



## EXPLORING DIGITAL NOMADS' KNOWLEDGE ECOLOGIES

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Tese de Doutorado apresentada ao Programa de Pós-graduação em Engenharia de Sistemas e Computação, COPPE, da Universidade Federal do Rio de Janeiro, como parte dos requisitos necessários à obtenção do título de Doutor em Engenharia de Sistemas e Computação.

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Rio de Janeiro  
Março de 2023

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TESE SUBMETIDA AO CORPO DOCENTE DO INSTITUTO ALBERTO LUIZ COIMBRA DE PÓS-GRADUAÇÃO E PESQUISA DE ENGENHARIA DA UNIVERSIDADE FEDERAL DO RIO DE JANEIRO COMO PARTE DOS REQUISITOS NECESSÁRIOS PARA A OBTENÇÃO DO GRAU DE DOUTOR EM CIÊNCIAS EM ENGENHARIA DE SISTEMAS E COMPUTAÇÃO.

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RIO DE JANEIRO, RJ – BRASIL  
MARÇO DE 2023

Almeida, Marcos Antonio de  
Exploring Digital Nomads' Knowledge  
Ecologies/Marcos Antonio de Almeida. – Rio de Janeiro:  
UFRJ/COPPE, 2023.

XV, 94 p.: il.; 29, 7cm.

Orientadores: Jano Moreira de Souza

Daniel Serrão Schneider

Tese (doutorado) – UFRJ/COPPE/Programa de  
Engenharia de Sistemas e Computação, 2023.

Referências Bibliográficas: p. 85 – 94.

1. Personal Knowledge Network. 2. Digital Nomad.  
3. Heterogeneous Information Network. I. de Souza,  
Jano Moreira *et al.* II. Universidade Federal do Rio de  
Janeiro, COPPE, Programa de Engenharia de Sistemas e  
Computação. III. Título.

*Dedico este trabalho a minha  
mãe, meu pai, minha esposa  
, meus filhos, netas, genro e noras*

# Agradecimentos

A Deus que me dá forças para continuar lutando.

Aos meus orientadores, professores Jano Moreira de Souza e Daniel Serrão Schneider, pelo estímulo, atenção e coragem em abraçar este difícil projeto de doutoramento. Aos co-autores dos artigos em colaboração, em especial António Correia pela contribuição e revisão de nossas publicações, sem as quais este trabalho não teria tido sucesso.

Ao Programa de Pós Graduação em Sistemas e Computação da COPPE/UFRJ pela qualidade de seu corpo docente e infraestrutura.

Aos meus familiares pela torcida, apoio e compreensão.

Resumo da Tese apresentada à COPPE/UFRJ como parte dos requisitos necessários para a obtenção do grau de Doutor em Ciências (D.Sc.)

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Março/2023

Orientadores: Jano Moreira de Souza  
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Programa: Engenharia de Sistemas e Computação

A massificação do trabalho remoto, em resposta à pandemia de COVID-19, provocou alterações significativas nos arranjos produtivos e laborais, tanto para os indivíduos, como para as organizações e para a sociedade. No nível da filosofia de vida pessoal, por exemplo, essa transformação pode ser evidenciada na disseminação de valores do nomadismo digital como o equilíbrio trabalho/lazer entre os trabalhadores corporativos. Por outro lado, ao nível das plataformas gig/crowd work, a emergência de tensões pode indicar o esgotamento dos modelos sociotécnicos de design adotados pelas bigtechs.

O desgaste desses modelos motiva esta tese a investigar como as práticas de trabalho, estilos de vida e todo o ecossistema nômade digital foram impactados em tempos de pandemia. Assumimos que para entender os impactos que estão sendo sentidos nas práticas e rotinas de gestão do conhecimento pessoal dos nômades digitais é necessário capturar as experiências vivenciadas por uma população online específica (ou seja, base de usuários do Reddit), juntamente com um exame profundo e amplo de suas preferências e expectativas em relação às questões da vida profissional mediadas pela tecnologia.

Assim, reunimos e processamos postagens de texto e comentários de usuários no subreddit '/r/digitalnomad'. Do ponto de vista de gerenciamento e desenvolvimento de aplicativos, os dados empíricos extraídos dessa amostra trazem informações perspicazes sobre os fenômenos que cercam a comunidade dos nômades digitais. Argumentamos que, para melhorar as soluções sociotécnicas existentes no ecossistema DN, uma maneira de abordar isso é entender como eles podem utilizar suas práticas e rotinas de Ecologia do Conhecimento Pessoal na expansão das fronteiras desse ecossistema para novos mercados.

Abstract of Thesis presented to COPPE/UFRJ as a partial fulfillment of the requirements for the degree of Doctor of Science (D.Sc.)

## EXPLORING DIGITAL NOMADS' KNOWLEDGE ECOLOGIES

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March/2023

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The Massification of remote work, in response to the COVID-19 pandemic, has been causing significant changes in productive and working arrangements, both for individuals, organizations and society. At the level of the philosophy of personal life, for example, this transformation can be evidenced in the spread of digital nomadism values such as work/leisure balance among corporate workers. On the other hand, at the level of gig/crowd work platforms, the emergence of tensions may indicate the exhaustion of the socio-technical design models adopted by bigtechs.

The wear and tear of these models motivates this thesis to investigate how work practices, lifestyles and the entire digital nomad ecosystem were impacted in times of a pandemic. We assume that to understand the impacts that are being felt on digital nomads' personal knowledge management practices and routines, it is necessary to capture the experiences lived by a specific online population (i.e. Reddit user base), along with an in-depth examination of their preferences and expectations regarding technology-mediated work-life issues.

From an application management and development perspective, the empirical data extracted from this sample brings insight into the phenomena surrounding the digital nomad community. To improve existing socio-technical solutions in the DN ecosystem, one way to approach this is to understand how they can use their Ecology of Personal Knowledge practices and routines in expanding the frontiers of this ecosystem to new markets.

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# List of Abbreviations

DAO	Decentralized Autonomous Organization, p. 1
DN	digital nomad, p. 1
GTM	Grounded Theory Methodology, p. 2
NFT	Non-Fungible Tokens. The concept of NFT originally comes from a token standard of the Blockchain Ethereum network, aiming to distinguish each token with distinct signs. This type of token can use its virtual/digital properties as unique identifications, p. 1
PKN	Personal Knowledge Network, p. 1

# Chapter 1

## Introduction

### 1.1 Thesis Motivation

The Massification of remote work in response to the COVID-19 pandemic has been causing significant changes in productivity and working arrangements for individuals, organizations, and society.

At the level of personal life philosophy, for example, this transformation can be evidenced in the spread of digital nomadism values such as work/leisure balance among corporate workers. On the other hand, at the level of gig/crowd work platforms, the emergence of tensions may indicate the exhaustion of the socio-technical design models adopted by big techs.

The wear and tear of these models motivate this thesis to investigate how the Covid-19 pandemic impacts work practices, lifestyles, and the entire digital nomad (DN) ecosystem. We assume it is necessary to capture the experiences lived by a specific online population (i.e., Reddit user base) to understand its impact, along with an in-depth examination of their preferences and expectations regarding technology-mediated work-life issues.

From an application management and development perspective, the empirical data extracted from this sample brings insight into the phenomena surrounding the digital nomad community. We argue that in order to design sociotechnical solutions for the DN ecosystem, one way to approach this is to understand how they can utilize their Personal Knowledge Ecology (JARRAHI *et al.* [1], AMINE CHATTI [2]) practices and routines to expand the frontiers of the DN ecosystem to new markets.

Finally, we present a framework proposal for exploring Digital Nomads Knowledge Ecologies JARRAHI *et al.* [1] using personal knowledge networks AMINE CHATTI [2]. The ongoing crisis in sociotechnical systems indicates the need to review development methods to pay greater attention to these systems' so-



cial factors and impacts. In the dominant design, the business layer interacts with actors (users and stakeholders) and business processes (stakeholders). The layer goal is to translate business rules into functionalities for the system's users. In the context of social networks and gig/crowd economy platforms, this design ratifies and expands the asymmetries between stakeholders/shareholders, creating tension that provokes the current crisis.

The choice of digital nomads as a case study for our empirical study was due to the peculiarity of their personal knowledge practices, which have moved from secondary sources of knowledge (organizational knowledge infrastructures) to seeking primary sources (the individual digital nomad) for sharing and building expertise (tacit to tacit) JARRAHI *et al.* [1]. This aspect, combined with their constant negotiation and pressure on the rules of ICT platforms, makes them excellent vectors for studying new productive arrangements.

## 1.2 Thesis Methodology

### 1.2.1 Grounded Theory (GTM)

This thesis aims to develop a holistic and unified understanding of digital nomads. For this, we carried out a sequence of exploratory studies in the different contexts in which the phenomenon of digital nomads arises. As the study progresses, new questions may arise, and, in this case, the focus of interest of the study may shift to another context. So we adopted the flexible Gioia methodology GIOIA *et al.* [3] to develop it in cycles.

The Grounded Theory (GLASER and STRAUSS [4], 1967) as well as their versions (Glaser, Straussian grounded theory CORBIN and STRAUSS [5], constructivist grounded theory CHARMAZ [6]) can provide rich theoretical descriptions of social science phenomena, but their critics point out that there is a lack of "scientific rigor" in their results. Gioia argues that his method balances this (often) conflicting need to develop new concepts inductively while serving the high standards of theoretical rigor. The methodology follows these steps: research design, data collection, data analysis, and grounded theory articulation.

The **Research Design** and **Data Collection** steps are moderate variations of traditional grounded theory approaches. The first "articulate a well-defined phenomenon of interest and research question(s)." The second "treats informants as knowledgeable agents" and adopts a flexible interview protocol to adjust it "based on informant responses". The table 1.1 summarizes the "Features of the Methodology That Enhance Grounded Theory Development" in the author's words.

Table 1.1: Steps and Key Features of the Gioia Methodology

Steps	Key Features
Research Design	Articulate a well-defined phenomenon of interest and research question(s); Initially consult with existing literature, with suspension of judgment.
Data Collection	Give voice to informants, who are treated as knowledgeable agents; Preserve flexibility to adjust interview protocol based on informant responses; ‘Backtrack’ to prior informants to ask questions that arise from subsequent interviews.
Data Analysis	Perform initial data coding, maintaining the integrity of 1st-order <sup>a</sup> (informant centric) terms; Develop a comprehensive compendium of 1st-order terms; Organize 1st-order codes into 2nd-order <sup>b</sup> (theory-centric) themes; Distill 2nd-order themes into overarching theoretical dimensions; Assemble terms, themes, and dimensions into a ‘data structure’.
Grounded Theory Articulation	Formulate dynamic relationships among the 2nd-order concepts in data structure; Transform static data structure into dynamic grounded theory model; Conduct additional consultations with the literature to refine articulation of emergent concepts and relationship;

1st-order <sup>a</sup> and 2nd-order <sup>b</sup> terms: respectively, informant-centric terms and “open codes” and researcher theoretic “axial codes” CORBIN and STRAUSS [5]

### 1.2.2 Objective Problems and Research Questions

The Massification of remote work, in response to the Covid19 pandemic , has been causing significant changes in productive and working arrangements, both for individuals , organizations and society.

The pandemic hit the research for this doctoral thesis, making the original, defended in the qualification of doctoral candidacy, a much more ambitious project of designing a new platform for forming heterogeneous information networks unfeasible. On the other hand, it created an opportunity to redirect research into a new field open to exploratory studies. We published the first empirical study on the impact of COVID-19 on digital nomads in the Literature DE ALMEIDA *et al.* [7].

Following the trail opened by the first article, we reconfigure the thesis to respond to the following objective problems.

1. Obtain a holistic and unified understanding of digital nomads and digital nomadism;
2. How has the COVID-19 pandemic affected digital nomads’ (DN) work prac-

tices, lifestyle, and ecosystem sustainability? How have stakeholders been affected, and how have they reacted to these changes? Have new stakeholders flourished and entered the ecosystem? Have new relationships emerged? Have new behaviors developed in response?;

3. How Digital Nomads explore new prosumer Arrangements?;
4. Furthermore, How do Digital Nomads explore Personal Knowledge Networks?

These objective problems help to map the knowledge base linked to the problem to identify the contributions of the thesis.

We can express these problems in a set of thesis research questions :

Table 1.2: Thesis Research Questions:

Research Questions	Description
TRQ 1	How has the Literature on Digital Nomads historically evolved? What are the main themes and issues? Is there any holistic and unified understanding of digital nomads and digital nomadism? How are the Conceptual Frameworks about nomadic working practices, lifestyle, collective culture, and personal motivation founded in Literature? How do they articulate with ground theory? How does COVID-19 emerge as an issue in Literature about Digital nomads?
TRQ 2	How do digital nomads perceive the impact of the COVID-19 pandemic on their everyday work-life space?
TRQ 3	How has the COVID-19 pandemic impacted the sustainability of the DN ecosystem?
TRQ 4	How do Digital Nomads Explore Knowledge Ecologies?

The first research question (TRQ1) is about the literature review process and the theoretical understanding of the phenomenon of digital nomads. The methodology used recommends a light review of the Literature.

Taking into account that there were very few articles on COVID-19 and no articles on digital nomads in the context of COVID-19 during the preparation of our first article [7], we decided to create a baseline on work practices and lifestyle of digital nomads and nomadic workers before COVID-19 found in the Literature so that we can compare with the results of the empirical study.

The other research questions (TRQ2, TRQ3, TRQ4) arose in the exploratory cycles of the empirical study. These cycles were driven by the premise that to improve socio-technical solutions for the DN ecosystem, one way to approach this is to understand how Digital Nomads can utilize their Personal Knowledge Ecology practices and routines to expand the frontiers of the DN ecosystem to new markets.

## 1.2.3 Empirical Study Contexts

### 1. Pandemic Context : Digital Nomadism during COVID-19

This case study focuses on the exploratory empirical study of digital nomads. The goal is to investigate the individual, social and technological factors that are of utmost importance for shaping the future of digital nomadic work from the point of view of the following questions: How do DNs perceive the impact of COVID-19 pandemic on their everyday work-life space? How are they dealing with them and how successful have been their attempts?

### 2. Digital Nomad Ecosystem Context Study : The rise of Wannabes´

This context of empirical study focuses on How has the COVID-19 pandemic impacted the sustainability of the DN ecosystem? How have stakeholders been affected, and how have they reacted to these changes? Have new stakeholders flourished and entered the ecosystem? Have new relationships emerged? Have new behaviors developed in response?

### 3. Digital Nomad Crypto Ecosystem Context Study : Exploring new arrangements.

This context of empirical study focuses on How have DNs been using Crypto Platforms facilities to spread the use of these technologies for investment, lending, and financial/commercial transactions? How have DNs been working in new productive arrangements created by the crypto economy to produce and distribute digital art (NFTs)?

## 1.3 Thesis Outputs

### 1.3.1 Theoretical artifact's

The thesis proposes practical solutions to objective problems expressed as research questions.

The first research question (TRQ1) is about the literature review process and the theoretical understanding of the phenomenon of digital nomads: How has the Literature on Digital Nomads historically evolved? What are the main themes and issues? Is there any holistic and unified understanding of digital nomads and digital nomadism?

For this questions, the thesis delivered the following artifacts:

1. The three-layered conceptual framework digital nomadism: a holistic framework that incorporates the concepts, themes, and dimensions encountered in

all conceptual frameworks found in the literature review of Digital Nomads and Nomadic Workers.

2. Three new versions of the three-layer conceptual framework of digital nomadism as a result of the theoretical articulation with the results of each of the cycles of the research contexts of the empirical study.

Chapter 3 details the construction process of the baseline version from the literature review, and Chapter 7 details the theoretical articulation with empirical study.

Regarding the second question: "How do digital nomads perceive the impact of the COVID-19 pandemic on their everyday work-life space?" The first and the second report address this question.

Concerning the third question: "How has the COVID-19 pandemic impacted the sustainability of the DN ecosystem?" The third report addresses this question.

Finally, the fourth report addresses the third question: "How do Digital Nomads Explore Knowledge Ecologies?".

The empirical study of digital nomads delivered the following artifacts :

1. The stakeholders' map of the digital nomad ecosystem in Section 8.3 (Figure 5.1)
2. Conceptualizing "how to be/ wannabe digital nomad" as a solopreneur business model;
3. The stakeholders' map of the crypto ecosystem in Section 8.3 (Figure 8.2)
4. The Forming Personal Knowledge Network Framework in Section 8.6 (Figure 8.4)

Table 1.3: Publications

Seq	Title	Forum	Status
1	COVID-19 as Opportunity to Test Digital Nomad Lifestyle	CSCWD 2021	Published
2	Digital Nomads during the COVID-19 Pandemic: Evidence from Narratives on Reddit Discussions	CSCWD 2022	Published
3	The Role of Wannabes in the Digital Nomad Ecosystem in Times of Pandemic	SMC 2022	Published
4	Mapping Tokenomics Arrangements to Expand the Digital Nomad Ecosystem	CSCWD 2023	Accepted
5	Designing for Hybrid Intelligence: A Taxonomy and Survey of Crowd-Machine Interaction.	MDPI Applied Sciences 2023	Published

## 1.4 Thesis Organization

The organization of the following chapters reflects, in general, the steps of a research investigation.

Part One contains chapters that present the literature review on related topics in Chapter 2 and the theoretical foundation of the Three-layered Framework of Digital Nomadism in Chapter 3 proposed by the thesis.

Part two includes Chapters presenting the research settings of Empirical Study on Digital Nomads' in Chapter 4 and reporting findings on context cycles in Chapter 5:

- Pandemic context cycle: 2 reports focused on answering the question, "How do digital nomads perceive the impact of the COVID-19 pandemic on their everyday work-life space?" (TRQ2)
- Digital Nomad Ecosystem Context Study: The Rise of Wannabes' This context of empirical study focuses on "How has the COVID-19 pandemic impacted the sustainability of the DN ecosystem?" (TRQ3)
- Digital Nomad Crypto Ecosystem Context Study: Exploring new arrangements. This context of empirical study focuses on "How do Digital Nomads Explore Knowledge Ecologies?" (TRQ4)

Finally, Part three contains chapters presenting the thesis outputs theoretical results and conclusions.

Chapter 6, Empirical Study Results and Conclusions, answers research questions (TRQ2, TRQ3, TRQ4) about Digital Nomadism during COVID-19, The rise of

Wannabes' and DN Ecosystem reconfigurations and Digital Nomads Exploring new arrangements in Crypto Ecosystem Context Study.

Chapter 7 promotes the theoretical articulation between Empirical Study Results and the Three-layered Framework of Digital Nomadism to address (TRQ1) "Obtain a holistic and unified understanding of digital nomads and digital nomadism phenom."

The Chapter 8 Exploring Personal Knowledge Ecologies promote the finds in Digital Nomad Ecosystem empirical study context and Digital Nomad Crypto Ecosystem empirical study context to present the following theoretical artifacts:

1. The stakeholders' map of the digital nomad ecosystem in Section 8.3 (Figure 5.1)
2. Conceptualizing "how to be/ wannabe digital nomad" as a solopreneur business model;
3. The stakeholders' map of the crypto ecosystem in Section 8.3 (Figure 8.2)
4. The Forming Personal Knowledge Network Framework in Section 8.6 (Figure 8.4)

The Chapter 9 , Conclusions Summary, the last one, presents artifacts and theoretical thesis contributions summary.

Table 1.4: Glossary

<b>Term</b>	<b>Explanation</b>
Nomadcity	as an infrastructure capability to provide a set of services for “Nomadic computing” users. “Nomadcity refers to the system support needed to provide a rich set of capabilities and services to the nomad as he moves from place to place in a transparent and convenient form.” [8].“Nomadcity as a new paradigm in the use of computer and communications technology”
Prosumer	Coined by Alvin and Heidi Toffler [9] in The Third Wave (1981) to describe "people working from their homes, using their computers, but... also free technical advice available over the telephone lines with instructions perhaps flickering on the TV or computer screen". This concept is used and remembered in each evolution of socio-technical infrastructures
solopreneur	The term solopreneur is a contraction of two words, "solo+entrepreneur", trying to convey the idea of an entrepreneur operating his business alone. We have found articles associated with using this term with digital nomads. MANCINELLI [10], for example, "self-employed knowledge workers, some of whom had fixed clients, while others worked through platforms, sometimes speaking of themselves as 'solopreneurs.'"



## Part I

# Theoretical Foundation and Literature Review Outputs

## Chapter 2

# Digital Nomadism: a Literature Review

Digital nomadism has begun to receive greater attention from academic literature in several areas but we found that much of the literature on digital nomadism is fragmented and scattered through different disciplines and perspectives, with a strong focus on digital nomads' lifestyles. In order to obtain a holistic and unified understanding of digital nomads, we conducted a comprehensive literature review to further conceptualize the phenomenon under study.

The literature review was carried out following the steps of the research on Digital Nomads. The first review of the literature on digital nomads was carried out at the beginning of the COVID-19 pandemic for the article [7].

### 2.1 Literature Review Methodology and Search Strategy

This literature review was undertaken using a snowballing approach [11] . This method is largely used when we need to iteratively find and prioritize relevant literature through a hand search of the reference lists of original studies published in prominent venues. Based on this, we also applied this methodology to identify conceptual theoretical frameworks and models the underlying aspects of Digital Nomadism as described in previous works.

After an initial exploration phase using the search terms 'CSCW' plus 'nomadic' and 'digital nomad' in well-known bibliographic databases, a set of relevant papers was retrieved in the areas of CSCW and Knowledge Management (KM), expanding to other areas as we advanced in our research, such as 'digital work' and 'gig economy'. At the end of this phase, we found four theoretical frameworks proposed to formalize and characterize nomadicity in three contexts of CSCW : The Nomadic

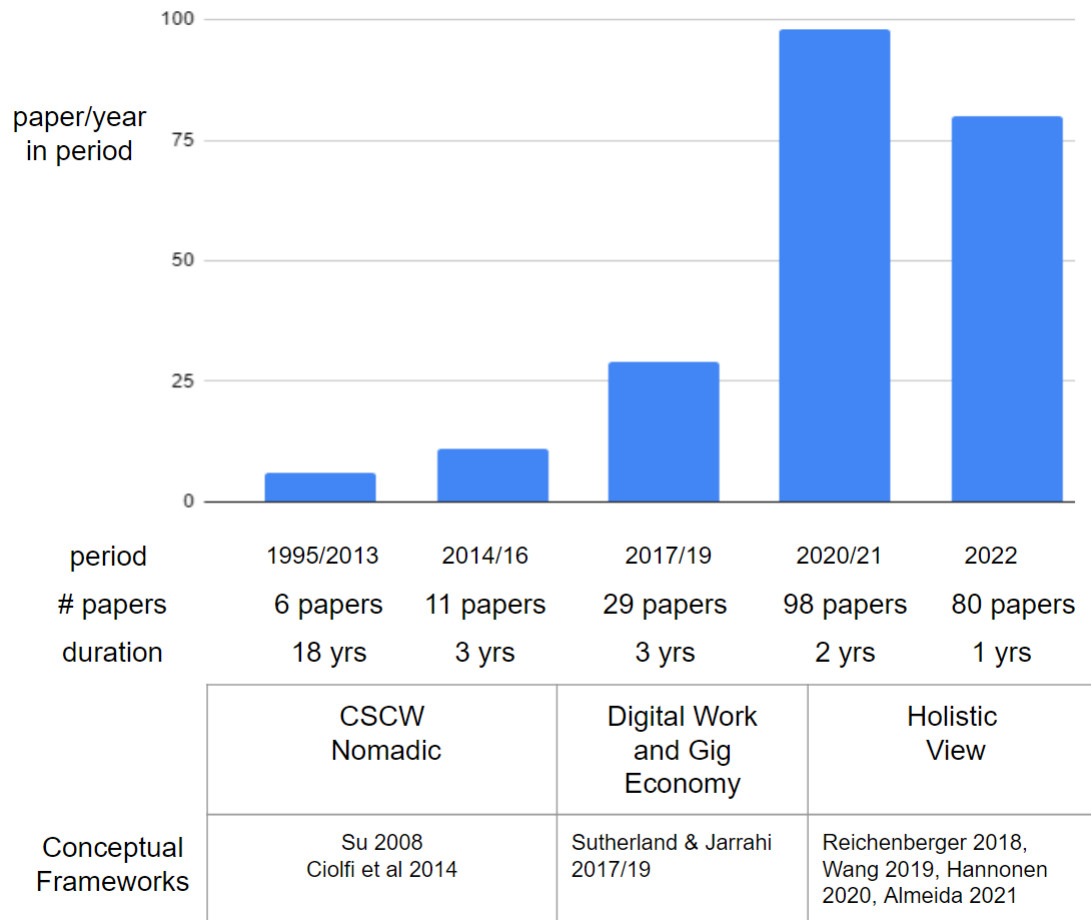


Figure 2.1: Growth of literature on nomadic work and digital nomadism in the last twenty seven years

approaches ([12, 13]), gig economy [14], and personal knowledge management [15].

In the following phase, a new search string was formulated with the terms ‘COVID’, ‘work’, ‘life’, and ‘nomad’ in order to find recent papers addressing the impact of COVID-19 pandemic on digital nomads and other remote workers. In this new search, we were able to identify additional proposals of more “holistic” conceptual frameworks ([16–18]), thus complementing the set of seven theoretical frameworks ([12–18]) that presented for understanding part or whole of the Digital Nomad phenomenon.

Given the diversity of types of methods, contexts and scopes in these works, it was necessary to empirically adopt a holistic strategy to consolidate these frameworks into a single conceptual framework.

In the following sections we explore and capture the concepts discussed in the literature in detail guided by three layer strategy used in Gioia methodology [3].

## 2.2 CSCW nomadic work approach

Table 2.1: CSCW nomadic work literature thematic approaches

Concepts/Themes	References
Technological and infrastructural for nomadicity	Ciolfi [13] views ICT previous works of Kleinrock [8] and Makimoto and co-authors [19], concerning the system properties and requirements in nomadic settings from a technical perspective.
Location-centered	Ciolfi [13] views focus on the ‘multi-location’ work as part of the mobile and nomadic lifestyle, Liegl [20]. Several other recent works follow this focus, like Lee [21, 22], Nash [23] and one more time, and Leigl [24]
On the frontier between life and work	Ciolfi [13] views personal and professional stories of nomadic workers experiencing Czarniawska [25], Buscher [26].
Nomadic practice as a multifocal strategy	Ciolfi [13] views about the first ‘holistic’ nomadic framework proposed by Su [12].
integrating with others	Su [12] a Social dimension view
seeking resources	Su [12] an Infrastructure dimension view
assemble actants	Su [12] an actor/network approach view of Device/Infrastructure interaction.
Nomadic Cultures	de Carvalho [27] expanded the concept of nomadic practices to include economic, social, cultural and technological views.

By tracing the origins of CSCW research on nomadic practices, we found a JCSCW "Special Issue: Work Practices, Nomadicity and the Mediatlional Role of

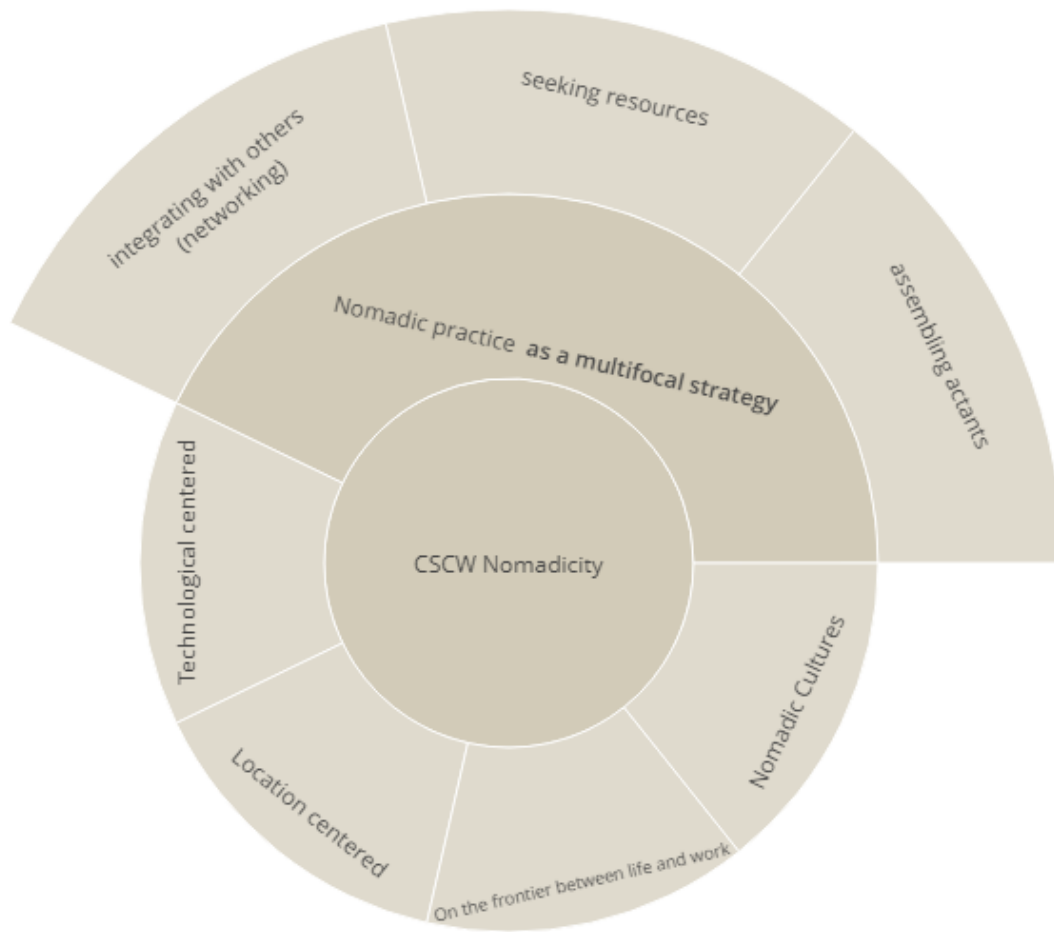


Figure 2.2: Thematic Consolidation Frames and Concepts From Literature: Nomadic Work

Technology". In these issue, the work of Ciolfi and de Carvalho [13] organizes previous research according to four main approaches:

The first approach is on "Technological and infrastructural aspects for nomadicity". This approach fits the work of Kleinrock [8] about "computing nomadic" concerning the system properties and requirements in nomadic settings from a technical perspective. Later in the book "digital nomad"[19], Makimoto and Manners invite the readers to ask themselves "I am nomad or settler?" to think about the opportunity to embrace an "nomadic business life".

The second is on "Location-centered". This dimension comprises the 'multi-location' work as part of a mobile and nomadic lifestyle, like, for example, in a work published in the same edition of JCSCW by Lieg [20]. This aspect remains very relevant. More recent studies in the context of Digital Nomads, are addressed by the same author in 2020 [24] and by other authors such as Nash [23] and Lee [21, 22].

The third is "On the frontier between life and work". through the lens of the exploratory work of Czarniawska [25] who immersed into the personal and professional stories of nomadic workers experiencing a boundaryless career, this frame comprises the work-life aspects that cross the nature of work and non-work activities in nomadic settings, criticized as "romanticized" by Büscher Büscher [26] in same journal edition.

The fourth is "Nomadic practice as a multifocal strategy", the first 'holistic' nomadic framework, proposed by Su [12]. Inspired by the survival strategies of nomadic shepherds, he empirically proposed three dimensions for analyzing the needs of these workers: assembling actants, seeking resources, and integrating with others in the organization. The "assembling actants" are the devices and services that are part of the "mobile office", such as cell phones, notebooks, and internet services necessary for the DNs to stay connected to work during the time of movement. It should be noted that the workers observed in the study are formed by informants from a large, distributed U.S. headquartered corporation. This means that the presented nomadicity is part of the position's duties.

These frameworks [12] and [13] contribute to the first steps in the social, tech, and personal dimensions of nomadic themes and concepts in the nomadic worker context. Table 2.1 and Figure 2.2 relates these CSCW nomadic work themes and concepts to the respective studies.

## 2.3 Digital Work and Gig Economy

The boundaries delimited by previous nomadic approaches by the CSCW community, under the impact of the gig economy's growth, expanding the concept of nomadic practices to include the economic, social, cultural, and technological thematics

Table 2.2: Digital/Gig work literature approaches

Concepts/Themes	References
digital nomads work practices	branding and marketing, professional mentoring (Sutherland [14]). Community building and knowledge sharing ([1, 14]) Networking (Su [12], [1, 14])
Entrepreneur and professional interactions	Managing work, recruiting screening contractors (Sutherland [1, 14])
Personal Knowledge Management	Self-managing and reflecting, Reinventing, Managing and making sense of information (Jarrahi [1]).
Personal Knowledge Network	Personal ecologies (Amine Chatti [2], [1])

as an object of study towards a more holistic view of nomadic culture.

The gig economy topic produced more work in 3 years (2017-2019) than the nomadic worker topic produced in 21 years (from 1995 to 2016). Jarrahi and colleagues, for example, have produced a substantial number of studies on the subject [1, 14, 28–30] and directly contributed to two essential conceptual frameworks [1, 14]

Sutherland’s study [14] about Digital Nomads’ work practices around gig platforms captures the motivations behind digital nomads’ work practices and lifestyle and paves the way for Jarrahi and co-authors [1]. Jarrahi’s work considers a personal dimension present from a personal knowledge management perspective. It organizes its framework around digital nomads’ activities related to social sharing, networking (community building), reinventing, self-reflecting, and managing or making sense of information. . Table 2.1 and Figure 2.3 relates these Digital/Gig work themes and concepts to the respective studies.

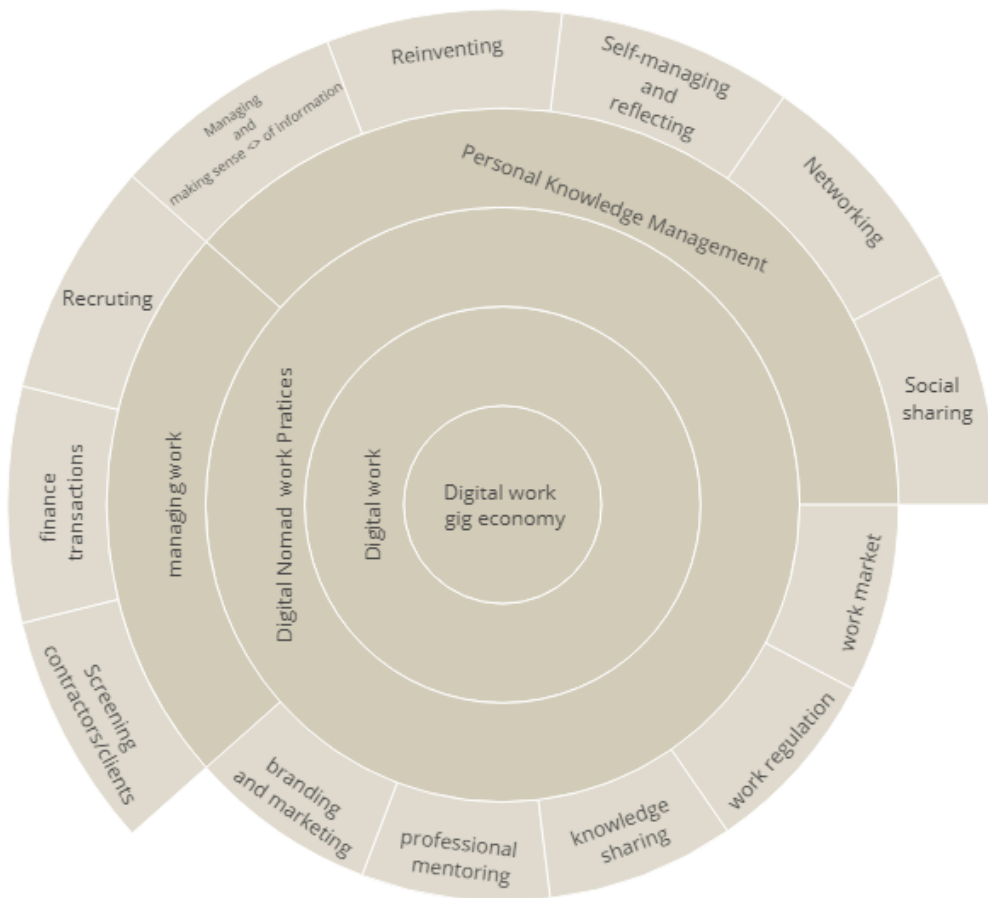


Figure 2.3: Thematic Consolidation Frames and Concepts From Literature: Gig Economy



## 2.4 Holistic View

Table 2.3: Digital Nomadism literature Holistic approaches

Concepts/Themes	References
Economic	factor of production and traditional dichotomies (Wang [17]).
Digital Nomad Holism	Personal , professional and spatial freedom (Reichenberger [16]) with autonomy, self development creativity and travel exposure
Tech	Infrastructure , communication (wang [17])
Work related mobility	telecommuting , freelancers, traveling professionals (Hannonen [18]) , factor production [17]
Cultural	wanderjahre, lifehacking (Wang [17]), Global/Neonomads , backpackers flashpackers (Hannonen [18]), Travel exposure [16, 18]

The search for a holistic view of DNs, an explicit claim by Reichenberger [16], was addressed in a couple of papers, including Wang et al. [17], and Hannonen [18]. These works indicate a fragmentation in the literature that addresses digital nomadism.

Wang et al. [17], argue that there is "comparatively less focus on theoretically framing digital nomadism within broader narratives in human history.". The authors propose opening a way for the holistic approach, expanding the theoretical sources of literature on digital nomadism using frameworks distinct concepts coming from culture, economics, and technology.

Sharing this concern, Hannonen [18] agrees with the criticisms on the fragmentation of the literature on digital nomadism but adds that Digital nomadism needs a more unified view due to the segmentation of subjects within each discipline.

In order to obtain a holistic and unified understanding of DNs, we conducted a comprehensive literature review to further conceptualize the phenomenon under study.

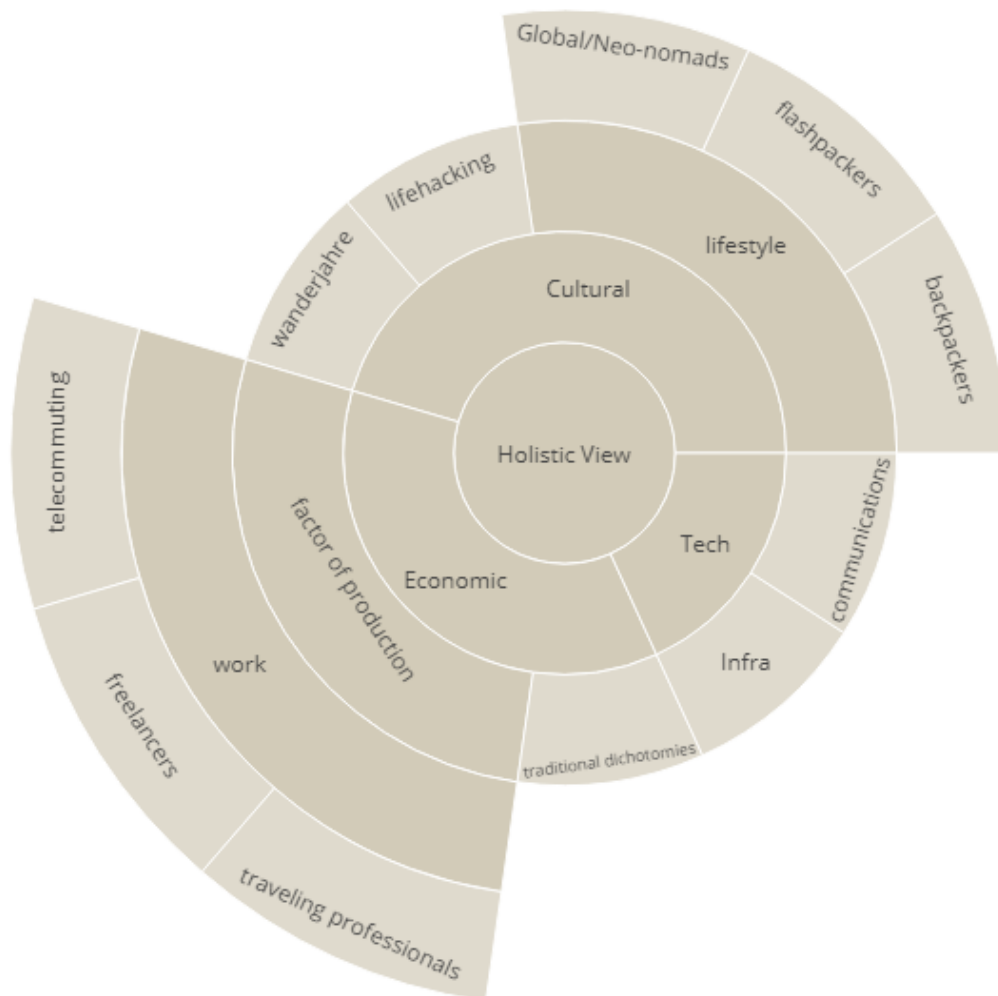


Figure 2.4: Thematic Consolidation Frames and Concepts From Literature: Holistic

# Chapter 3

## The Three-layered Framework of Digital Nomadism

Table 3.1: Literature Articulation with three-layer Framework at Dimensional Layer

Dimension	Literature Articulation
Personal	<p>Personal Knowledge Management: Personal Knowledge Ecology (self-managing and reflecting, Reinventing, Managing and making sense of information) JARRAHI <i>et al.</i> [1];</p> <p>Personal Knowledge Network AMINE CHATTI [2], Intensional Networks NARDI <i>et al.</i> [31]</p> <p>Lifestyle THOMPSON [32]: backpackers WANG <i>et al.</i> [17], HANNONEN [18], RICHARDS and WILSON [33]; self-actualization MÜLLER [34]; autonomy REICHENBERGER [16], NASH <i>et al.</i> [28], ENS <i>et al.</i> [35]; independence NASH <i>et al.</i> [28]</p>
Social	<p>Media Cultural Production: (Nomadic Cultures) CIOLFI and DE CARVALHO [13], WANG <i>et al.</i> [17], HANNONEN [18], FABIANO PINATTI DE CARVALHO <i>et al.</i> [27]; (Social Media Broadcasting) HARDJONO and PENTLAND [36]</p> <p>Market practices: (branding, Networking) JARRAHI <i>et al.</i> [1], SUTHERLAND and JARRAHI [14];</p> <p>Community practices:(mentoring, knowledge sharing, Community building) [1, 14];</p>
Tech	<p>Platforms SUTHERLAND and JARRAHI [14], KINDER <i>et al.</i> [30], WANG <i>et al.</i> [37] : (labor market) ENS <i>et al.</i> [35], WANG <i>et al.</i> [38]; (payment) KINDER <i>et al.</i> [30], WANG <i>et al.</i> [38], (communication) JARRAHI <i>et al.</i> [1], KINDER <i>et al.</i> [30]; (cloud) [30];</p> <p>Nomadocity : (assembling actants)SU and MARK [12]; (coworking spaces) SU and MARK [12], LIEGL [20], LEE <i>et al.</i> [21] and (infrastructure resources) SU and MARK [12], CIOLFI and DE CARVALHO [13].</p>

The main goals of the Three-layered Conceptual Framework of Digital Nomadism

[7] are:

1. obtain a holistic and unified understanding of digital nomads and digital nomadism
2. Support a digital ethnography study on digital nomadism, following techniques to encode and analyze qualitative data Gioia methodology [3].

### 3.1 Framework Design based on Grounded Theory

Given the diversity of types of methods, contexts and scopes found in literature review, it was necessary to empirically adopt a holistic strategy to consolidate the concepts and theoretical frames found in literature review into a single conceptual framework on Digital Nomadism.

We decided to align the data structure of the conceptual frame with the approach followed by the Gioia methodology [3], in these three theoretical layers: Dimensional, Thematic and 1st-order concept. In this way, the concepts originating from the empirical study will be more easily compared and identified with the concepts present in the literature, thus fulfilling the two objectives of the framework.

### 3.2 Framework Building Steps

The construction of the framework was done in two stages. In the first stage, we cataloged all the concepts and themes found in each group of frames, respecting the same nomenclature and organization adopted by the original works whenever possible. After that, we analyzed the catalog to define the dimensions to be adopted in the framework. To facilitate this process, we divided the seven frameworks into three groups.

The frameworks SU and MARK [12] and CIOLFI and DE CARVALHO [13] contribute to dimensions of nomadic themes and concepts in the nomadic worker context. Table 2.1 and Figure 2.2 relates these CSCW nomadic work themes and concepts to the respective studies and present the result of consolidating the works of the first group.

We depict in 2.3 the result of the consolidation of the works of the second group formed by the two frameworks by Jarrahi [1] and Sutherland [14]. Both are co-authors of the two works mentioned above and use the same empirical study in the context of gig/digital work but with two different approaches. Furthermore, they belong to the same research group led by Jarrahi that contributed other works to the DN literature, such as Nash [28] and Kinder [30].

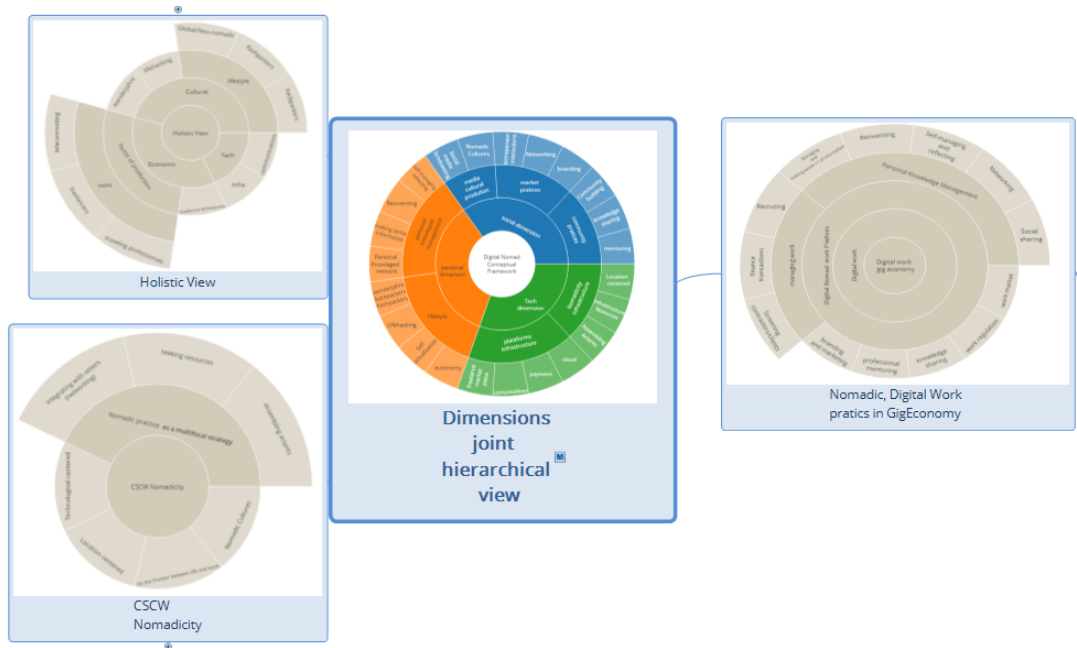


Figure 3.1: The Three-layered Framework of Digital Nomadism: Consolidation Process

Finally, in Figure 2.4 we present the result of the consolidation of the three frameworks by Wang et al. [17], Hannonen [18] and Reichenberger [16]. Here the methods and contexts diverge, mainly between Reichenberger and the others. Wang’s work practically encompasses that of Hannonen, who works with a more restricted context.

Initially, there was a large dispersion of dimensions in the catalog. It was then necessary to consolidate them until we reached a set of dimensions with the highest possible degree of abstraction to represent the phenomenon in all present contexts. At the end of the process, we identified three main dimensions: Personal, Social, and Technical. Once these three dimensions were defined, it was possible to associate each of the 1st order concepts of each framework in the catalog according to the three dimensions. The figure 3.1 represent this step.

Finally, in the framework’s final step, the themes present in the original frameworks were grouped and organized in an intermediate layer according to an ontology proposed by the authors [7].

### 3.3 Framework as artifact to support empirical study

In order to obtain a holistic and unified understanding of DNs, we conducted a comprehensive literature review to conceptualize the phenomenon under study further.

To do this, a previous work aimed at consolidating themes, theories, and ques-

tions about digital nomadism and nomadic work [7] proposed a conceptual framework based on a comprehensive review of DN literature. Each new report from the study empiric outputs a new version of this framework. In response to new objectives incorporated in the study, as a result of our exploratory approach, an additional literature review needs to be conducted to address other research questions that emerged in the context of the pandemic [39] and its impact on the ecosystem of digital nomads [40]. The purpose of this framework was to synthesize some of the main theoretical frameworks found in the literature in a single artifact, to facilitate the theoretical articulation between emerging concepts in the empirical study and the theory.

The figure 3.2 depicts the result of the literature review into a single conceptual framework that outlines the concepts found in the digital nomadic literature after applying three layer strategy, inspired by Gioia methodology [3] At the highest level of abstraction, we consolidated a set of 2nd-order themes within three dimensions: Personal, Social, and Technological.

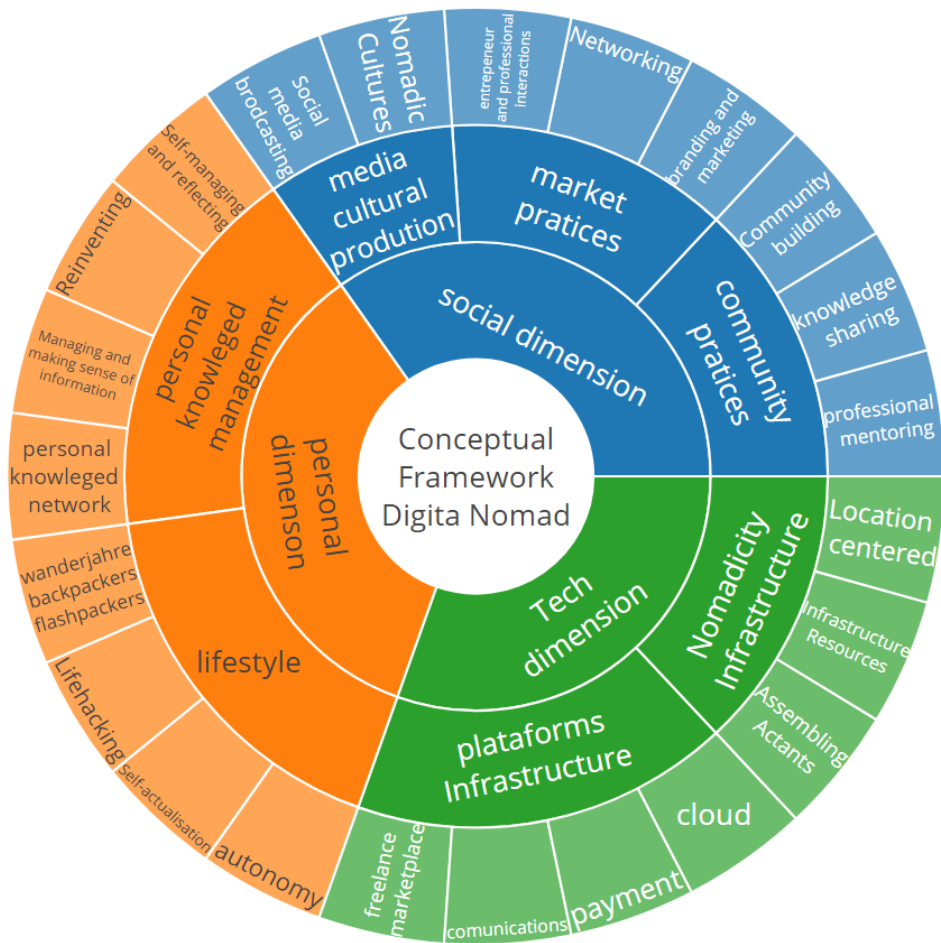


Figure 3.2: The Three-layered Framework of Digital Nomadism: a set of categories were organized by level of abstraction from high to low as follows: Dimension, Themes, and Concepts.

In the *Personal dimension*, the topics of interest are linked to the intimate motivational issues behind personal choices and decisions in all aspects of personal and professional life, grouped by commonly used themes and concepts such as self-actualization [28], autonomy [11, 19], independence [18], and personal traveler behavior (backpackers, flashpackers, wanderjahre) [17, 18] into the category of “lifestyle” [5]. In the professional context, we highlight personal knowledge management and its practices [19] due to its intimate nature.

In the *Social dimension*, topics related to professional and business relations developed in the marketplace segment niche [16, 19] are addressed taking into account the underlying characteristics of communities [19], cultural and traveler tribes [6, 9,10], production and commercialization of digital content [24], and socioeconomic aspects [17, 18, 23, 24]

Finally, in the *Technological dimension*, aspects of IT platforms [17, 20, 23] built to provide human resources to the labor market [16, 22], means of payment [23], communication [3], and artifact sharing through cloud computing [20] are treated. This dimension also comprises IT resources that are specific to travelers but also generally used by DNs, including “assembling actants” [4], coworking spaces [4, 25, 38] and other IT infrastructure resources [4, 13]

## Part II

# Empirical Study on Digital Nomads



# Chapter 4

## Empirical Study Research Strategy

### 4.1 Empirical Study Research Setting

This empirical study aims to obtain a holistic and unified understanding of digital nomads. For this, we carried out a sequence of exploratory studies in the different contexts in which the phenomenon of digital nomads arises. As the study progresses, new questions may arise, and the focus of interest of the study may shift to another context. Taking this into account, we decided to adopt a sufficiently flexible methodology so that our study could be systematically developed, which allowed for evolution in exploratory cycles.

We decided to adopt the methodology of Gioia [3] in the empirical study and promote theoretical articulation through a conceptual framework supported by a data structure that “shows the dynamic relationships among the emergent concepts that describe or explain the phenomenon of interest and one that makes clear all relevant data-to-theory connections”.

In this way, we managed to create and use, from our first work [7], an artifact that incorporates the literature in a single conceptual framework and is ready to receive new insights from exploratory studies, and that effectively manages to transit between “data structure to grounded theory” [3] and vice versa.

#### 4.1.1 Method

We adopted GIOIA *et al.* [3] methodological approach to define our research setting for the empirical DN study on DNs. This methodology is organized into the following steps: research design, data collection, data analysis, and grounded theory articulation.

The **Research Design** and **Data Collection** steps are moderate variations of traditional grounded theory approaches. The first one “articulates a well-defined phenomenon of interest and research question(s)” and the second “treats informants

as knowledgeable agents” and adopts a flexible interview protocol to adjust it “based on informant responses” [3].

The **Data Analysis** and **Grounded Theory Articulation** steps constitute the main distinctive features of the Gioia methodology. In the Data Analysis step, one should “perform initial data coding, maintaining the integrity of 1st-order (informant centric) terms”, consolidate these terms into “2nd-order (theory-centric) themes”, then “distill 2nd-order themes into overarching theoretical dimensions (if appropriate)” and, finally, ensure a good data structure to “assemble terms, themes, and dimensions” [3]. According to the author “The data structure not only allows us to configure our data into a sensible visual aid, it also provides a graphic representation of how we progressed from raw data to terms and themes in conducting the analyses—a key component of demonstrating rigor in qualitative research ” [3]

In the Grounded Theory Articulation step, the method uses data structures to promote an articulation between “emergent concepts” and “the existing theoretical literature”. To do it, the method adopts in this step the following approaches: “formulate dynamic relationships among the 2nd-order concepts in data structure, transform static data structure into dynamic grounded theory model and conduct additional consultations with the literature to refine articulation of emergent concepts and relationships”.

The last step of the Gioia methodology is critical to our goals. In order to facilitate the transition between the emerging concepts in our empirical study and the existing literature, we developed a conceptual framework of the DN phenomenon during the initial literature review organized according to a three-layer data structure proposed by the method.

### 4.1.2 Research Design

The aim of this empirical study is to understand how the waves of COVID-19 have been affecting the lifestyle of digital nomads. We can express this context more specifically in ‘how’-oriented research questions (RQs) as follows: how do COVID-19 waves impact their “nomadic working practices” (RQ1), how does the pandemic affect their “nomadic lifestyles” (RQ2) to first round , and how are they dealing with it (RQ3).

To address these RQs we used an inductive approach to derive the emergent themes following Gioia and colleagues’ [3] methodological proposal:

1. *User-generated data collections* gathered from the online discussion forum Reddit.
2. *Open-coded data analysis* on data collections in order to capture 1st-order terms while maintaining the integrity.

3. *Assembling each data item* (1st-order terms) into a dynamic data structure composed by 2nd-order (theory-centric) themes. At the most basic level, this data structure was further developed to improve the articulation between the emergent concepts and their relationships from the posts of DNs on Reddit discussions with the main data structure of 1st-order terms of the conceptual framework.
4. *Theoretical articulation and conceptual framework.* We used the data structure outlined from the three-layered conceptual framework of digital nomadism [7] as a baseline adding new concepts at each cycle's end, which embodies concepts, themes, and theoretical dimensions (identified from a literature review) into a single artifact. Therefore, we articulated the emergent concepts and relationships from data collection and analysis processes with our conceptual framework.

### 4.1.3 Data Collection

Our data collections were gathered primarily from the subreddit “r/digitalnomad”, a Reddit’s channel that currently counts with more than 1,325,300 members. To this end, the empirical data was extracted using Reddit API on two occasions. The first data set refers to the fixed period of March to June 2020, with the goal of obtaining insights into the first four months of COVID-19. Afterwards, we complemented our study with a second set of posts published between January and July 2021. It is worth noting that the aforementioned Reddit channel is used by numerous DNs that share their views while newbies and veterans post their responses.

### 4.1.4 Data Analysis

After data collection, over three hundred posts were analyzed and categorized using an open coding approach. The codification was performed on the same basis of the initial coding process, maintaining the integrity of informant-centric narratives to develop a comprehensive compendium of 1st-order terms on the effects of COVID-19 pandemic. We organized the 1st-order codes into 2nd-order (theory-centric) themes that were then further attached to the original conceptual framework [7] as a baseline.

### 4.1.5 Grounded Theory Articulation and Conceptual Framework

This step aims to articulate the emergent concepts and relationships from data collection and analysis processes with our conceptual framework to better conceptualize

the phenomenon of digital nomadism and thus obtain a holistic and unified understanding of DNs. In the analysis stage, we organize the open-code terms (informant-centric) into a dynamic data structure composed of 1st-order (informant-centric compendium) and 2nd-order (theory-centric) themes. In the articulation stage with the conceptual framework, these 1st-order concepts are articulated with the 1st-layer concepts present in the conceptual framework. Suppose that it expresses a concept that does not fit any 1st layer concept. In that case, the theoretical articulation should create a new 1st-layer concept that generalizes this concept to include it in the framework.

## 4.2 Digital Nomad Empirical Study Contexts: Pandemic, DN Ecosystem, DN Crypto Ecosystem

### 4.2.1 Covid-19 outbreak: the rise of remote work

Although the coronavirus disease has undoubtedly been transforming work routines around the world, there is a lack of empirical evidence on the nature and magnitude of these disruptions, and more research is needed into observing the behavioral, social and organizational aspects of the impact of COVID-19 on the lifestyle and digital work practices of DNs [38]. At this juncture, the possibility of a resurgence of infections despite the ongoing vaccination plan suggests that companies may anticipate the establishment of novel work arrangements, with a focus on social distance and specially the use of IT-based tools to work remotely.

Recent literature about the impacts of the COVID-19 pandemic has emerged in almost all areas of human knowledge. In these studies, the effects of SARS-CoV-2 are noted in “forced” home office work arrangements [41], team collaboration [42], online education [43], among many other domains. For instance, Rudnicka [41] conducted a survey with traditional office workers, who lived in the United Kingdom and worked more than three days per week at home during lockdown. One of the conclusions of that study was that the respondents had difficulties in staying focused on work due to additional “distractions” from the family environment. On the other hand, Brynjolfsson et al. [44] exploited this transition to remote work in the United States and found that around fifty percent of Americans are now working from home and that younger workers were more receptive to suddenly switching to this model. We can infer that some of the impacts reported in studies concerned with the transition to remote digital work as a consequence of the pandemic conditions may also be somewhat valid for DNs because both share similar features.

## 4.2.2 On the impact and wider consequences of COVID-19 pandemic on digital nomadism

Despite the immense impact of COVID-19 on lifestyle and digital work practices worldwide, only a few studies intended to investigate these impacts in the digital nomadism literature. Among the few related works identified is a case study examining the challenges of COVID-19 for a community of lifestyle travelers. OzNomads are “lifestyle travelers who practice extreme mobilities and are independent of specific geographic locations”.[45]. The measures imposed by the Australian government to deal with the pandemic have had adverse effects on the OzNomad community. In particular, there are five major challenges facing OzNomads, which include displacement, marginalization, social isolation, financial impacts, and mental health. As Williamson and colleagues [45] have pointed out, such challenges represent “serious implications for the wellbeing of a community that contributes substantially to regional and rural Australia as workers, consumers and volunteers”. Through a systematic review of the literature, Viana-Lora and co-authors [46] analyzed a set of conceptual and empirical works aimed at studying the impact of the pandemic on mobility and tourism behavior in destinations. Although the results reveal the lack of empirical research on this impact, emerging challenges as well as a future research agenda on tourist mobility in destinations are discussed based on the identified proposals, predictions and recommendations. In [47] the author applies the uses and gratification theory to describe the gratifications that motivate DNs combined with the Maslow’s hierarchy of needs in order to further investigate whether DNs’ needs have changed over the course of the pandemic. The aim is to provide terminological and philosophical insights into the very concept of DNs and into possible futures

# Chapter 5

## Reports on Empirical Study of Digital Nomads, Ecosystems and New Prosumer Arrangements

### 5.1 1st Report: COVID-19 as an Opportunity to Test Digital Nomad Lifestyle

We report the first findings of an empirical study aimed at investigating how COVID-19 pandemic has impacted the work practices and lifestyles of digital nomads (DN). Preliminary findings indicate COVID-19 as an opportunity to test DN lifestyle by aspiring digital nomads who want to plan their careers and also present evidence of an overload of online channels for actual DNs.

#### 5.1.1 Research Settings

From an empirical standpoint, we go back to the initial questions of how the COVID-19 waves are affecting the home and work lives of digital nomads with a look at their strategies and requirements for adapting themselves to a post-pandemic world. In order to achieve this, we take a broad approach to empirically understand the concerns of users by analyzing posts and related discussions that occurred in the context of COVID-19 pandemic.

In this sense, we qualitatively examined user-generated data retrieved from the ‘/r/digitalnomad’ subreddit, a Reddit’s channel with more than 840,000 members (where numerous DNs share their thoughts and experiences). The empirical data was gathered from March to June 2020 using Reddit’s Web API.

As a part of an ongoing digital ethnography effort, techniques similar to those applied in Grounded Theory, based on Gioia et al.’s [3] methodology were adopted

to code all qualitative data into a set of specific themes which contributed to obtain consistent and comparable results with the pre-pandemic period (e.g., [1, 14] ).

As mentioned above, the purpose of using such methods is to inform the design of nomadic computing technologies based on the real needs and everyday work practices of DNs as captured in their posts and comments.

### **5.1.2 Findings Summary**

We conducted an in-depth analysis of messages about the impact of COVID-19 on DNs lifestyle and work practices, exchanged among community members, to capture first-order emerging concepts [3].

From our analysis, we found a substantial number of posts reporting COVID-19 as an opportunity to experience aspects of the DNs lifestyle. Following this, we detected two additional 1st-order key concepts: overhead on online channels; and freelance agency practices.

### **5.1.3 COVID-19 as an opportunity to test Digital Nomad Lifestyle**

From our analysis, we found a substantial number of posts reporting COVID-19 as an opportunity to experience aspects of the DNs lifestyle. In view of this, three cases could be identified: 1) traditional home office employees; 2) independent professionals who are DN candidates; and 3) DN candidates willing to invest in learning more about the lifestyle of a digital nomad.

#### **Traditional home office employees**

The first scenario includes people who have traditional jobs and decided to try the DN's lifestyle due to the implementation of remote work in the companies where they work.

An example of this case can be found in the post #7, where a user claims that, “due to the current pandemic, I am guaranteed remote for at least several months now...” and asks for information on “best town to hiking [...] work during the day, and hike during the afternoons”

#### **Independent professionals who are DN candidates**

The second situation includes DN candidates with a professional activity suited to this lifestyle, testing the viability of this solution. This is well illustrated by the user of post #8: “I decided a long time ago that this is the lifestyle for me, so when the pandemic hit I saw it as a perfect opportunity to road test my minimal

remote-working setup from home, maybe acquire some clients and ideally take it on the road once the world's borders reopen". This claim is in line with the view of DNs as risk-takers SUTHERLAND and JARRAHI [14] in the sense that they are able to cope with the uncertainties of this type of work in several degrees

### **DN candidates wanting to invest in learning DN lifestyle**

At its founding, the third scenario includes those who are taking advantage of the quarantine to acquiring a useful skill or learn about a certain profession in the DN lifestyle, as can be seen in post #17: "I am hoping to break into the digital nomad lifestyle once COVID-19 is sorted out [...] I am currently learning web development [...] this seems like a good path however it will be a while before I am an employable developer, especially in a remote position. So I am looking into other sources of income in the meantime. Two areas that stick out to me are SEO and video/photo editing".

#### **5.1.4 Overhead on online channels**

Preventive measures such as social distancing and self-isolation imposed by COVID-19 have been impacting DNs face-to-face activities and causing the migration of socialization activities (which previously occurred preferably face-to-face) to the video-conferencing format.

However, we have captured evidence of exhaustion of these online channels by a number of DNs, as it can be seen in an interview involving 14 digital nomads that was released in a video published in post # 60: "I think the hardest of this is being at the computer all day and then the things we would normally do when you just connect the adventures [...] we can't do it anymore [...] and like I want to connect socially with people but the last thing I feel like doing at the end of the day after spitting at my laptop is sitting at my laptop on a video call, even though I want to talk to people"

#### **5.1.5 Freelance agency practices**

In the post #4, entitled "How I Pull 3k+ Monthly As A Nomad Selling Other People's Fiverr Services", we captured evidence that COVID-19 stimulates the search for new practices to overcome limitations and explore opportunities around gig platforms. First of all, the post deals with a subject that we will return to in the next sections, which is about the difficulty of entering the market as a freelancer through gig/crowd platforms, as a user put it: "I noticed that there are literally hundreds of thousands of talented freelancers selling their skills on freelance platforms like



Fiverr, Upwork & PPH”. The same user then summarizes the strategy: “First, you find in-demand services that freelancers are already offering at low prices on freelancing websites [...] (Second) You then market their services to businesses that need it. Once you get the sale, you hire the freelancers to deliver the work for you”. Finally, he/she organizes and enumerates the steps as follows: “Step 1: Find a profitable service to offer to the right niche. Step 2: Find Clients/TEST. Step 3: Double Down (Scale) / Retest”. The strategy of finding a niche to operate is justified in this section: “The key to starting a successful service arbitrage/Drop Service business is to identify a service that is already trending [...] pair it up with an industry (niche) that reciprocates well with your offer. The reason we’re niching down is to move away from competition/market oversaturation, which is absolutely essential considering the low entry barriers for ANY online business”.

The most interesting thing was to analyze the controversial reactions caused by this post, which is highly criticized by those who see this agency as a spurious practice of those who “I get it’s a pretty normal capitalist thing to do, but the way I see it you’re feeding off other people’s talents because you have no skills of your own”. It is not what most people think because one of the best rated responses in this post states that: “I’m perfectly happy to take on work subcontracted to me from someone else who is finding clients and closing the deals. When I was freelancing solo as a developer I spent much more time searching for clients, going back and forth over whatever bullshit they wanted to talk about and other annoying details that were not development”. Several other responses pointed in the same direction. That means this is an important point to take into account when designing gig platforms.

## 5.2 2nd Report: Digital Nomads Pandemic Narratives

The second report on new findings about the results of an empirical study which aims to investigate how the COVID-19 pandemic has been shaping nomadic work practices and also challenging the lifestyles of digital nomads (DN). To do this, we collected textual data from posts in a Reddit community. We argue that, in order to understand how to design technical solutions for the so-called ‘new normal’ working conditions, one way to approach this is to understand how digital nomads are being impacted in their work practices and routines, and also how they are seeing the future of their technology-mediated work-life space. Finally, we show how evidence collected from digital nomads about their experiences and difficulties perceived during the pandemic period can inform CSCW researchers worldwide about

future design-oriented strands.

In the last couple of years, COVID-19 has propagated within and between almost all regions of the world and progressed to a worldwide pandemic situation where millions of people suffered from this lethal disease. Despite all the resources invested in understanding the social and technical outcomes of the changes involved in remote work imposed directly by the pandemic itself, we still lack empirical evidence on the nature and magnitude of these disruptions. From a CSCW frame, the outbreak of COVID-19 coronavirus infection has undoubtedly been transforming work routines and social infrastructures around the world [41]. However, there is limited robust evidence on how location-independent workers build resilience and adaptability to effectively manage such complexities taking into account the nuances of digital nomadic work in times of pandemic, including the challenges and barriers imposed by the successive lockdowns and restrictions during this period.

### 5.2.1 Research Setting

Through the collection and analysis of data from an online discussion community where numerous digital nomads share their thoughts and experiences, we intend to investigate how the biggest global pandemic has been shaping their daily work settings, with special attention to their geographically remote activities. In this regard, we intend to understand how to better respond to the needs and threats that confront DNs in the pandemic age through an in-depth empirical study of the individual, social and technological factors that are of utmost importance for shaping the future of digital nomadic work from the point of view of the following questions: how do COVID-19 waves impact their “nomadic working practices” (R2-RQ1), how does the pandemic affect their “nomadic lifestyles” (R2-RQ2), and how are they dealing with it (R2-RQ3).

1. How do digital nomads perceive the impact of COVID-19 pandemic on their everyday work-life space?
2. How are they dealing with them and how successful have been their attempts?

In order to do this, we analyze the process of adaptation to this new reality by exploring discussions that have taken place on the ‘/r/digitalnomad’ subreddit at the same time as the pandemic crisis spread, from March 2020 onwards. We argue that, in order to understand how to design for the so-called ‘new normal’ digital work practices, one way of addressing this problem is to understand how digital nomads are being impacted in their work routines, and also how they envision the future considering the nomadic workforce as a whole.

## Data Collection

Gathered primarily from the online forum channel (subreddit) ‘/r/digitalnomad’, a Reddit’s channel that currently counts with more than 1,325,300 members where numerous DNs share their views while newbies and prospects post their responses, the empirical data was extracted from Reddit’s Web API in two occasions.

The first collected posts from March to June 2020 and the second from January to July 2021. Both collections are from the ‘Reddit data collection’.

## Data Analysis

Table 5.1: 1st-order concepts that emerged from the 2nd report on empirical study

<b>1st-order Concepts</b>	<b>2nd-order Themes</b>	<b>Aggregate Dimensions</b>
Building Personal Lifestyle Narratives during COVID-19 Pandemic	Lifestyle	Personal
Sharing Lifestyle Narratives and Strategies to dealing with COVID-19	Community Practices	Social
Online Information about Visa and Border Measures and Requirements	Nomadic Infrastructure	Tech

About 300 posts were analyzed using an open coding approach. The codification was performed from initial data coding, maintaining the integrity informant centric terms to develop a comprehensive compendium of 1st-order terms in COVID-19 pandemic context. We organized the 1st-order codes into 2nd-order (theory-centric) themes to attach to framework [7]. The results are depicted in Table R2-I

### 5.2.2 Dealing with Reddit richness sociomateriality

The detailed analysis of some posts reveals that the dynamics of interaction in the community can provoke a chain of very rich interconnected responses (threads), with the consequent dissemination of a great diversity of subjects within an apparently chaotic chain. For example, post#36 “What are people’s thoughts on moving countries right now or in the near future? Need some advice and second opinions” published in June 2020, during the first few months of COVID-19 pandemic by the informant (u-gitsandshiggies), develops a thread that starts with the issue “meeting people”, a subject in which we are very interested, generating the following chain of comments: the informant (u-indiebryan) claims that “I think if meeting people is your primary purpose for the DN lifestyle now is definitely not the time to do it”. On the other hand, informant (u-lifeofnosocks) states: “I’m in Stockholm and

can confirm that meeting people has also been almost non-existent during the past couple months; that's even without lockdown" and concludes with the following observation: "There's a big difference between level of risk in meeting friends you already know vs being outgoing and trying to meet people".

This dynamic is as rich as it is chaotic that from one subject one arrives unexpectedly to another. The informant (u-indiebryan) in his answer about "meeting people" says that "I've been in Japan for the past few months and can confirm it's been pretty difficult to meet people during this". Another informant (u-lilfit) takes advantage of the discussion and poses a question: "Hi friend! Can I ask what work you do? I know Japan can be quite expensive so I really envy your ability to live there and work". And then (u-indiebryan) answers: "I'm a freelance programmer on Upwork [...] The barrier to entry to start making money coding on Upwork is pretty low, if that's your jam. (u-indiebryan)" and adds that he intends not to travel during COVID: "Been in Asia for 2 years now. Was in Japan 2 months last year and will be here 6 months this time due to the virus and not wanting to fly".

Focusing on the subject "living in Japan", this thread develops with the following sequence of comments: the informant (u-dharda) brings his personal experience (or his "Personal Lifestyles Narrative", theme developed in section X): "From personal experience, Tokyo was cheaper than I expected. We rented a whole apartment, 5 beds, on the ring metro, one station from Shibuya, and it cost us 1,500 month" and was promptly answered by an informant (u-carolinax): "Was that 1,500 month for 1 apartment, or between the 5 of you? Also what's the square footage?", allowing clarification: "For the entire apartment, which was the smallest I've ever seen - 1 bedroom, a living room, and kitchen everything was tiny, and the beds were one on top the other... But hey, it was top quality and had everything you can imagine [...]" (u-dharda)

Then a new subject "Visa expiring" emerges in the thread. Informant (u-edcRachel) expresses her concerns as follows: "So my main concern right now is legality. I stayed in UK and I'm coming up on my Visa expiring. At that point I'll be forced to either move on or extend my visa. Right now it's looking like moving on is an option, but it's still a point of stress to possibly deal with that, knowing that if another wave happens they could close borders quickly". Another thread in response to the post question "Do you think it's still worth it?" is triggered in the answer to the informant's comment (u-ninesquirrels): "Not in 2020 - I wouldn't" and he enumerates his motives. The first is about a certain hostility from local residents: "A lot of local people are gonna be hostile to you being there now, no matter how safe you think it may be. Some people in the tourism industry may be happy to see you, but most other people are going to feel like 'why are you here? Why are you threatening us with potential disease?'" The second is about the risk

of getting trapped: “You could very easily end up trapped somewhere” and, finally, most attractions are closed: “Honestly, so much stuff is still gonna be really not fun. Closed bars. Closed attractions. Closed beaches. Social distancing measures. Wherever you go is going to suck just a little bit, at least”.

Despite presenting rich material, some of the statements of the last thread may be questionable, which justifies caution when dealing with this information. For example, the statement that “The barrier to entry to start making money coding on Upwork is pretty low” (u-indiebryan) is not sufficiently generalized. On the contrary, most of our accounts go in the opposite direction to the claim that “barrier to entry on Upwork is pretty low”. However, those who break this barrier with a vast portfolio of services have access to a good income.

### 5.2.3 Findings Summary

Looking at the themes that emerged from the data analysis, we notice that this kind of information extracted from the Reddit discussion network can provide us with answers to our research questions on how COVID-19 waves have impacted the nomadic working practices of DNs (R2-RQ1), their nomadic lifestyles (R2-RQ2), and how they are dealing with it (R2-RQ3). Following the methodological guidelines adopted in this study GIOIA *et al.* [3], the idea here is to present the findings according to the 1st-order concepts that emerged from the empirical study (Table R2-I). Thus, the issues related to R2-RQ2 will be addressed in “Building personal lifestyle narratives during COVID-19”, while the emerging topics related to R2-RQ3 will be addressed in “Sharing lifestyle narratives and strategies to dealing with COVID-19” and “Online information about visa and border measures and requirements”.

### 5.2.4 Building and sharing lifestyle narratives and strategies to dealing with COVID-19

The lifestyle of DNs has been highly challenged in one of its main characteristics: the freedom to travel and practice adventure tourism. As a result, this provided the opportunity to build personal narratives of what their lifestyle was like during COVID-19, and their strategies for dealing with the pandemic. One interesting observation is that there is a flood of personal narratives on how DNs are dealing with COVID-19 pandemic in response to questions about its impact on their lifestyle.

From the data retrieved, topics revolve around travel concerns, border requirements, information seeking about a destination’s healthcare system, etc. This is expressed in the post #10007 titled “What have your DN experiences been like during COVID?” (u-acssej), which was published in July 2021 and relates directly to

our R2-RQ3. In response to this question, an informant gives a long and very detailed month-by-month account of what happened in his life during the pandemic, summarized as follows: “February 2020 I had been living in Manila . . . to get to Thailand in February. Between February 2020 and February 2021 there were 11 trips between Manila, Copenhagen, Germany, Turkey, Bangkok, 3 months of lockdown, countless PCR tests and a COVID infection. Looking back somewhat of a miracle. I don’t get how everything worked out so well, traveling was definitely not easy and I’m Sooo tired of PCR tests” (u-SpeakBeingForward). After this account the same informant concludes: “However, I also think this might have been the transition from being a digital nomad to now just settling down. My moving days are over (hopefully) and it feels like I have found a home”. A true Nordic saga. The analysis of this commentary shows that the informant is building his personal account during COVID-19, which will be a part of his personal narrative in the future. In other words, sharing an account of what is happening during the pandemic is part of the process of building and maturing the personal narratives of DNs. The analysis of the following posts brings more evidence about this type of narratives.

In post #28, “Today is 4 years since I quit my job with no real plan in place”, published in July 2020, we found a typical DN account: “Four years and three weeks ago I met my now husband ... I just quit my job ... And then we got to work building a website ... My now husband quit his job 4 or so months later to come on board. We started making sales. Not many but enough to know this could work ... Since we left Australia our country route has been Malaysia, Thailand, Malaysia, Wales, Portugal, Wales, France, Spain, Gibraltar, Romania, Hungary, Bulgaria, Netherlands, Malaysia, Singapore, Thailand and now Sri Lanka. We still have the first business ... usually about US\$ 4k a month. But since we have little accommodation costs it is enough” (u-my-secret-id). By analyzing the reactions to this post by other members, we found manifestations that show that this is an inspiring narrative, as reported by an informant (u-ArcadianCloud) as follows: “What an incredible story! Any secrets to success with your small businesses? I would love to be my own boss”.

A closer look at this narrative shows that it contains the elements that identify a DN as a “social figure” MÜLLER [34]: he left his job in Australia to launch himself as a freelancer, to create his own business and travel around the world, practicing geoarbitrage to have costs compatible with the revenue of his business. This explains the fact that this type of post usually receives open codes such as nomadisadream, livingasaDN, nomadlifestyle, whybeDN, and personalSharedExp. Although each code expresses a slightly different aspect, it was common for them to appear together.

Another example of this type of personal narrative can be found in post #22:

“Not letting life pass me by” (u-timidtom), published in June 2020. In this report, the informant reflects on his philosophical yearnings in the following terms: “I’ve been doing some soul searching to further define my ‘why’ for wanting to switch to this lifestyle”. The informant goes even further by posing the following question to the community members: “Curious if other people share this as their ‘why’”. In response to this call, an informant provided insights about his ‘why’ with the following personal narrative: “I was 28 and had roughly 10 years on the tech scene all over the US. I even put myself through university by freelancing. I too had the itch to travel and see the world. Well, I set off for Romania for a 3-month sojourn and just 9 short years later returned to the US just to have culture shock in my own country and decide to leave again as soon as feasibly possible. Long story short, I finally settled in Ecuador” (u-coderPro). Moreover, a different informant (u-buminthealley) contributed to this debate in the following lines: “I was 29 and stuck in a corporate job that I hated. I had always wanted a high-paying management role so I could buy a house and live the American dream. . . My main “why” was similar to yours. I don’t want my life’s accomplishments to be summed up in a LinkedIn profile, and I don’t want to spend 50 hours a week working/commuting and have no free time. . . After a few months of planning, I quit and went on a 3-month road trip around the US, and then flew to Thailand. That was 3 years ago and I haven’t looked back. . . I spent the past 3 years designing a lifestyle that allows me to work 4-5 hours a day, increase my quality of life, and save more money than ever.”

We can see that the use of “work 4-5 hours a day” connects the last post to the work of FERRISS [48]. This means that the informant, during the construction of his narrative, tries to approach the ideal expressed by the “social figures” MÜLLER [34] of the DNs. Finally, he concludes with a very timely statement for those who are living their dream: “[...] his lifestyle isn’t for everyone though, and it won’t solve many of your problems” and still enumerates them: “Do you want to spend your free time experiencing all kinds of new, cool sh\*t that most people never get to? Is your social life lacking? Do you want a wife and kids?” This post had 102 comments where there are several personal narratives that would not fit here.

### **5.2.5 Online information about visa and border measures and requirements**

Topics like visa renewal and questions about borders, taxes etc. are so frequent that the community administrators left some useful links on these topics to articles on Wikipedia. Our preliminary analysis of these posts revealed some initiatives among members to bring online solutions on these issues. An example can be found in post #20: “A dashboard to track which countries are welcoming visitors, quarantine

policies, and other restrictions imposed locally” (u-siaappchallenger). In this post, the informant offers a first version of a Web page: “It is the first version, please tell me how I can improve it.” While some members criticized the lack of precision in the page, most of them contributed with suggestions for further improvement.

### 5.3 3rd Report: The rise of ‘wannabes’ Digital Nomads

This report on new findings about the results of an empirical study which aims to investigate how the so-called “wannabe” digital nomads (DN) activities contribute to the sustainability of the DN ecosystem.

The goal of this work is to understand how the COVID-19 pandemic is affecting the digital nomad ecosystem. To do so, we first need to examine the current state of this ecosystem, its actors, interests and relationships. Following the methodology proposed and discussed in section III, we use the grounded theory embodied in the conceptual framework DE ALMEIDA *et al.* [7] on digital nomadism in conjunction with the results of our empirical study, whose focus here is to capture the behavior of the stakeholders of the ecosystem created to sustain the DN activities.

We intend to understand how to better respond to the needs and threats that DNs face in the pandemic era through an in-depth empirical study carried out through the collection and analysis of data from an online discussion community specific to DNs, with special attention to their geographically remote activities. Such a study focuses on the individual, social and technological factors that are of utmost importance to shape the future of the DN ecosystem.

In order to do this, we analyze the process of adaptation to this new reality by exploring discussions that have taken place on the ‘/r/digitalnomad’ subreddit at the same time as the pandemic crisis spread, from March 2020 onwards. We argue that, in order to understand how to design for the so-called “new normal” digital work practices, one way of addressing this problem is to understand how the DNs are being impacted in their ecosystem.

#### 5.3.1 ‘Wannabe’ Digital Nomads, who they are?

The analysis of posts detected emerging concepts among a part of a heterogeneous, non-nomadic group (the Wannabes Digital Nomads). Post analysis reported at [7] also indicates that this group used remote work as an opportunity to reinvent themselves and to test the DN lifestyle. The three types of wannabe DNs are not actually Digital Nomads, but they play an important role in the DN business model, according to Schlagwein [49] and thus in the sustainability of the ecosystem [1].



### 5.3.2 Research Setting

The aim of this work is to understand how the waves of COVID-19 have been affecting the Digital Nomad ecosystem. We can express this context more specifically in terms of “how” Research Questions (RQs) as follows:

R3-RQ1: How do digital nomads perceive the impact of COVID-19 pandemic on their everyday work-life space?

R3-RQ2: How are they dealing with the pandemic restrictions to their “lifestyle”?

R3-RQ3: How has the COVID-19 pandemic impacted the sustainability of the DN ecosystem? How have stakeholders been affected, and how have they reacted to these changes? Have new stakeholders flourished and entered the ecosystem? Have new relationships emerged? Have new behaviors developed in response?

To address these RQs we used an inductive approach to derive the emergent themes following gioia methodology:

1. User-generated data collections gathered from the online forum Reddit and other data collections from online Web resources;
2. Open code data analysis on data collections in order to capture 1st order to maintain the integrity (informant centric) terms;
3. Assembling each data collection from 1st-order terms into a dynamic “data structure” with 2nd-order (theory-centric) themes and theoretical dimensions;
4. Theoretical articulation with the conceptual framework: We used the data structure outlined from the three-layered conceptual framework of digital nomadism DE ALMEIDA *et al.* [7], which incorporated concepts, themes and theoretical dimensions from the DN literature review into a single artifact. Then we articulated the emergent concepts and relationships from the analysis of data collections with our conceptual framework.

#### Data Collection

Gathered primarily from the online forum channel (subreddit) ‘/r/digitalnomad’, a Reddit’s channel that currently counts with more than 1,325,300 members where numerous DNs share their views while newbies and prospects post their responses, the empirical data was extracted from Reddit’s Web API in two occasions. The first collected posts from March to June 2020 and the second from January to July 2021. Other data collections were gathered from online Web resources (news: interviews, articles, reports; DNs personal pages: blogs, vlogs; DNs business ecosystems: crowd work platforms, cowork/cohabit experience) about specific issues

## Data Analysis

About 300 posts were analyzed using an open coding approach. The codification was performed from initial data coding, maintaining the integrity of informant-centric terms to develop a comprehensive compendium of 1st-order terms in the context of the COVID-19 pandemic. We organized the 1st-order codes into 2nd-order (theory-centric) themes to attach to the framework DE ALMEIDA *et al.* [7].

The results are depicted in Table 5.3.2

Table 5.2: 1st-order concepts that emerged from the 3rd report on empirical study

1st-order Concepts	2nd-order Themes	Aggregate Dimensions
COVID as an opportunity to reinvent yourself	Personal Knowledge Management	Personal
Geo-arbitrage as critical factor to define destination and finance sustainability	Market Practices	Social

### 5.3.3 Findings Summary

How the themes that emerged from the data analysis can provide us with answers to our research questions about how the COVID-19 waves impact their nomadic work (R3-RQ1), their lifestyle practices (R3-RQ2), and their ecosystems sustainability (R3-RQ3)? Following the recommendations of the adopted method GIOIA *et al.* [3], the idea here is to present the findings according to Table I. The themes related to R3-RQ2 and R3-RQ3 correspond mainly to the concepts expressed in “COVID as opportunity to reinvent yourself” and issues related to both R3-RQ1, R3-RQ2 and R3-RQ3 will be addressed in “Geoarbitrage as critical factor to define destination and finance sustainability”.

### 5.3.4 Wannabe digital nomads use COVID-19 as opportunity to reinvent themselves

The members of this community are not just made up of DNs. A considerable and very active part is formed by a heterogeneous set of candidates for the DN lifestyle, sometimes called “wannabe digital nomads”, as mentioned earlier. Our data analysis indicates that we can classify them into 3 main groups:

*Wannabe DN employee:* People with traditional jobs who chose to try the DN lifestyle due to the adoption of remote work by the companies they worked for.

*Wannabe DN self*: DN candidates who have a profession suitable for this lifestyle, checking the feasibility of this solution.

*Wannabe DN learn*: Discussion board members who are benefiting from quarantine to learn a timely skill and/or learn about a particular profession in the DN lifestyle.

An example of *Wannabe DN self* can be found in post #36 (u-gitsandshiggies). He presents the problem this way: “Basically I’ve been feeling stagnant where I am (in a fairly small city in Canada) since before covid and have been wanting to move countries for a while” and realizes the opportunity to experience a new lifestyle: “I’ve never done the ‘digital nomad’ thing, but I’m starting to get online editing work at the moment, and I’m confident in my ability to do it. And if I needed extra work, I might be able to do some freelance filming stuff depending on what type of Visa I get”. He then questions whether traveling after the reopening of the borders would be worth it: “So obviously right this moment, a lot of borders are closed, but once they start to open up, what do people think about moving to another country? Would it be a bad idea? Extra hard to meet people and make friends? Not much to do?”. And he ends his post by saying: “I don’t want to go and then feel like it’s not worth it, but I also don’t want to wait around for ‘the perfect’ time which may never come. But if I’m being honest, it would still be more exciting than staying where I’m at in life right now”.

Our analysis of the post concludes that for this informant, a non-nomadic freelancer, Covid-19 is an opportunity to experiment the “digital nomad thing” and move to another country. Several examples similar to these manifestations can be seen in other posts with similar content.

The group with the highest number of occurrences is Wannabe DN employee. Post#24, published in June 2020 by (u-thearabicbrownie), for example, asks “Travelling Europe During COVID: Tips, Advice” and argues that “my workplace like many others has instituted work from home. It’s been a few months now and I’m wondering what it’s like to travel” (u-thearabicbrownie). This is a situation in which the informant has a steady job, wants an experience abroad, and to use his “opportunity to reinventing oneself” to “traveling Europe during COVID” thanks to the implementation of remote work in the company where he works in response to COVID-19. Another post similar, the post #41, published around the same time, was posted by (u-MuchPair) on “Employee as international nomad?”. In this post, the informant states that “I am seriously looking into testing out digital nomad life this fall, pending borders opening up. I am employed at a company I’m happy at and would love to stay. However, I would like to try working remotely for two months as a trial run in another country (I’m thinking South America).”

As presented in the evidence above, for the wannabe DNs, the expansion of

remote work brought on by COVID-19 was an opportunity used to reinvent themselves.

Among them, the group of workers with formal jobs was responsible for several transformations in the ecosystem as a whole.

Firstly, in the online communities of DNs we could detect a reaction to the intense presence of these remote workers (with active jobs) in their forums. The post#10020, published in June 2021 by user u/Martin1905, for example, asks in the title “Good alternatives to this subreddit?” and argues that “When I first came here (maybe around 5 years ago) this was a good place. ... Today this subreddit is totally changed and it seems most people here are everything but DNs, and instead just want to criticize the lifestyle. ... Most posts are stuff like "I want to work in Mexico for a month, should I tell my boss?" or "here is why being a DN is bad"”.

### 5.3.5 Geoarbitrage plays a key role in travel plannings

In several situations related to the choice of a travel destination, comments about the practice of geoarbitrage appear in discussion threads. We collected several manifestations from different posts in all Reddit data collections (from March to June 2020, and from January to July 2021). For example :

- Comment on (post#10009): “Compared with the USA, Taipei is absolutely not expensive. Not sure what country you’re from or are living in” (u-artman225);
- Comment on (post#10017): “That’s why I said Latin America is too expensive because I want a lifestyle inflation through geoarbitrage and put the rest in my business”;
- Comment on (post#10034): “Having spent a good six years doing the whole digital nomad thing in Asia you don’t need much of anything besides your passport and access to funds. Everything else can be found cheaply there”;
- Or even in a long thread of 214 comments like in (post#10077): “You’re fine. I did it for five years with almost no money saved, making about 1000 dollars a month. If you can adapt, you’ll be fine. With 1800 dollars a month you’ll be comfortable in many countries. Brazil, Thailand, China, Taiwan, Vietnam, Laos, Indonesia, Malaysia, Singapore, Ukraine, Serbia, Bosnia, Poland, Spain, France, Germany, Georgia” [u-inglandation]; “You can live comfortably on less than 1000 USD/month in SEA for example. 1800 USD/month also gives you a great lifestyle in eastern Europe, certain parts of Africa, and South America” (u-Martin1905);

As presented in the discussions above, it can be noted that the chosen destination must be cheap because in this way it is possible to practice geoarbitrage, since the informants have ties to the labor market or provide services to clients in their country of origin, which in the case of DNs are located in developed economies.

We will discuss the theoretical implications of this evidence in section 7

### 5.3.6 'Howtobe/wannabe' business model

Regarding the entrepreneurship practices adopted by DNs, reported by several authors [1, 37, 50], our study presents the wannabe/"how to be" symbiotic mechanism at the core of the DN ecosystem, represented in Figure 1 as the fuel for its economic sustainability, a route to entrepreneurial training and articulation with other entrepreneurship networks. First, DNs form an audience for their own content produced through social networking services, as indicated in a couple of works [1, 7, 37]. On the other hand, the members of the communities that are not DNs are formed by those interested in the "DN thing", who form the audience of the DNs for blogs/vlogs and other media that discuss subjects related to the DN lifestyle. Among these, some are interested enough to consider the experience, and become wannabe DNs. The "how-to-be-DN" businesses are destined for these, which will train new DNs, teach them, and thus maintain the sustainability of the ecosystem as long as there is audience and audience conversion into wannabes.

Despite the well-founded criticisms that see digital nomadism as "the cultural avatar neoliberalism of a globalized gentrification" [51], or "entrepreneurialism" [10], we prefer to conceive of this manifestation of solopreneurship as a career alternative for the wannabe DN employees. For example, we detected among the wannabes manifestations of having their "own business", among the wannabe DN self, who are more adherent to this idea, and to a lesser extent among the wannabe DN learn, who are more interested in having a profession or remote work first, before engaging as entrepreneurs.

The analysis of the posts also indicated, with regard to the entrepreneurial path, a search for professional knowledge that allows setting up a business. In this context, Jarrahi's study describes the practices of Personal Knowledge Ecologies [1, 52] as a personal instrument allied to communities. We understand that the combined use of the intellectual capital of DNs and their social capital within the community gives rise to the "seed" capital of the "how-to-be-DN" businesses.

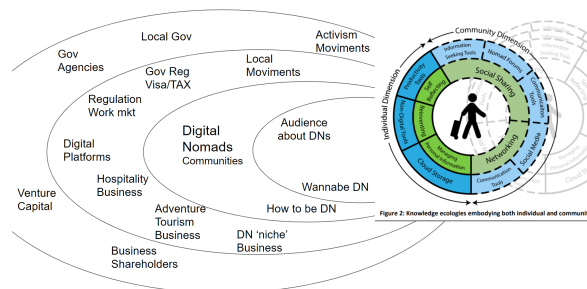
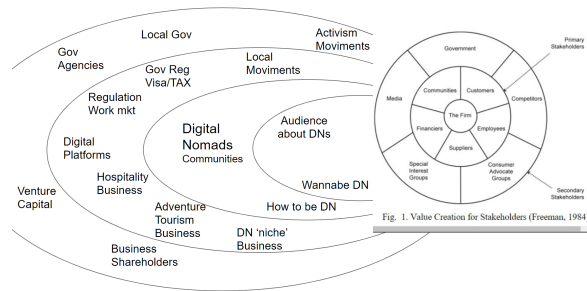
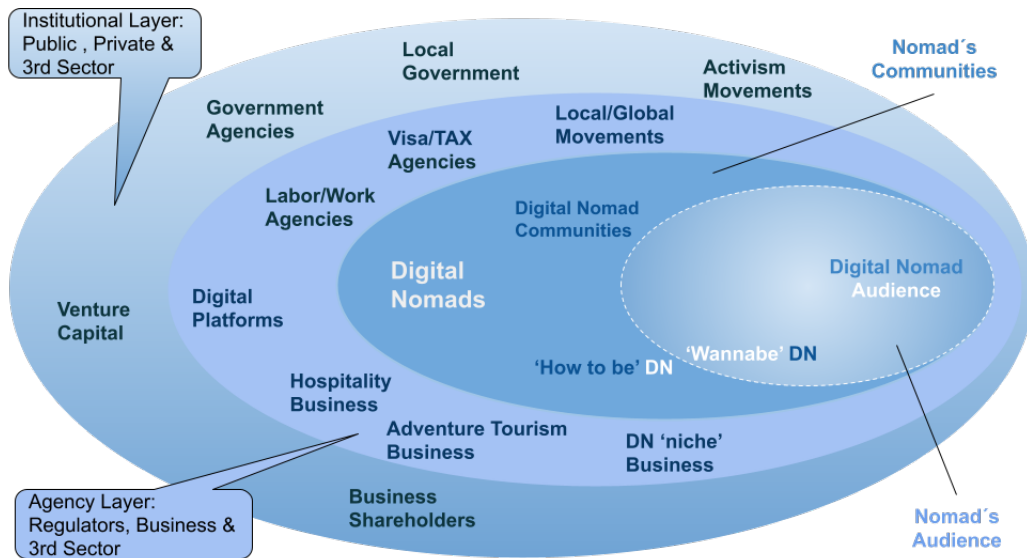


Figure 5.1: Digital Nomad Ecosystem as IS web 2.0 at top of page outlined on our 3rd report and comparatives with "value creation for stakeholders" Freeman's approach followed by Jarrahi's "personal knowledge ecology" [1]

## 5.4 4th Report: Digital Nomad as prosumer on crypto economy arrangements

The Massification of remote work, in response to the Covid19 pandemic , has been causing significant changes in productive and working arrangements, both for individuals , organizations and society.

At the level of the philosophy of personal life, for example, this transformation can be evidenced in the spread of digital nomadism values such as work/leisure balance [16, 28, 53] among corporate workers. [7] On the other hand, at the level of gig/crowd work platforms, the emergence of tensions [30] may indicate the exhaustion of the socio-technical design models adopted by bigtechs. Wear of these models motivates us to incorporate into our studies of digital nomadism and future work, the investigation of new productive arrangements. Among these arrangements, we are particularly interested in studying new models of socio-technical design, such as those emerging in virtual organizations structured around the ecosystem of crypto-economic networks (eg, Ethereum Non-Fungible Tokens NFT)[54] .

### 5.4.1 Research Setting

To conduct this research, we collected and analyzed textual data from posts in a subset of Reddit communities, following the Gioia methodology (Gioia et al., 2013) that is organized through the steps: Research Design, Data Collection, Data Analysis and Grounded Theory Articulation. Our key research questions include:

R4-RQ4: How have they been using Digital Platforms facilities to spread the use of these technologies for investment, lending and financial/commercial transactions?

R4-RQ5: How have digital nomads (DNs) been working in new productive arrangements created by the crypto economy, in the production and distribution of digital art (NFTs)?

### Data Collection

Our data collections were gathered primarily from the subreddit “r/digitalnomad”, a Reddit channel where DN’s share their views while newbies and prospects post their responses. To this end, the empirical data was extracted using Reddit API on three occasions. The first data set refers to the fixed period of March to June 2020, with the goal of obtaining insights into the first four months of COVID-19. Afterward, we complemented our study with a second set of posts published between January and July 2021. On the third occasion, posts were collected from January to

May 2022 from other subreddits to specifically address issues related to the use of cryptocurrencies and NFTs. Other data collections were gathered from online Web resources (news: interviews, articles, reports; DNs personal pages: blogs, vlogs; DNs business ecosystems: crowd work platforms, co-working/cohabit experience) about specific issues. In total, around 400 posts and more than 10,000 comments were collected.

## Data Analysis

After the data collection phase, we analyzed and categorized over four hundred posts using an open coding approach. Coding was performed similarly to the initial coding, maintaining the integrity of the informant-centered narratives to develop a comprehensive compendium of 1st-order terms on the effects of the COVID-19 pandemic. We organized the 1st-order codes into 2nd-order (theory-centered) themes that were then appended to the original conceptual framework [7, 39, 40].

The results are depicted in Table 5.4.1

Table 5.3: 1st-order concepts that emerged from the 4th report on empiric study

<b>1st-order Concepts</b>	<b>2nd-order Themes</b>	<b>Aggregate Dimensions</b>
Personal Knowledge Networks as a key factor to explore new markets	Personal Knowledge Management	Personal
DN Communities as CoPs Hubs	Communities Practices	Social
CoP to Access new arrangements on emergent crypto markets	Market Practices	Social

### 5.4.2 Findings Summary

We detected limited interest regarding issues related to the economic crypto ecosystem on the "r/digitalnomad" subreddit. A search for keywords related to R4-RQ4, such as "NFT", "Digital art" and "metaverse", for example, returned only 5, 3 and 2 posts respectively.

We didn't find any posts on the aforementioned subreddit mentioning other currencies associated with strong communities on Reddit (solana, polygon, terra, and dogecoin, for example). Although the total number of posts analyzed was small, it is illustrative of the relationship that this community has with the economic crypto ecosystem.



### 5.4.3 How does DN deal with cryptocurrency?

The analysis of the posts indicates that DNs are experienced users in dealing with cryptocurrencies, and mature enough not to fall easily into crypto scams, as we can see in some discussions. For example, in the comments received by post#(9t13o0) from November 2018 sent by the user (u/bitxoin) with the title “Crypto Digital Nomads”. The user asks: *Are there any crypto digital nomads here? Who makes money in the crypto/blockchain world? I’m keen to know what you guys do and how you do it!*

Most responses indicated that, with regard to making money in the crypto market, it is more sustainable to monetize through the production of content related to the subject than to profit from financial operations. In his response, (u/Jaqqarhan) states that *"I made a little money in 2016/2017 during the blockchain/cryptocurrency bubble, but that was mostly luck"* Then he concludes with the message *"If you want to be a digital nomad, you need real skills that people are willing to pay money on"*. Following this thread, the user (u/TexasStateStunna) completes *"I think your options are pretty much blogging and getting money through affiliate links"*, which is immediately endorsed by another user: *"There’s tech dev, marketing, consulting, trading, investing, training work to do"* (u/heliosincome). Other testimonies also endorse this discourse: *"I work as a freelance writer for several cryptocurrency review sites and blockchain startups"* (u/Josvan135).

This sequence of comments on the post shows that for DNs it is more viable to work with content production in this market or as a software developer than to bet on financial gain in cryptocurrencies or in the appreciation of non-fungible assets (NFTs), investment offers in ICOs and other products created by the crypto economy. As a result of this and similar posts, the user (u/bitxoin) was identified as a scammer by the community and banned from Reddit.

On the other hand, both for professionals in transition and for young students aspiring to DNs, there are manifestations pointing in the direction of a career in the crypto-economic context. As an example of the 1st case, we cite post#210004 sent in the last days of December 2021, by the user (u/Free-Awareness) with the traditional question of a wannabe DN [40]: *"How can I become a digital nomad?"* He is interested in knowing *"how can someone who is in the trades, transition to becoming a digital nomad?"* He wants to take advantage of his free time to invest in this transition, and asks for help on *"how to learn these things.. like ..shopify/dropshipping; crypto/blockchain /dapp dev/ nft /stocks"*.

The other case appears in the post#(9lz4uhg) entitled *"Is this lifestyle for me, and is it even realistic?"*, sent on March 6, 2021 by a young student aspiring to be a DN, *"I’m a 17 y /o male wrapping up junior year in high school in the states.."*

*If pursuing Programming in college means being able to live this life it's something I would do in a heart beat". Among the various manifestations among the 87 responses that the post received, one response suggested a career as a dapp/web3 developer: "I noticed you mentioned you're a programmer, highly encourage you to look into idea of developing blockchain based decentralized dApps, there's a huge.. incredibly HUGE future surrounding it and corporations have already been jumping on it and hiring blockchain programmers and developers. I'm also surprised universities/colleges haven't really begun offering more course options on blockchain yet. Definitely look into it to see if it interests you as a programmer" (u-CryptoNug).*

#### **5.4.4 Personal Knowledge Network practices on CoPs as a key factor to explore new digital markets**

We detected limited interest regarding issues related to the economic crypto ecosystem on the "r/digitalnomad" subreddit. A search for keywords related to RQ4, such as "NFT", "Digital art" and "metaverse", for example, returned only 5, 3 and 2 posts respectively. We didn't find any posts on the aforementioned subreddit mentioning other currencies associated with strong communities on Reddit (solana, polygon, terra, and dogecoin, for example). Although the total number of posts analyzed was small, it is illustrative of the relationship that this community has with the economic crypto ecosystem.

For example, post#210002 posted by (u-lebed2045) on December 29, 2020 celebrates the self-sufficiency achieved working as a blockchain developer, in the post titled *"Hi from Cairo my fellow nomads. I'm so happy that despite everything I finally managed to get self-sustainable for the first time since 2014"*. He describes his work as follows: *"I'm programming smart-contacts(+backend) on solidity and a little bit of vyper for stablecoin DEX (I'm an active user of DeFi so I absolutely love what I'm doing)"*. He then shows the financial adventure and the taste for risky assets: *"Decentralized stablecoins are a big topic for me because I tried to build one back in 2017-2018 but failed. I have a personal story why I absolutely hate banks and centralized organizations which abuse their powers (and every other abuser as well) so I little too extreme and have 99% of my money in crypto. I cash-out every couple of weeks fiat in one of my two debit cards and no more than necessary [...]* If I could stop using centralized messengers (is it interesting why we can use any email client but we locked in the closed ecosystems of instant-messengers?) I would absolutely do it as well".

Some are already thinking about starting working in this area, as we can see in post#210004 sent by user (u-Free-Awareness) on December 28, 2021: *"How can I become a digital nomad"*? He poses a question on *"how can someone who is in*

*the trades, transition to becoming a digital nomad? I have a lot of spare time on my hands and would like to transition soon. I have some ideas on what to start but would like your guys experience and knowledge on how to learn these things more efficiently and effectively: shopify/dropshipping, crypto/ blockchain /dapp dev/ nft /Stocks". Most answers however are conservative. User (u-SeeCF) for example recommends: "I'd use the skills you already have to pivot into something that can be done remotely rather than jumping away from your existing skillset to do some random shit... Say you work in welding, look at the network of services and suppliers that support welding: logistics, b2b, b2c, etc. Every industry has remote-compatible jobs now".*

It is not always possible to find in this community of DNs anyone who can share the experiences of a digital nomad like the user (u-lebed2045) in his post#210002. In response to the user (u-truffles), he asks: *"How did you start learning blockchain? Are you completely self taught"*? In response to this question, the user (u-lebed2045) is able to explain the path he took to get to where he is at this moment: *"I used to program different things since 14 years old and it's pretty much the only earnable thing I was doing the whole of my life. My relationship to bitcoin and blockchain is based on my deep (and quite extreme) believes in the importance of the decentralization revolution, so I would do it anyway even without money (as I did before). But there many brilliant developers in the industry who are here only for money and it's totally okay. I guess our experience of learning are very different as well, so I start from the economy, reading the code of bitcoin, read hundreds of whitepapers (not exaggeration), talking to many people, visiting events (back in Vancouver there was a magnificent bitcoin-libertarian underground club DCTRL), etc. And only after that some programming learning, hackathon, etc. On the practical side, reading <https://github.com/ethereumbook/ethereumbook> is an absolute must, but after that tutorials, hackathons, reading github code of other projects, do your own pet projects. I'm not that experienced yet, but feel free to dm/on twitter if you need any help".* We will discuss this post in depth in the next sections.

## Part III

# Results and Conclusions

# Chapter 6

## Empirical Study Results and Conclusions

### 6.1 Remembering Objective Problems and Research Questions

It is convenient to start this chapter of the results and conclusions part of the thesis by recalling the objective problems and research questions that motivated this work.

1. Obtain a holistic and unified understanding of digital nomads and digital nomadism;
2. How has the COVID-19 pandemic affected digital nomads' (DN) work practices, lifestyle, and ecosystem sustainability? How have stakeholders been affected, and how have they reacted to these changes? Have new stakeholders flourished and entered the ecosystem? Have new relationships emerged? Have new behaviors developed in response?;
3. How Digital Nomads explore new prosumer Arrangements?;
4. Furthermore, How do Digital Nomads explore Personal Knowledge Networks?

These objective problems help to map the knowledge base linked to the problem to identify the contributions of the thesis. We can express these problems in a set of thesis research questions :

The research questions of the thesis closely follow the contexts through which the empirical study has traveled in its cycles, so in the sections of this chapter, we will present answers to the following TRQs: How do digital nomads perceive the impact of the COVID-19 pandemic on their everyday work-life space? (TRQ2), How has the COVID-19 pandemic impacted the sustainability of the DN ecosystem? (TRQ3), and How do Digital Nomads Explore Knowledge Ecologies? (TRQ4).

Table 6.1: Thesis Research Questions:

Research Questions	Description
TRQ 1	How has the Literature on Digital Nomads historically evolved? What are the main themes and issues? Is there any holistic and unified understanding of digital nomads and digital nomadism? How are the Conceptual Frameworks about nomadic working practices, lifestyle, collective culture, and personal motivation founded in Literature? How do they articulate with ground theory? How does COVID-19 emerge as an issue in Literature about Digital nomads?
TRQ 2	How do digital nomads perceive the impact of the COVID-19 pandemic on their everyday work-life space?
TRQ 3	How has the COVID-19 pandemic impacted the sustainability of the DN ecosystem?
TRQ 4	How do Digital Nomads Explore Knowledge Ecologies?

## 6.2 Empiric Study Reports Conclusions

### 6.2.1 The rise of work of home and Wannabe DN om traditional DN Sites: Tensions and Opportunities

With the interest expressed by the new remote workers to experience DNs lifestyle due to COVID-19 pandemic, what opportunities arise for redesigning gig platforms? One of the top recurring problems is the difficulty in getting established on these platforms even for experienced professionals. A hard-hitting account of this problem is found in post #8: “As a TV/media producer, writer and video editor of 15+ years, as well as being a professional graphic designer and lifelong musician/audio-mixer, I was pleasantly surprised to read in an article that Video Producer, Writer, Graphic Designer and Musician are among some of the most viable roles for digital nomads”. From an interview with a successful professional on one of these platforms we collected the following statement: “The gig platform strategy (as a company) is to grow the number of clients who are using the platform. They feel, as a platform, they already have enough freelancers with proven track records. They don’t need anymore”. Kinder et al. [30] highlighted this problem on gig platforms through an ethnographic study conducted at Upwork, where they reported the asymmetry of information and power between clients and freelancers. In addition, the authors also reported the technical limitations of these platforms and the conflict between the interests of the platforms and their users.

On the one hand, the platform wants to impose an isolated environment, in which all interactions and transactions take place with the protection of its algo-

rithms. On the other hand, users are part of an ecosystem of more extensive and comprehensive digital platforms, which include social media (LinkedIn, AngelList, etc.), labor platforms such as Fiverr and Total, payment platforms (e.g., PayPal, Venmo), cloud storage and file-sharing services (e.g., Dropbox), and communication platforms (e.g., Slack and Whatsapp). In these environments, users can relate directly without the need for intermediation, allowing the adoption of strategies by clients and freelancers to circumvent the restrictions imposed by the platforms' algorithms. One of these strategies was analyzed through the lens of freelance agency (post #4). It is interesting to note that among the controversial reactions that this post received is the criticism of the “middle man” or agency that is the bedrock of several projects in the blockchain community. It was from this community that some initiatives appeared proposing the use of “smart contracts” to regulate conflicts related to crowdfunding [55], crowdsourcing [56] and digital production [36] projects and ventures.

Regarding the implications for design in the context of online remote work platforms, we identified that the main limitations in current platforms stem from the business model of these platforms.

Following this line of reasoning, we recommend the search for a more transparent and fair business model among shareholders and stakeholders. Secondly, in relation to the difficulty of access of new entrants to the market due to the algorithmic assessment made by the current platforms detected in our study, we recommend efforts in the search for solutions to attract the entrance of new players that promote the expansion of the demand for remote work through new productive arrangements.

## **6.2.2 Reconfigurations on Digital Nomad Ecosystem consequences on Digital Nomadism**

Most of the adjustments that took place in the DN ecosystem are linked to the growth of a large number of formal workers interested in experiencing “Work From Home like a Digital Nomad”, that is, the adoption of digital nomadism by formal workers. Naturally, this causes a series of tensions between workers and the management of traditional organizations at a time when they move back, at least partially, to face-to-face work.

Recent literature on digital nomadism has been ratifying and dialoguing with the results of our empirical study. We report that this change of subject creates points of tension among new members of the r/digitalnomad subreddit community. Pita et al, [57] do an analytical study of topics discussed on the subreddit r/digitalnomad. The analysis compared three subperiods between January 2019 and December 2021: pre-pandemic (January 2019 to February 2020), lockdown (March 2020 to April

2021), and vaccinated (May to December 2021). Their study concludes that topics have changed between pre-pandemic and those of lockdown and vaccinated. This result corresponds to our finding of “Wannabes use COVID-19 as an opportunity to reinvent themselves”. The discussion on tax taxation in the US that we presented earlier is a striking example of this change, presenting another bias: the breach in the contract between the DNs and the State (government). This issue was recently addressed by Cook [58], who claims that DNs attempt to ‘opt-out’ or ‘re-draw’ the social contract, but in practice, they remain entangled in multiple state institutions”. Following this line of discourse, Aroles and colleagues [[59] examine the appropriation of digital nomadism by capitalist logic, enumerating several shreds of evidence, including “the emergence of ‘coworkation’ (inspirational coworking retreats, set in stunning locations around the world; development of digital nomad camps; organization of digital nomad cruises; rise of collaborative workspaces such as coworking spaces, co-living spaces, makerspaces, etc)”.

The criticism of the fact that digital nomadism is becoming mainstream is due to its association with a “revolutionary figure who can bring about change” found in Deleuze [60], and thus interpreting this transformation as the end of the movement [10, 50, 51, 61] . We on the contrary, like others [16, 34, 38, 53], prefer to conceive of this manifestation of solopreneurship as a career alternative for the wannabe DN employees. For example, we detected among the wannabes manifestations of having their “own business”, among the “wannabe DN self”, who are more adherent to this idea, and to a lesser extent among the “wannabe DN learn”, who are more interested in having a profession or remote work first, before engaging as entrepreneurs. The analysis of the posts also indicated, with regard to the entrepreneurial path, a search for professional knowledge that allows setting up a business. In this context, Jarrahi’s study describes the practices of Personal Knowledge Ecologies [1] as a personal instrument allied to communities. We understand that the combined use of the intellectual capital of DNs and their social capital within the community gives rise to the “seed” capital of the “how-to-be-DN” businesses.



# Chapter 7

## Articulation Theoretical Digital Nomad Phenom

### 7.1 Remembering Objective Problems and Research Questions

It is convenient to start this chapter of the results and conclusions part of the thesis by recalling the objective problems and research questions that motivated this work.

1. Obtain a holistic and unified understanding of digital nomads and digital nomadism;
2. How has the COVID-19 pandemic affected digital nomads' (DN) work practices, lifestyle, and ecosystem sustainability? How have stakeholders been affected, and how have they reacted to these changes? Have new stakeholders flourished and entered the ecosystem? Have new relationships emerged? Have new behaviors developed in response?;
3. How Digital Nomads explore new prosumer Arrangements?;
4. Furthermore, How do Digital Nomads explore Personal Knowledge Networks?

These objective problems help to map the knowledge base linked to the problem to identify the contributions of the thesis. We can express these problems in a set of thesis research questions :

Table 7.1: Thesis Research Questions:

Research Questions	Description
TRQ 1	How has the Literature on Digital Nomads historically evolved? What are the main themes and issues? Is there any holistic and unified understanding of digital nomads and digital nomadism? How are the Conceptual Frameworks about nomadic working practices, lifestyle, collective culture, and personal motivation founded in Literature? How do they articulate with ground theory? How does COVID-19 emerge as an issue in Literature about Digital nomads?
TRQ 2	How do digital nomads perceive the impact of the COVID-19 pandemic on their everyday work-life space?
TRQ 3	How has the COVID-19 pandemic impacted the sustainability of the DN ecosystem?
TRQ 4	How do Digital Nomads Explore Knowledge Ecologies?

## 7.2 Three-layer Framework Conceptual baseline to Theoretical Articulation from 1st Report

Table 7.2: Three-layer Framework Conceptual baseline to Theoretical Articulation from 1st Report

1st-Layer Concepts	2nd-Layer Themes	Theoretical Dimensions
Autonomy, backpackers , self-actualization, lifehacking	Lifestyle	Personal
self-managing and reflecting, Reinventing, Managing and making sense of information and Personal Knowledge Network	Personal Knowledge Management	Personal
Nomadic Cultures and Social Media Broadcasting	Media Cultural Production	Social
Community building, mentoring ,knowledge sharing	Community practices	Social
branding, Networking and entrepreneur interactions	Market practices	Social
freelance marketplace, communication, payment and cloud	Platforms	Tech
assembling actants, Location centered and infrastructure resources	Nomadcity	Tech

In order to obtain a holistic and unified understanding of DNs, we conducted a comprehensive literature review to conceptualize the phenomenon under study

further. To do this, a previous work aimed at consolidating themes, theories, and questions about digital nomadism and nomadic work DE ALMEIDA *et al.* [7] proposed a conceptual framework based on a comprehensive review of DN literature. This is the baseline version.

### 7.3 Theoretical articulation with 2nd Report on Empirical Study

The conceptual framework initially developed in previous work DE ALMEIDA *et al.* [7] allowed us to capture emerging themes in the context of COVID-19 pandemic. Through this lens, we were able to articulate the insights provided by informants within the frame of the emerging literature on digital nomadism.

Following this approach, it is worth noting that two key concepts that emerged from this iterative process deserve a conceptual deepening. In particular, the mechanisms underlying the building and sharing of personal narratives play a central role in search of the “digital nomad way of life”. Thus, we understand that these concepts are sufficiently generalizable to be incorporated into the original conceptual framework of digital nomadism DE ALMEIDA *et al.* [7], as illustrated in Fig. 3.2

Table 7.3: 1st-Layer Concepts that emerged from the Theoretical articulation on 2nd Report

<b>1st-Layer Concepts</b>	<b>2nd-Layer Themes</b>	<b>Theoretical Dimensions</b>
Building Narratives	Lifestyle	Personal
Sharing Narratives	Community Practices	Social

Taking a broader perspective, the concept of building narratives is thematically linked to the first-level concepts found in the “Personal Dimension”. As a result, the hierarchical structure imposes some “Sophie’s choices” or ontological ones. Naturally, narrative construction processes have strong components of “Personal Knowledge Management”, a point of connection with many of the concepts developed in the work of Jarrahi and colleagues [1]. The authors mention processes of “self-managing and reflecting” and “managing and making sense”, but in the context of “work practices” or “building career”. Nonetheless, our reading of this concept is more in the direction of building identity or even the search for approaching the “social figure” as mentioned in Muller’s [34] work. In this way, we frame this concept among the existing concepts in the first-order layer related to the “Lifestyle” theme of the original conceptual framework DE ALMEIDA *et al.* [7]. Similarly, “Sharing Narra-

tives” naturally fit into “Community Practices” although it differs from the concepts expressed in the conceptual layer of this theme (community building, knowledge sharing, mentoring). Finally, it should be noted that these personal narratives of DNs are commonly present in the literature as being associated with cultural and media production [17, 27].

In many respects, personal narratives emerge virtually in every type of discussion on the Reddit forum and this is an essential characteristic of DNs. Whether to give information about a place, or indicate a platform for any purpose (e.g., dating, job seeking, networking), or any other subject, a post or comment is almost always accompanied by a report of a unique, special and personal experience. These narratives are constructed and revised in each intervention to embody the essence of their personal nature and worldview. The nomadic theme has been a subject of particular scrutiny from a CSCW frame. For instance, the work of Czarniawska [25] constitutes one of the most prominent examples of this phenomenon by bringing a view that is sometimes considered as “romanticized” by some authors (for example, Büscher [26] and Cook [61]). But in no way this view is any less valuable than the so-called “realistic” view of the digital nomadism phenomenon. We understand that this dialectic is productive in the search for a holistic view of a complex phenomenon that spans cultures, geographies, and technical progress.

Given the above discussion, the online behavior of DNs when sharing experiences through personal narratives is so incorporated into their imagination that they appear on several occasions. Even non-nomads (including “wannabe” digital nomads [49]) formed by distinct groups of remote workers in the home office (employees, freelancers, etc.) present themselves through this type of narratives. As we pointed out earlier, the restrictions imposed on the lifestyle of DNs during the pandemic contribute to the construction of a repertoire of narratives about the various extreme situations experienced during this COVID-19 period. These narratives, which can contain strategies to face these restrictions or even best practices on how to plan a trip, are shared within the community and end up being incorporated into personal narratives.

Finally, the Figure 7.1 presents the new version of the conceptual framework, highlighting the concepts that were added.

Table 7.4: 1st-Layer Concepts that emerged from the Theoretical articulation 3rd report

<b>1st-Layer Concepts</b>	<b>2nd-Layer Themes</b>	<b>Theoretical Dimensions</b>
How to be / Wannabe	Market Practices	Social
Geoarbitrage as critical factor to define destination and finance sustainability	Market Practices	Social

## 7.4 Theoretical articulation with 3rd Report on Empirical Study

### 7.4.1 Wannabe digital nomads use COVID-19 as opportunity to reinvent themselves

Evidence presented in Section IV.A, “Covid as an opportunity to reinvent yourself”, based on data analysis, is an example of the strength of building a conceptual framework provided by a data structure recommended in the Gioia methodology [12]. The analysis of posts detected emerging concepts among a part of a heterogeneous, non-nomadic group (the wannabe DNs). Post analysis also indicates that this group used remote work as an opportunity to reinvent themselves and to test the DN lifestyle.

The three types of wannabe DNs are not DNs, but they play an important role in the DN business model, according to Schlagwein [49] and thus in the sustainability of the ecosystem [1].

These evidences were easily aligned with the concept of “reinventing” present in the conceptual framework DE ALMEIDA *et al.* [7], inspired by and coming from the work of Jarrahi [1], who defines it as follows: “Reinventing, in this context, is the act of transforming ideas, experience, and general knowledge into a solution that directly addresses the project at hand”. On the other hand, looking deeper into the most relevant questions, we will discuss in the next sections the role of geoarbitrage in the nomadic lifestyle sustainability strategy and the impact of wannabes on the entire ecosystem.

### 7.4.2 Geoarbitrage as critical factor to define destination and finance sustainability

The issue of geoarbitrage emerges in the Reddit community in different contexts, as per our previous argument Geoarbitrage plays a key role in travel planning. Discussions about housing costs and other issues related to travel planning do not always

explain this concept, but it will be present, even if subliminally, since cheap travel is a necessary requirement for planning this type of trip. In the same way, maintaining a presence in the job market or its original client portfolio is a requirement for the sustainability of a financial project. Keeping your income tied to the job or service market of developed countries while enjoying all the perks by traveling in Southwest Asia (or other cheap regions for Europeans, Americans and Australian Canadians) is the essence of the geoarbitrage strategy found on almost every “how-to-be-DN” Web artifact. For example, in the work “The 4-Hour Work Week Ferriss” [48], cited by Schlagwein [49] as “the bible of digital nomadism”, he explicitly relies on the concept of geoarbitrage to promise “Live Anywhere and Join the New Rich”, which features a “market practice” theme within our conceptual model.

### **7.4.3 The rise of Wannabes on the digital nomad ecosystem**

During data analysis it became evident that the emergence of wannabe DNs would have a major impact on the ecosystem. Following the proposed methodology, we decided to include a new specific RQ on this subject: “How has the COVID-19 pandemic impacted the DN ecosystem sustainability”? We identified in the framework’s corpore data structure DE ALMEIDA *et al.* [7] several aspects related to the aforementioned RQ, but in a fragmented way, as presented in section 2. Finally, we added new articles related to the RQs discussed in this study to the framework’s corpore.

Among these, some are interested enough to consider the experience, and become wannabe DNs. The “how-to-be-DN” businesses are destined for these, which will train new DNs, teach them, and thus maintain the sustainability of the ecosystem as long as there is audience and audience conversion into wannabes.

Table 7.4 presents the result of the new concepts that should be included in the framework, and Figure 7.2 presents the new version of the conceptual framework, highlighting the concepts that were added.

## **7.5 Theoretical articulation with 4th Report on Empirical Study**

### **7.5.1 Personal Knowledge Network practices on CoPs as a key factor to explore new digital markets**

we detected limited interest regarding issues related to the crypto-economic ecosystem on the “r/digitalnomad” subreddit. Despite this, we were able to collect evidence

Table 7.5: 1st-Layer Concepts that emerged from the Theoretical articulation 4th report

<b>1st-Layer Concepts</b>	<b>2nd-Layer Themes</b>	<b>Theoretical Dimensions</b>
DN Communities as CoPs Hubs	Community Practices	Social
CoP to Access new markets	Market Practices	Social

of the use of CoP to access new markets, as per the reports presented in the previous sections.

This fact can be seen notably in post #210002 by the author of the post whose answer to the question “How did you start learning blockchain?” summarizes these practices this way: “talking to many people, visiting events, and after that tutorials, hackathons, reading github code of other projects, do your own pet projects”. This is due to the diversity of existing professions in the DNs community, which makes it a "hub" between several CoPs of knowledge workers.

Addressing the RQ5 (How have digital nomads (DNs) been working in new productive arrangements created by the crypto economy, in the production and distribution of digital art (NFTs)?), we can postulate that, although DNs use cryptocurrencies with some ease, we detected little interest in matters related to the economic crypto ecosystem on the “r/digitalnomad” subreddit. It would be more plausible to say that there are professionals working on economic crypto software projects that are DNs than to say that DNs work in this market segment.

In particular, the mechanisms underlying Personal Knowledge Networks as a key factor to explore new markets. However, this concept is already present in the framework in the Personal dimension. On the other hand, as we showed in previous sections, both the concept related to community practices “DN as hub of CoPs” and the use of CoPs to access new markets (“CoP to Access New Mkts”) are sufficiently generalizable to be incorporated into the original conceptual framework of digital nomadism DE ALMEIDA *et al.* [7] . Table II presents the result of the new concepts that should be included in the framework, and Figure Figure 7.3 presents the new version of the conceptual framework, highlighting the concepts that were added

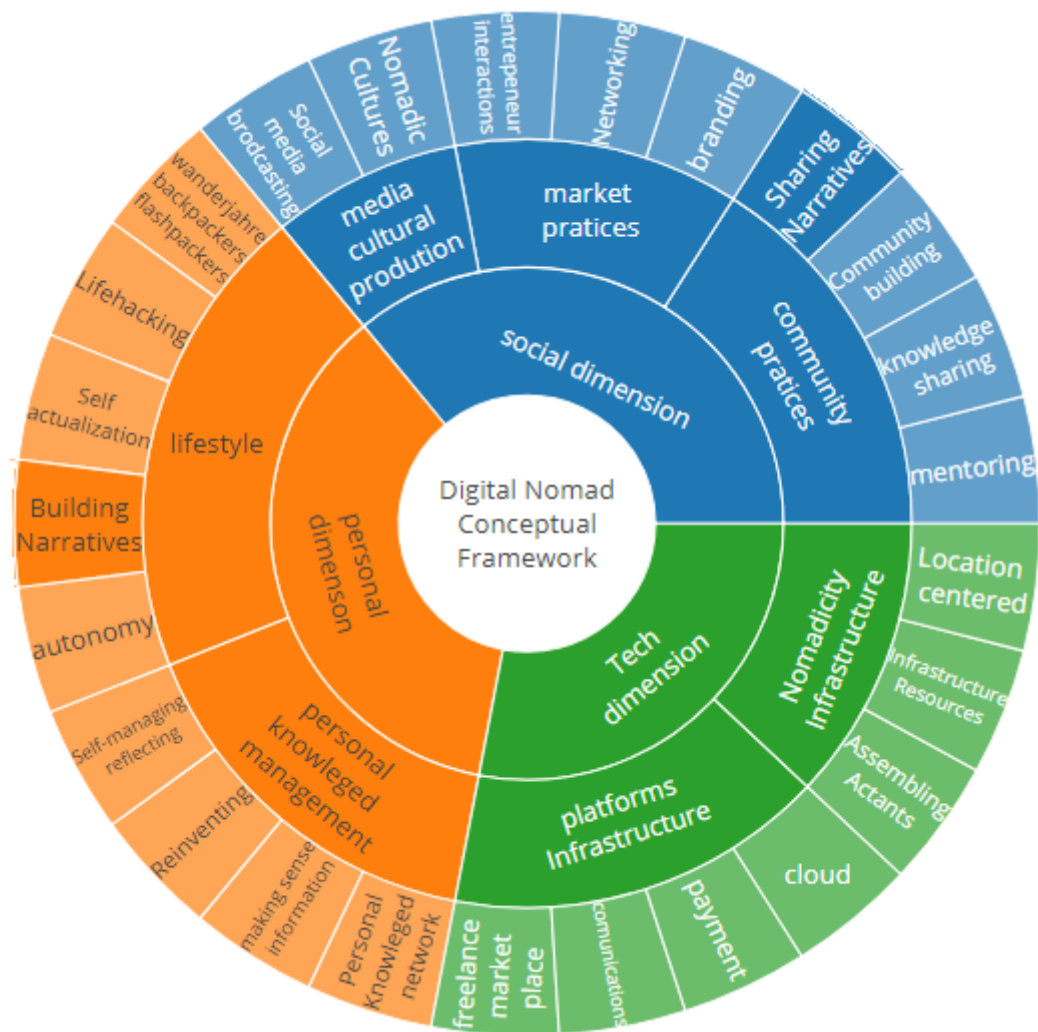


Figure 7.1: Three-layered conceptual framework of digital nomadism after adding the 1st-Layer Concepts that emerged from the 2nd report on Theoretical articulation.



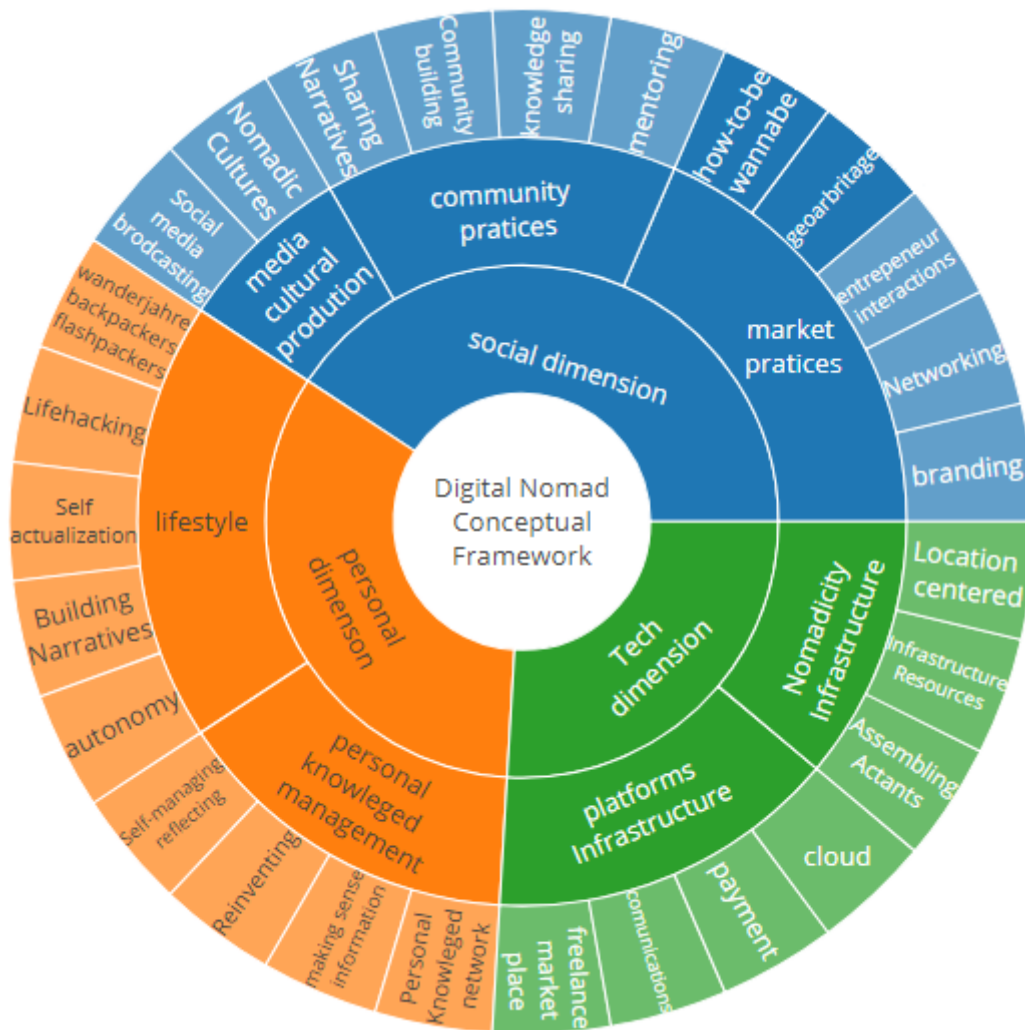


Figure 7.2: Three-layered conceptual framework of digital nomadism after adding the 1st-Layer concepts that emerged from the 3rd report on Theoretical articulation.

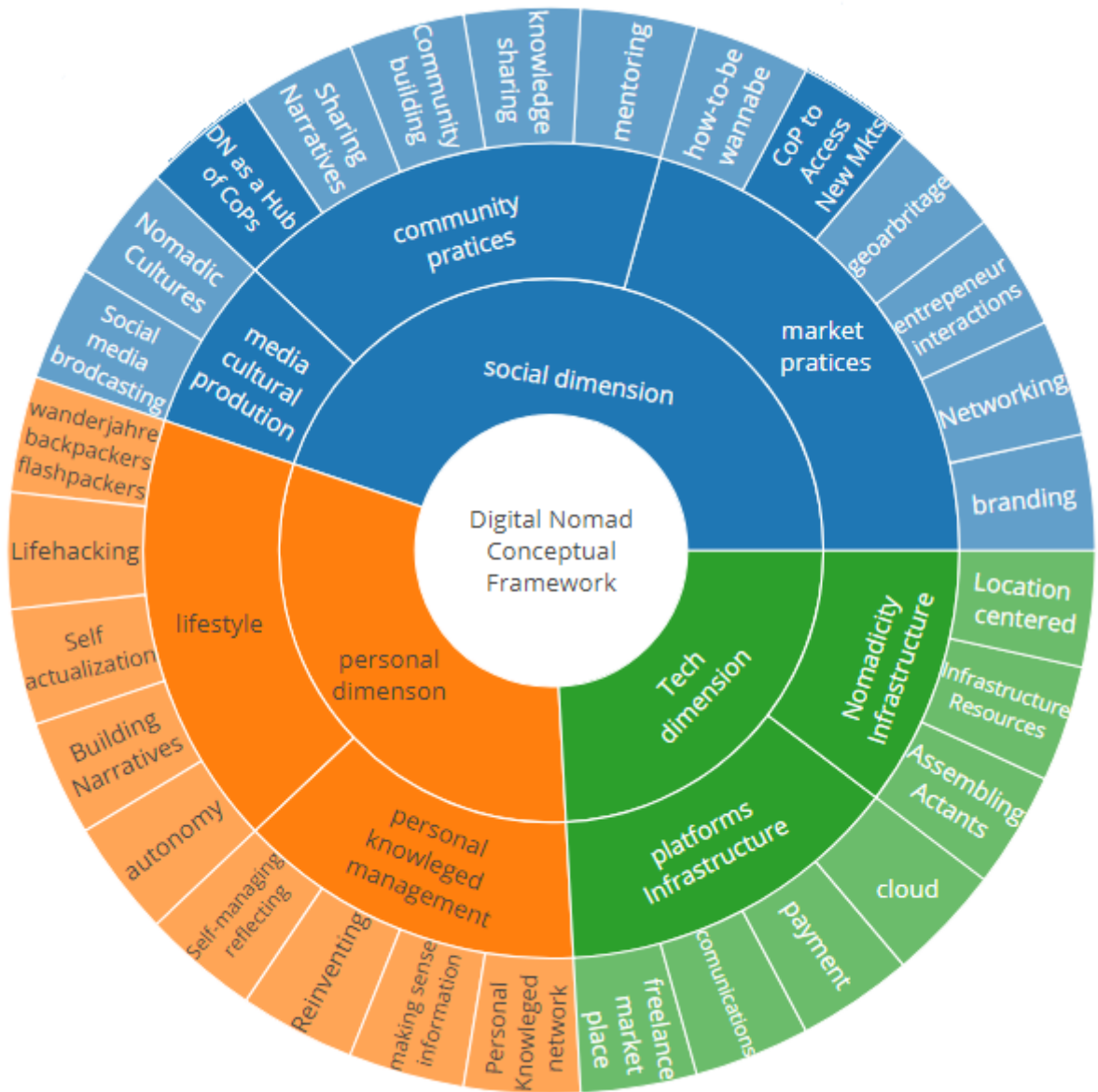


Figure 7.3: Three-layered conceptual framework of digital nomadism after adding the 1st-Layer concepts that emerged from the 4th report on Theoretical articulation.

# Chapter 8

## Exploring Personal Knowledge Ecologies

### 8.1 Remembering Objective Problems and Research Questions

It is convenient to start this chapter of the results and conclusions part of the thesis by recalling the objective problems and research questions that motivated this work.

1. Obtain a holistic and unified understanding of digital nomads and digital nomadism;
2. How has the COVID-19 pandemic affected digital nomads' (DN) work practices, lifestyle, and ecosystem sustainability? How have stakeholders been affected, and how have they reacted to these changes? Have new stakeholders flourished and entered the ecosystem? Have new relationships emerged? Have new behaviors developed in response?;
3. How Digital Nomads explore new prosumer Arrangements?;
4. Furthermore, How do Digital Nomads explore Personal Knowledge Networks?

These objective problems help to map the knowledge base linked to the problem to identify the contributions of the thesis. We can express these problems in a set of thesis research questions :

Table 8.1: Thesis Research Questions:

Research Questions	Description
TRQ 1	How has the Literature on Digital Nomads historically evolved? What are the main themes and issues? Is there any holistic and unified understanding of digital nomads and digital nomadism? How are the Conceptual Frameworks about nomadic working practices, lifestyle, collective culture, and personal motivation founded in Literature? How do they articulate with ground theory? How does COVID-19 emerge as an issue in Literature about Digital nomads?
TRQ 2	How do digital nomads perceive the impact of the COVID-19 pandemic on their everyday work-life space?
TRQ 3	How has the COVID-19 pandemic impacted the sustainability of the DN ecosystem?
TRQ 4	How do Digital Nomads Explore Knowledge Ecologies?

## 8.2 Mapping Digital Nomad Ecosystem

The introduction of a new research question in our third report [40] empirical study, “How have the waves of COVID-19 impacted the sustainability of the DN ecosystem?” (R3-RQ3), created the need to carry out “additional consultations with the literature to refine articulation of emerging concepts and relationships” GIOIA *et al.* [3], which we will address in this section.

The analysis of the concepts expressed in the framework DE ALMEIDA *et al.* [7] gives us clues about how the existing ecosystem around DNs is organized. In the technological dimension of the framework [7], concepts related to the use of temporary work platforms [14, 30] by some DNs to obtain a source of income emerge. In the same technological dimension, we found evidence in the literature of the use of other platforms to meet the demands of the DNs in serving their customers, such as means of payment [30, 37], communication [8, 30], and artifact sharing through cloud computing [30].

Other infrastructure resources necessary for the exercise of a nomadic life, such as coworking spaces [10, 21, 23, 24], are provided by the hospitality business, which is increasingly betting on co-live, a new DN business niche [46, 62]. More comprehensively, Aroles and colleagues [50] examine the appropriation of digital nomadism by capitalist logic, enumerating several evidences, including “the emergence of ‘coworkation’ (inspirational coworking retreats, set in stunning locations around the world; development of digital nomad camps; organization of digital nomad cruises; rise of collaborative work spaces such as coworking spaces, co-living spaces, makerspaces, etc)” [50].

Local governments are also important actors in this ecosystem, as was recently demonstrated by the creation of the VISA Digital Nomad by several countries [63].

To represent the DN ecosystem, we decided to adopt an approach that combines elements of Freeman’s stakeholder value creation process [27] with the networked knowledge ecosystem approach proposed by Amine Chatti [3] together with elements of Jarrahi’s approach in his ecology of knowledge [1].

Following Freeman’s approach [64] , whose basic idea is a value transfer chain between stakeholders, grouped in layers according to some criteria, in our model we group stakeholders according to influence power and collaboration capacity. Close layers interact with each other, with the outermost ones having greater power of influence and the innermost ones having greater power of collaboration.

In light of the above, and inspired by the logic of the original work by Freeman [64] , in the outermost layer of the model (Figure 8.1) we present the governmental and regulatory institutions (such as the national and local government agencies - Gov Agencies and Local Gov, respectively), each in its governmental sphere; social agents (such as social movements, groups of local movements and activists linked to international movements - Activism Movements) and controllers of private institutions (such as Venture Capital and Business Shareholder). The agents indicated in this layer have the power to influence the businesses found in the next layer.

In the next layer, we captured the different businesses linked to the DNs (Hospitality, Adventure Tourism and DN ’niche’), the governmental agencies of social regulation such as the regulators of the labor market (Regulation Work Mkt) and other agencies for border control, issuance of visas and tax regulation (Gov Reg Visa/TAX) and, finally, the agents of local and global activist movements (Local/Global Movements). The interaction of this last layer with the next layer, where the DNs and their Digital Nomads Communities are located, takes place both virtually through Digital Platforms and in person through local infrastructures (coworking, co-live, etc). These communities are formed by both digital nomads and non-digital nomads. DNs collaborate in these communities to educate newcomers, aspirants, and general stakeholders who form a “DNs Audience” interested in their lifestyle issues. A part of this audience is made up of the aspirants to DN lifestyle (the so-called wannabes DN), target customers for the “how-to-be-DN” businesses.

In the previous sections, we presented evidence of the emergence of a heterogeneous group of aspirants to the DN lifestyle, who had access to remote work due to the measures adopted to prevent the spread of COVID-19. Among them, the group of workers with formal jobs was responsible for several transformations in the ecosystem as a whole.

On the other hand, this large contingent of remote employees started to be attended and disputed by the Hospitality Business sectors in ’coworkation’, ’coworking’

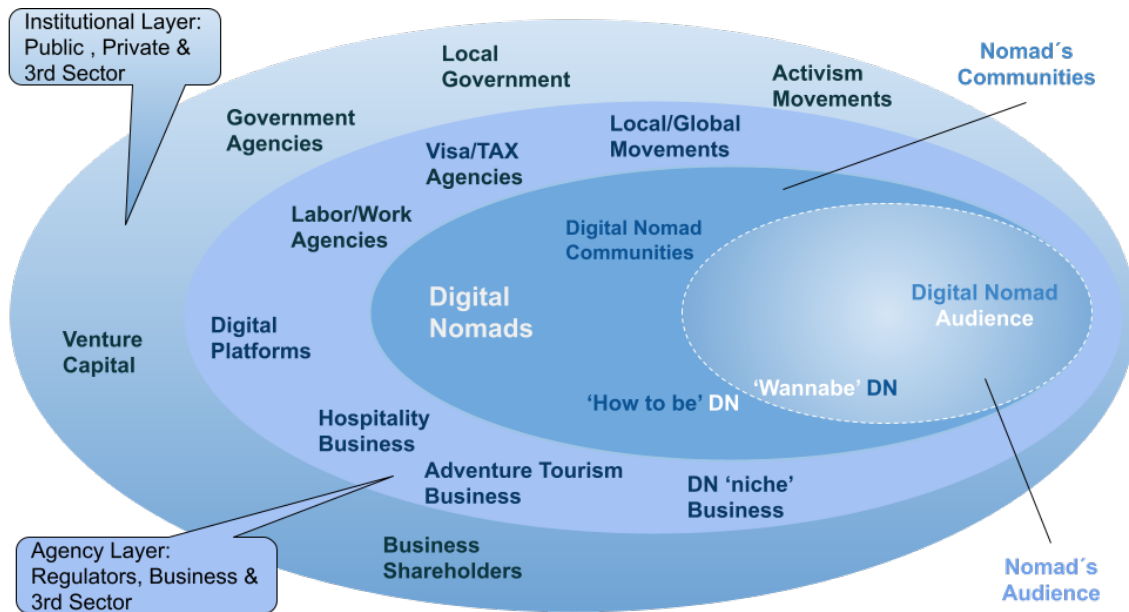


Figure 8.1: Stakeholders Map of Digital Nomad Ecosystem

and 'co-living' projects operated by major brands such as AirBnB, WeWork and hotel brands like Zoku and citizenM, who have developed products aimed at this niche market of DNs. This movement has been leveraging the trend (detected by Aroles and colleagues [50] ) of digital nomadism becoming mainstream. Many like him associate DNs with a “revolutionary figure that can bring about change” found in Deleuze [60] , and thus interpret this transformation as the end of the movement. Others [7, 16, 32, 37] , on the contrary, perceive the interest shown by the economic mainstream as proof of the relevance of this market niche and of the expectation of growth of digital nomadism among the contingent of “wannabe DNs”, as was discussed in [7] and confirmed by the evidence presented in previous sections.

Looking at the entrepreneurial ecosystem among DNs, Aroles et al.[50] draw attention to a business model developed by them: some DNs “organize co-living and fun experiences for online entrepreneurs and digital nomads” or “operate websites and platforms that help people gain location independence and become digital nomads”. The target market for this type of “how to be digital nomad” business model is formed by a group of aspiring DNs, called “wannabe” digital nomads by Schlagwein [49] . We argue that the “how to be/wannabe” system is the foundation on which the ecosystem of digital nomads expands in scale and scope.

### 8.3 Mapping Crypto Economic Ecosystem

There is a vast, complex and dynamic socio-technical ecosystem created around the crypto economy, and therefore both the academic literature and the communities

of practice present partial and complementary visions of each of these emerging ecosystems, which expand in all directions, occupying and creating new markets.

Some authors such as Brennecke [65] claim that “to understand blockchain-based business models and innovations, it is necessary to understand human interactions within blockchain ecosystems”.

On the other hand, Pereira and colleagues [66] state that blockchain technology has been receiving much public attention recently, “but the majority of the previous studies have focused on the technical aspects, and overlooked blockchain investigation from a managerial perspective”.

Others like Shin and colleagues [67] argue that “cryptocurrency is seen as a network with a socio-technical structure since the systems are composed of technical infrastructure and the social relations between users of the crypto ecosystem”. The analysis moves towards uncovering socio-political ramifications offered by adopting socio-technical approaches in the blockchain context. According to the authors [32], the fundamental aspect that provokes all this dynamic is the expansion of this financial operations system through “digital tokens without a trusted third party” due to its competitive advantage over the markets that use “digital tokens with a trusted third party”. The consequences of this expansion are disruptive, as they directly affect the traditional financial market. Ironically, we maintain that in response to the financial and social crisis of 2008, bitcoin occupied Wall Street.

Finally, the authors [67] concludes that cryptocurrency “is a socio-technical system that constitutes new and important objects of social inquiry that must be addressed beyond the myopic context of a financial asset”.

The term "tokenomy" is a keyword related to the so-called crypto economy, joining others such as blockchain and DAO [65–69] is used to describe the math and incentives governing crypto assets. Despite the fact that the crypto economy as a research topic is rapidly expanding across different areas of knowledge, so far there are few studies on the subject in the context of HCI/CSCW. We argue that in order to understand the success or failure of incentive and engagement mechanisms promoted by crypto-economic projects, it is critical to understand the principles behind good tokenomics design.

A good tokenomics project begins with the alignment of interests among all the stakeholders involved. In this way, mapping the stakeholders of the crypto-economic ecosystem is a key factor for the design of good tokenomics projects. Using the same mapping approach adopted in mapping the ecosystem of DNs, we use Freeman’s approach [64], whose basic idea is a value transfer chain between stakeholders grouped in layers according to some criteria. We maintained the criterion of grouping them according to their power of influence and their ability to collaborate. Figure 2 depicts the result of the analysis of subreddits linked to the main projects

of crypto economic ecosystems. The influence of “crypto activism communities” is present in all these communities, which is why it is located in the center of the onion diagram. Given the complexity of these ecosystems, we decided to categorize these communities as “Cryptocurrency communities” for communities around a particular cryptocurrency; “Hodlers’ Investors” for the cryptocurrency investor communities with strong activist bias, “Free Soft Crypto Projects” for the community of developers and entrepreneurs involved in crypto-economic projects, and “Creative Communities” for the creative industry communities involved in these projects.

Around these communities, in the immediately upper layer of the diagram, we find the types of crypto-economic software projects that we will focus on in this paper. The “Cryptocurrency Networks” projects include technological infrastructure projects for cryptocurrencies in blockchain networks, such as bitcoin, ethereum, solana, polygon, etc. These networks are built to provide all the infrastructure needed to transact each currency. Older software projects are not multi-network, that is, they only execute transactions on a given network, although projects have now emerged to provide inter-chain solutions. For this reason, it is natural that ecosystems emerge within each cryptocurrency network that seek to attract developers and support new strategic projects in their network.

This support is often made from financial resources (grants) intended to solve specific problems of a technical or market nature. For this they rely on foundations (such as the “Ethereum foundation”) that mediate with stakeholders from all layers. We can see the importance of this action for the developer community, in the analysis of the following excerpt from the user’s post#210002 (u-lebed2045): “So I start from the economy, reading the code of bitcoin, read hundreds of whitepapers (not exaggeration ), talking to many people, visiting events (back in Vancouver there was a magnificent bitcoin-libertarian underground club DCTRL) . . . On the practical side,... is an absolute must, but after that tutorials, hackathons, reading github code of other projects, from your own pet projects”.

Continuing with the description of the types of crypto-economic software projects, we have included in the diagram the “Wallets” and “Exchanges” which are the basic applications for carrying out transactions with cryptocurrencies. In the “Wallets” users can load their currency to make online transactions. “Exchanges”, as the name implies, are exchange houses where purchase and sale transactions are carried out between crypto and fiat currencies (the common currencies of the economy).

Continuing on this financial trail, we identify DeFi projects that are Decentralized Finance projects where users can lend, finance and invest without the intervention of the traditional financial industry represented by the stakeholders “Fintechs”, “Capital Investment Industry” and “Business Finance”, which we will address fur-



ther up. It should be noted that the disintermediation in transactions between people is at the center of the activist discourse of these communities, echoing social movements such as "Occupy Wall Street" in 2008.

"DApps" is the acronym for decentralized applications (and once again we find ourselves with the word "decentralized"). In the context of crypto-economic software projects, the word "decentralized" has a very specific meaning. Decentralization here concerns the transfer of control and decision making from a centralized entity (individual, organization or group) to a distributed network.

This transfer of control is done through two components of this type of application, a partner component and a technical component. The smart contracts implemented in the technological infrastructure to regulate transactions on the blockchain network (which in turn is an implementation of the application of a book for accounting (ledger), typical in "Cryptocurrency Networks") is the technical component, and the "DAOs" or "Decentralized organizations" for governance of smart contracts are their social component. These two components of these systems translate the essence of their socio-technical nature.

All software projects are implemented by DApps. That way, regardless of the type of project, Wallets, Dex Exchanges, Defi, DAOs, IOT DLT and NFT mkt, each one has its DApp. "IOT DLT dapps" are specific applications for the supply chain and product delivery, generally for proof of product/supplier origin. This application is linked to the digital transformation in the Industry represented in the figure by "Industry 4.0 Supply-Chain".

"NFT mkt" are decentralized marketplace applications with a variety of applications but mainly for trading digital assets. The acronym NFT stands for "Non-Fungible Token", non-fungible in economic crypto, and means that it is a unique item and not interchangeable for another of the same kind, such as coins, where this economic concept comes from. The application of this concept, translated as a digital asset whose ownership is registered on the blockchain, drives the digital market of NFTs in the creative economy represented in the next layer of the figure by "Digital Art Prosumer Ecosystem" and "Game Industry Ecosystem".

Finally, at the outermost layer, there are stakeholders, the governmental and regulatory institutions ("Gov Agencies"), controllers of private institutions (such as "Venture Capital" and "Business Shareholder") and users and businesses that invest in crypto. currencies ("Crypto Investors")

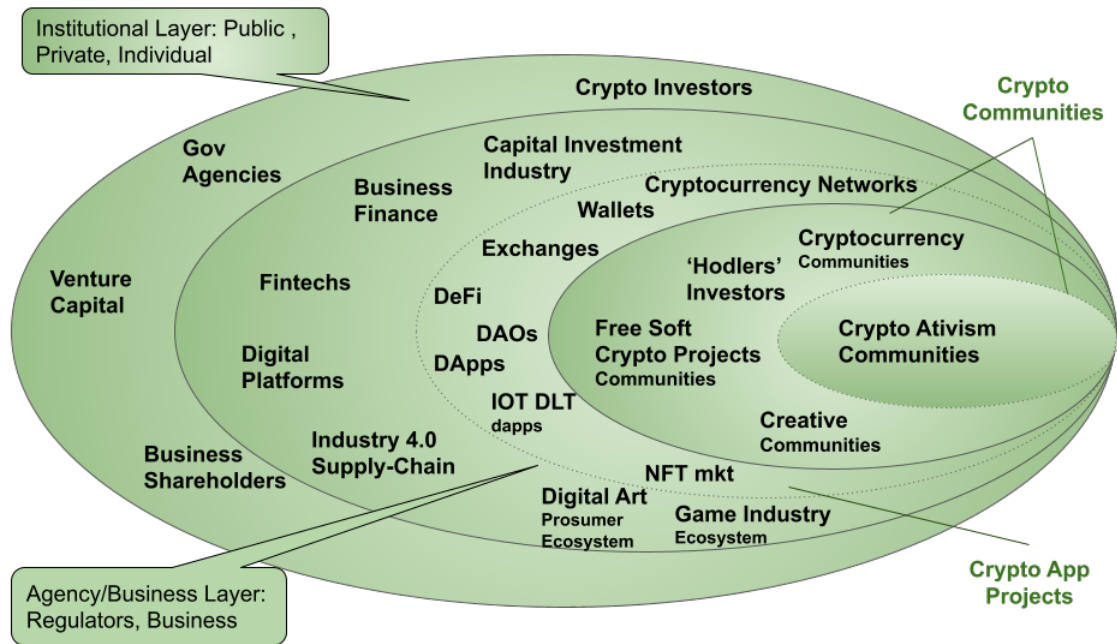


Figure 8.2: Stakeholders map on Crypto Ecosystem

## 8.4 Personal Knowledge Network and Knowledge Ecologies

Concretely, the Framework for Exploring Personal Knowledge Ecologies starting points from three works: Personal Knowledge Network and Knowledge Ecology, "Intentional" Networks, and Personal Knowledge Ecologies following AMINE CHATTI [2], NARDI *et al.* [31], and JARRAHI *et al.* [1], respectively.

First, we will discuss these concepts according to the personal knowledge management literature and new productive arrangements in the labor market. In the final sections, we will present the conceptual artifacts produced by this thesis.

Chatti introduced the Personal Knowledge Network (PKN) [2] concept as an alternative model to the Knowledge management (KM) and personal knowledge management (PKM) models. He argues that the PKN model views knowledge as a personal network and represents a knowledge ecological approach to KM.

He builds this model on top of two concepts: The PKN and the Knowledge ecologies that emerge from them. He argues that knowledge management implies the continuous development of PKN and the ecologies that emerge from them.

The personal knowledge network is a unique adaptive repertoire of:

1. tacit and explicit knowledge nodes, i.e. people and information;
2. one's theories in use which represents an individual's norms and strategies for achieving value and assumptions that bind strategies and values together.

The one's PKN is an extension of one's external network with new tacit and explicit knowledge nodes (external level) and a reframing of one's theories-in-use (conceptual/internal level). He claims, "A PKN shapes the knowledge home and the identity of the individual knowledge worker". This aspect is very relevant to thesis aims.

Jarrahi's work [1] detects these Personal Knowledge Ecologies in digital nomads' activities in the context of gig work. Figure 8.3 exhibits these activities. What is distinct in the case of digital nomads is that these practices have moved from secondary sources of knowledge (organizational knowledge infrastructures) seeking to primary sources (the individual digital nomad) for sharing and building expertise (tacit to tacit). Jarrahi argues that the value of community practice (COP) has been evident in a practical study that describes the activities that usually take place by knowledge workers in a learning environment for which COP has a vital role in providing such an environment.

## 8.5 Networkers and other Prosumer Arrangements

The study of collaboration across organizational boundaries, Nardi's "intensional" networks [31] is a vital starting point for one of the central thesis outputs: Framework for Forming Personal Knowledge Network.

Intensional networks are the professional contacts that workers form while collaborating to carry out a project. These professionals are called upon to meet the needs of each specific work project. Once joint work ends, the network has some persistence: the shared experience of the collaborative assignment helps to establish relationships that form the basis for future work. The author chose the term "intensional" to reflect the effort and deliberateness with which people construct and manage personal networks. They explain that "the spelling of the term is intended to suggest a kind of tension and stress in the network." They found that "workers experience stresses such as remembering who is in the network, knowing what people in the network are currently doing and where they are located, and making careful choices from among many media to communicate effectively with their contacts." Finally, the "intensional" also suggests a "tensile strength" in network activity. they found informants endlessly resourceful and energetic in their everyday collaborative activities within their networks.

The authors define the "Key network tasks" as constantly present duties to guarantee a supply of a potential pool of labor or contacts for future joint work. They list three key tasks:

1. Building a network: Adding new contacts to the network so that there are avail-

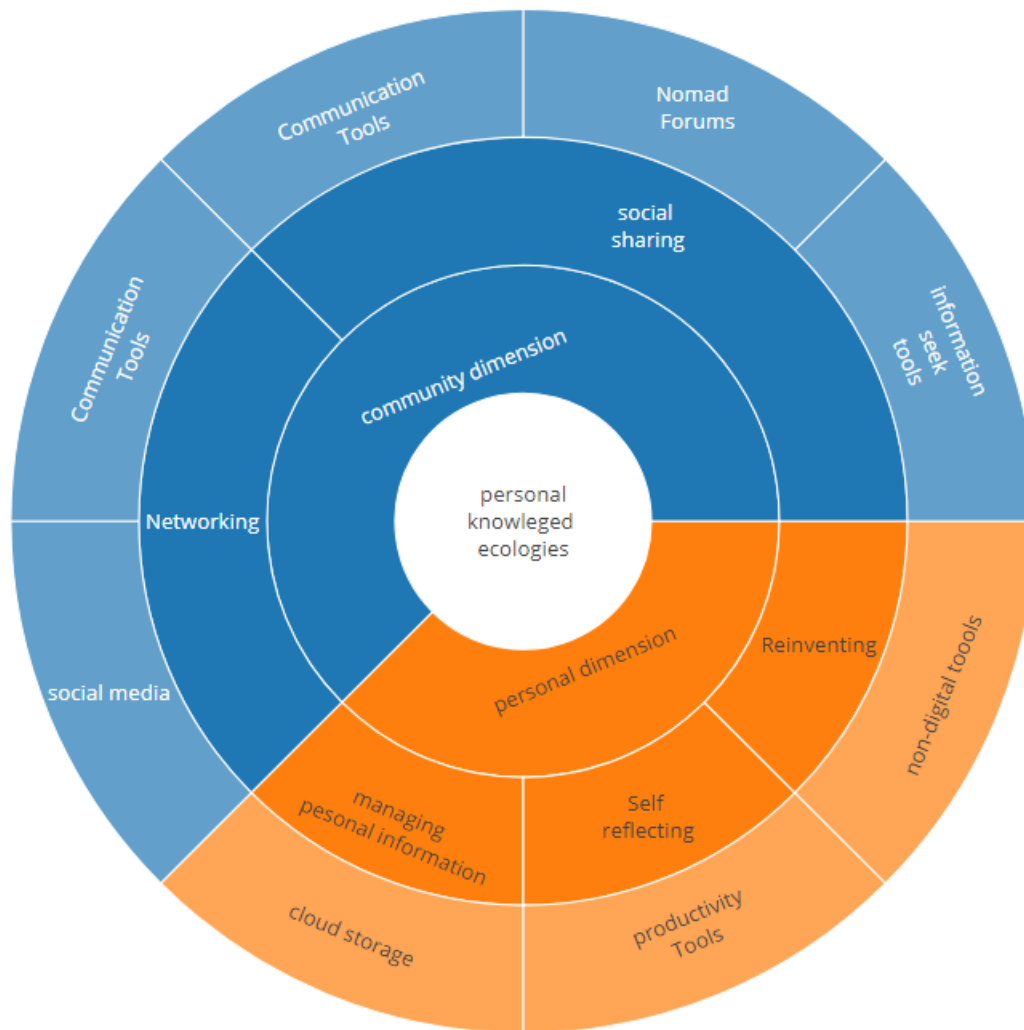


Figure 8.3: Personal Knowledge Ecologies from Jarrahi [1]

able resources when it is time to conduct joint work;

2. Maintaining the network, where a central task is keeping in touch with extant contacts;
3. Activating selected contacts at the time the work is to be done.

Easley and Kleinberg in their book "Networks, Crowds, and Markets: Reasoning About a Highly Connected World" [70] explore other aspects of this subject linked to our project of an artifact for PKN, where we emphasize the point of view of complex networks in new arrangements of the digital economy.

## 8.6 Framework for Forming Personal Knowledge Ecologies

In the previous sections 8.2, we concluded that at the core of the ecosystem of digital nomads operates a heterogeneous community formed by an audience interested in the various subjects related to nomads and among them, a large contingent of workers with regular employment interested in adopting part of the lifestyle due to the adoption of the remote work.

On the other hand, the members of the communities that are not DNs are formed by those interested in the "DN thing," who form the audience of the DNs for blogs/vlogs and other media that discuss subjects related to the DN lifestyle. Among these, some are interested enough to consider the experience of becoming Digital Nomads. The "how to be DN" businesses will train new DNs, teach them and thus maintain the sustainability of the ecosystem by converting the general audience into wannabes DN.

For the DN solopreneurs, "How to be/wannabe" is a route to an entrepreneurial career and articulation with other entrepreneurship networks. The business operation resembles Nardi's "Intensional Networkers."

The operating context described by Nardi in the activities of networkers in their intensional networks leads to reactive network formation. The recommendation algorithms too. In this thesis, we propose forming a personal contact network based on the knowledge available in the various social networks. For this, we created a framework for exploring the personal knowledge network.

The proposed solution to the problem of building a strategic information system with heterogeneous information networks is composed of a *framework* that expresses and incorporates the general strategy for building, operating and evaluating this network supported by augmented intelligence artifacts for mediation and extracting knowledge from these networks.

The *framework* follows the general principles of PDCA (Plan-do-check-act), popularized by W. Edwards Deming in the 1950s, but which follows a long line of collaborations that trace their lineage back to Francis Bacon and Galileo Galilei. It is interesting to point out that our proposal emphasizes planning during the construction of the network and the analysis of the results in the evaluation for decision making.

1. Build (plan, discover *Effector Nodes*
  - (a) Design (set goals and objectives) and design the network
  - (b) choose networks and other sources of information.

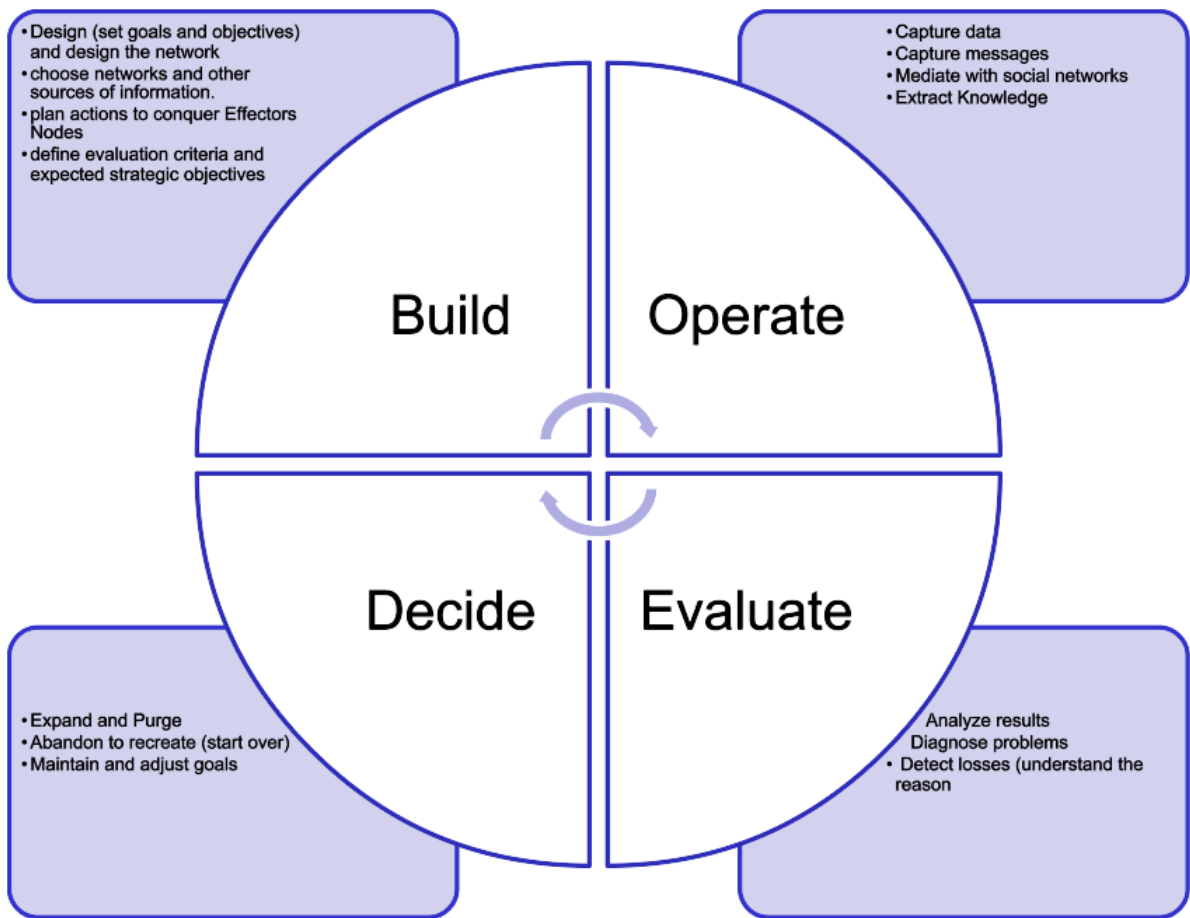


Figure 8.4: Forming Personal Knowledge Network Framework

- (c) plan actions to conquer *Effector Nodes*
  - (d) define evaluation criteria and expected strategic objectives
2. Operate
- (a) Capture data
  - (b) Capture messages
  - (c) Mediate with networks
  - (d) Extract Knowledge
3. Evaluate
- (a) Analyze results
  - (b) Detect losses (understand the reason)
  - (c) Diagnose problems
4. Decide
- (a) Expand and Purge
  - (b) Abandon to recreate (start over)
  - (c) Maintain and adjust goals

The Digital Nomad Crypto Ecosystem Context Study in section 8.3 shows the emergence of new arrangements of prosumers within knowledge economy ecosystems. In this study, we detect an opportunity to apply the Framework for Exploring Personal Knowledge Ecologies using personal knowledge networks beyond the context of digital nomads. Although this development is not within the scope of this thesis, it paves the way for further exploratory research on this topic.

# Chapter 9

## Conclusions Summary

It is convenient to start this chapter of the results and conclusions part of the thesis by recalling the objective problems and research questions that motivated this work.

1. Obtain a holistic and unified understanding of digital nomads and digital nomadism;
2. How has the COVID-19 pandemic affected digital nomads' (DN) work practices, lifestyle, and ecosystem sustainability? How have stakeholders been affected, and how have they reacted to these changes? Have new stakeholders flourished and entered the ecosystem? Have new relationships emerged? Have new behaviors developed in response?;
3. How Digital Nomads explore new prosumer Arrangements?;
4. Furthermore, How do Digital Nomads explore Personal Knowledge Networks?

These objective problems help to map the knowledge base linked to the problem to identify the contributions of the thesis. We can express these problems in a set of thesis research questions :



Table 9.1: Thesis Research Questions:

Research Questions	Description
TRQ 1	How has the Literature on Digital Nomads historically evolved? What are the main themes and issues? Is there any holistic and unified understanding of digital nomads and digital nomadism? How are the Conceptual Frameworks about nomadic working practices, lifestyle, collective culture, and personal motivation founded in Literature? How do they articulate with ground theory? How does COVID-19 emerge as an issue in Literature about Digital nomads?
TRQ 2	How do digital nomads perceive the impact of the COVID-19 pandemic on their everyday work-life space?
TRQ 3	How has the COVID-19 pandemic impacted the sustainability of the DN ecosystem?
TRQ 4	How do Digital Nomads Explore Knowledge Ecologies?

## 9.1 Thesis Outputs

### 9.1.1 Theoretical artifact's

The thesis proposes practical solutions to objective problems expressed as research questions.

The first research question (TRQ1) is about the literature review process and the theoretical understanding of the phenomenon of digital nomads: How has the Literature on Digital Nomads historically evolved? What are the main themes and issues? Is there any holistic and unified understanding of digital nomads and digital nomadism?

For this questions, the thesis delivered the following artifacts:

1. The three-layered conceptual framework digital nomadism: a holistic framework that incorporates the concepts, themes, and dimensions encountered in all conceptual frameworks found in the literature review of Digital Nomads and Nomadic Workers.
2. Three new versions of the three-layer conceptual framework of digital nomadism as a result of the theoretical articulation with the results of each of the cycles of the research contexts of the empirical study.

Chapter 3 details the construction process of the baseline version from the literature review, and Chapter 7 details the theoretical articulation with empirical study.

Regarding the second question: "How do digital nomads perceive the impact of the COVID-19 pandemic on their everyday work-life space?" The first and the second report address this question.

Concerning the third question: "How has the COVID-19 pandemic impacted the sustainability of the DN ecosystem?" The third report addresses this question.

Finally, the fourth report addresses the third question: "How do Digital Nomads Explore Knowledge Ecologies?".

The empirical study of digital nomads delivered the following artifacts :

1. The stakeholders' map of the digital nomad ecosystem in Section 8.3 (Figure 5.1)
2. Conceptualizing "how to be/ wannabe digital nomad" as a solopreneur business model;
3. The stakeholders' map of the crypto ecosystem in Section 8.3 (Figure 8.2)
4. The Forming Personal Knowledge Network Framework in Section 8.6 (Figure 8.4)

## 9.2 Publications and Future works

Table 9.2 complements the contributions mentioned above, listing the publications that were accepted or submitted during the period of production of this thesis, and that is directly related to this research

Table 9.2: Publications

<b>TRQs</b>	<b>Title</b>	<b>Forum</b>	<b>Status</b>
TRQ1 TRQ2	COVID-19 as Opportunity to Test Digital Nomad Lifestyle	CSCWD 2021	Published
TRQ1 TRQ2	Digital Nomads during the COVID-19 Pandemic: Evidence from Narratives on Reddit Discussions	CSCWD 2022	Published
TRQ1 TRQ3	The Role of Wannabes in the Digital Nomad Ecosystem in Times of Pandemic	SMC 2022	Published
TRQ1 TRQ4	Mapping Tokenomics Arrangements to Expand the Digital Nomad Ecosystem	CSCWD 2023	Accepted
TRQ4	Designing for Hybrid Intelligence: A Taxonomy and Survey of Crowd-Machine Interaction.	MDPI Applied Sciences 2023	Published
TRQ1 TRQ2 TRQ3 TRQ4	Empirical Study on Digital Nomadism: Survey, Conceptual Framework and Research Agenda	to be de- fined	Ready to submit

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