhineva väärtuse postkapitalistlikud aspektid, mis on kõrvutatud kapitalismis domineeriva väärtuse teooriaga. Kuna väärtuse aspektide analüüsimiseks väljakujunenud raamistiku pole, on esitatud analüüsikategooriate loetelu, mille hulka kuuluvad ratsionaalsus, struktuur, sotsiaalne eesmärk, progress ja moraalsus, mida kasutatakse väärtuse kaugemaleulatuva aspektide demonstreerimiseks erinevates valdkondades.

Töö lõpuosas esitakse laiem nägemus inimloomusest, võttes arvesse ühisvaral põhineva väärtuse ideed. Ühisvaral põhineva väärtuse teooria võib olla nii funktsionaalselt kui ka intellektuaalselt kasulik alternatiivse narratiivina, esinedes lugudes ja küsimustes, mis võivad suunata tulevaste sotsiaalsete ja majanduslike korralduste potentsiaalset muutumist.

Appendix 1

Publication I

Giotitsas, C., Pazaitis, A., & Kostakis, V. (2015). A Peer-to-Peer Approach to Energy Production. *Technology in Society*, 42: 28–38.

Publication II

Pazaitis, A., Kostakis, V. & Bauwens, M. (2017). Digital Economy and the Rise of Open Cooperativism: The Case of the Enspiral Network. *Transfer: European Review of Labour and Research*, 23(2): 177–192.

Publication III

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Publication IV

Bauwens, M., Kostakis, V., & **Pazaitis, A.** (2019). *Peer to Peer: The Commons Manifesto*. London: Westminster University Press.

Publication V

Pazaitis, A. & Bauwens, M. (2019). New Roles of Citizens, Markets and the State for an Open-Source Agricultural Revolution. In: Vivero Pol, J. L., Ferrado, T., De Schutter O., & Mattei, U. (Eds.), *Routledge Handbook of Food as a Commons*. New York: Routledge, 70–84.

Publication VI

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Publication VII

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Publication VIII

Kostakis, V., & Pazaitis, A. (2020). Who Creates Value? Insights on Value Theory from *The Last Dance*. *Halduskultuur: The Estonian Journal of Administrative Culture and Digital Governance*, 21(1): 76–85.

Publication IX

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Appendix 2

Publication X

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