Urban Sustainability Transitions in the Global South:
Navigating (in)stabilities for Transformative Change

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This thesis is based on two published articles, one conditionally accepted article and one submitted manuscript – as presented in Chapters 2 to 5.

Jayaweera, R., Rohracher, H., Becker, A., Waibel, M., 2023. Houses of cards and concrete: (In)stability configurations and seeds of destabilisation of Phnom Penh's building regime. Geoforum, 141 (2023) 103744. ISSN 0016-7185, https://doi.org/10.1016/j.geoforum.2023.103744.

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To increase the readability of the thesis, all headings, figures, and tables have been renumbered in a consecutive manner. Anonymised passages of manuscripts were uncovered. Abbreviations and citation styles have been harmonised. References were combined in one list. A declaration of the authors' contributions is indicated in the Appendix. Layout and graphics by Ravi Jayaweera, unless otherwise stated.

Summary

Cities and their built environments play a key role in the quest for a global transformation towards sustainability. While they account for three quarters of global resource consumption and global greenhouse gas emissions, they are equally discussed as victims of climate change and loci of sustainability innovations. It is hence widely acknowledged that radical transitions towards urban sustainability are needed. The field of transitions research emerged to understand and support such processes of transformative change. This research is, however, largely limited to particular spatio-institutional contexts of Western Europe, or cases in the Global North more generally. While these indeed need to transition towards more sustainable system states, cities and urban built environments in Southern contexts, or contexts that clash with the implicit assumptions of mainstream transitions literature, are under-researched. Here, transitions are urgently needed because the rapid urbanisation and high construction activities that currently take place create long-term infrastructural and institutional lock-ins and path-dependencies. These Southern urbanization processes come hand in hand with lifestyle changes of societies with increasing incomes and emission levels that are at odds with future global sustainability. This study therefore aimed to enhance the understanding of sustainability transitions and how these can be supported in heterogeneous contexts of the Global South. Instead of simply copying Northern concepts, this thesis sought to develop approaches to better understand the complexities of socio-technical configurations of building sectors in Southern cities and ways to translate these insights into impactful tools that can support processes of transformative change towards urban sustainability. The thesis furthermore aimed at developing means of evaluation that can capture the diverse effects of transition interventions.

The study developed, firstly, a conceptual framework for the analysis of socio-technical regimes to identify the factors that stabilize the socio-technical status-quo and the factors that ingrain instability into the regime configuration before any transition processes become apparent. Particular constellations of (de)stabilizing factors are understood to create openings for transition interventions that can unlock processes of change towards sustainability. The framework was applied to the building sector of Phnom Penh, Cambodia and showed tensions and instabilities primarily within socio-cultural and economic dimensions and a dominance of stabilizing effects within the political-institutional dimension. Strongest barriers to change were not economic commitments, as others have argued, but social commitments that are associated with the neo-patrimonial and illiberal setting of Phnom Penh. Sustainability frontrunners were meanwhile found to be fragmented and marginalized.

Addressing these findings in a second step, the thesis developed a transition intervention, the Sustainable Building Arena. Adapting the Transition Management approach of transition studies

to the particular context of Phnom Penh and the identified (in)stability configuration, a specific process methodology and a set of wider principles for the contextualisation of transition interventions were developed. These involve the deliberate positioning of transition interventions to state institutions, increased sensitivity towards participant selection, temporally variegated inclusion of actors and levels of shielding safe spaces, and the invitation of those actor groups that are associated with destabilizing effects in the socio-technical system.

Being integrated into the Build4People Project, the Sustainable Building Arena and a second transition intervention, the Sustainable Building Incubator were subsequently implemented. While the assessment of effects of transition interventions is generally limited, this is especially true for one of the key aims of many interventions: the empowerment of frontrunners and change agents. In a third step, the study therefore developed a holistic understanding of empowerment in transitions that moves beyond isolated empowerment concepts. The developed framework builds on the empowerment literature within psychology, development studies, and transitions studies and considers empowerment in terms of social capital, motivation, and resource access. Changed levels within these dimensions – that can also involve *dis*empowerment –are understood to be based on the intervention design and the induced learning effects. The findings indicate that both the Arena and the Incubator created empowering environments with generally positive, albeit partially conflicting (dis)empowerment outcomes. Amongst others, the latter relate to lacking funds for the implementation of developed project ideas, and the discouraging effects for participants that did not win prizes in competition-driven programmes.

Overall, the study showed that in cities of the Global South, transition interventions that are contextualised on the basis of (in)stability configuration analysis can provide empowering spaces, but come with their own ambiguities. By reflecting on the transformative effects, such as the (dis)empowerment of frontrunners and adapting interventions accordingly, transition researchers and practitioners can seek to mitigate these ambiguities and enhance the transformative potential. The thesis thus contributes to the debates on socio-technical regimes and incumbencies, regime (de)stabilization and geographic specificity, as well as debates on transition governance, transitions in the Global South and (dis)empowerment in transition processes. Besides the contextualisation principles for transition interventions, the two conceptual frameworks for the analysis of socio-technical regimes through their (in)stability configuration, and the more nuanced study of empowerment effects, the thesis generated a range of process results: This includes co-created problem framings, visions for a “Green and liveable Phnom Penh for all”, transition strategies and transformative project ideas, five start-up ideas for a more sustainable urban built environment in Phnom Penh, as well as a network of sustainability frontrunners.

Zusammenfassung

Städte und ihre gebaute Umwelt spielen eine Schlüsselrolle bei der globalen Transformation zur Nachhaltigkeit. Sie verantworten etwa drei Viertel des weltweiten Ressourcenverbrauchs und der globalen Treibhausgasemissionen, sind aber ebenfalls Orte, an denen die Auswirkungen des Klimawandels besonders konzentriert auftreten. Es ist daher weithin anerkannt, dass radikale Transformationen zu städtischer Nachhaltigkeit notwendig sind. Das Forschungsfeld der Transformationsforschung ist entstanden, um solche Prozesse des transformativen Wandels in Richtung Nachhaltigkeit zu verstehen. Diese Forschung ist jedoch weitgehend auf spezielle räumlich-institutionelle Kontexte in Westeuropa, oder allgemein auf Fälle im Globalen Norden beschränkt. Während diese in der Tat zu nachhaltigeren Systemzuständen übergehen müssen, sind Städte und ihre gebaute Umwelt im Globalen Süden oder anderen Kontexten, die mit den impliziten Annahmen der Mainstream Transformations-literatur kollidieren, kaum erforscht. Im Globalen Süden sind Transformationen dringend erforderlich, da rasche Urbanisierungsprozesse und massive Bautätigkeit zu langfristigen infrastrukturellen und institutionellen lock-ins und Pfadabhängigkeiten führen. Sie gehen außerdem mit entsprechenden Veränderungen lokaler Lebensstile von Gesellschaften mit steigenden Einkommen und Emissionswerten einher, die der zukünftigen globalen Nachhaltigkeit zuwiderlaufen. Gleichzeitig sind es gerade diese Städte, die besonders stark von den Konsequenzen des Klimawandels betroffen sind. Ziel der vorliegenden Thesis ist daher, das Verständnis von Nachhaltigkeitstransformationen in heterogenen Kontexten des Globalen Südens zu verbessern und aufzuzeigen, wie diese unterstützt werden können. Anstatt Konzepte aus dem Norden auf den Süden zu kopieren, zielt diese Arbeit darauf ab Ansätze zu entwickeln, die die Komplexität soziotechnischer Konfigurationen von Gebäudesektoren in Städten des Südens besser verstehen lassen. Zusätzlich sollen Verfahren für die Überführung dieser Erkenntnisse in wirkungsvolle Instrumente herausgearbeitet werden, die Prozesse des transformativen Wandels hin zu urbaner Nachhaltigkeit unterstützen können; ferner sollen Mittel zur Evaluierung der Interventionen entwickelt werden, die die Vielfalt ihrer Auswirkungen erfassen und eine Grundlage für die Verbesserung der Interventionen bieten können.

In einem ersten Schritt wurde dafür ein konzeptioneller Rahmen für die Analyse sozio-technischer Regime entwickelt, um Faktoren zu identifizieren, die den sozio-technischen Status quo stabilisieren und Faktoren, die bereits Instabilität in diese Konfiguration einbringen, bevor Transformationsprozesse sichtbar werden. Es wird postuliert, dass bestimmte Konstellationen von (de)stabilisierenden Faktoren Ansatzpunkte für Interventionen schaffen, die Veränderungsprozesse hin zu mehr Nachhaltigkeit unterstützen können. Dieses Konzept wurde auf den Bausektor in Phnom Penh, Kambodscha, angewandt. Es zeigte Spannungen und

Instabilitäten vor allem in den soziokulturellen und wirtschaftlichen Dimensionen, während in der politisch-institutionellen Dimension stabilisierende Effekte dominieren. Die größten Hindernisse für nachhaltigen Wandel waren nicht wirtschaftliche Verpflichtungen, wie an anderer Stelle argumentiert wurde, sondern soziale Verpflichtungen, die mit dem neopatrimonialen und illiberalen Kontext von Phnom Penh verbunden sind. Nachhaltigkeits-pioniere sind derweil fragmentiert und marginalisiert.

In einem zweiten Schritt wurden diese Erkenntnisse aufgegriffen und in eine Transformationsintervention, die Sustainable Building Arena, überführt. Durch die Anpassung des *Transition Management* Ansatzes der Transformationsforschung an den konkreten Kontext von Phnom Penh und die dort identifizierte (In)Stabilitätskonfiguration, wurden eine spezifische Prozessmethodik und eine Reihe von weitergehenden Prinzipien für die Kontextualisierung von Transformationsinterventionen entwickelt. Diese beinhalten die bewusste Positionierung von Interventionen zu staatlichen Institutionen, eine erhöhte Sensibilität bei der Teilnehmerauswahl, eine zeitlich variierte Einbeziehung von Akteuren und Abschirmung der geschaffenen safe spaces, sowie die Integration jener Akteursgruppen, die mit destabilisierenden Effekten im sozio-technischen System assoziiert werden.

Eingebunden in das Build4People-Projekt wurden anschließend die Sustainable Building Arena und eine weitere Intervention, der Sustainable Building Incubator, in Phnom Penh umgesetzt.

Die Untersuchung der Empowerment-Effekte von Transformationsinterventionen wurde bisher vernachlässigt, obwohl Empowerment ein zentrales Ziel vieler Interventionen ist. In einem dritten Schritt wurde daher ein Konzept von Empowerment in Transformations-prozessen entwickelt, das die Vielfalt der Empowerment-Effekte integriert und damit über isolierte Empowerment-Konzepte hinausgeht. Der entwickelte Ansatz baut auf der Empowerment-Literatur in der Psychologie, der Entwicklungsforschung und der Transformationsforschung auf und betrachtet Empowerment in Bezug auf Sozialkapital, Motivation und Ressourcenzugang. Veränderungen innerhalb dieser Dimensionen – die auch *Dis*empowerment beinhalten können – werden als Folgen des Interventionsdesigns und der induzierten Lerneffekte verstanden. Die Ergebnisse zeigen, dass sowohl die Arena als auch der Incubator ein Umfeld schufen, das insgesamt positive, wenn auch teilweise widersprüchliche (Dis-)Empowerment-Ergebnisse auslöste. Letztere beziehen sich unter anderem auf fehlende Mittel für die Umsetzung entwickelter Projektideen und eine entmutigende Wirkung für Teilnehmer, die in wettbewerbsorientierten Programmen keine Preise gewannen.

Insgesamt hat die Studie gezeigt, dass Transformationsinterventionen in Städten des Globalen Südens, die auf der Grundlage der Analyse von (In)Stabilitätskonfigurationen kontextualisiert werden, empowernde Räume schaffen können, die jedoch ihre eigenen Ambivalenzen mit sich bringen. Eine reflexive Umsetzung von Interventionen, die z.B. die (Dis)empowerment-Effekte

untersucht und Interventionen entsprechend anpasst, kann diese Ambivalenzen adressieren und das transformative Potenzial der Vorhaben erhöhen.

Die Arbeit leistet damit einen Beitrag zu den Debatten über soziotechnische Regime, deren (De)Stabilisierung und geografische Spezifität, sowie zu Debatten über Transition Governance, Transformationen im Globalen Süden und (Dis)Empowerment in Transformationsprozessen. Neben den Kontextualisierungsprinzipien für Transformationsinterventionen und den beiden konzeptionellen Rahmen für die Analyse sozio-technischer Regime durch ihre (In)Stabilitäts-konfiguration und die differenziertere Untersuchung von Empowerment-Effekten von Transformationsinterventionen hat die Arbeit eine Reihe von Prozessergebnissen hervor-gebracht: Dazu gehören gemeinsam erarbeitete Problem-rahmungen, Visionen für ein "grünes und lebenswertes Phnom Penh für alle", Übergangsstrategien, transformative Projektideen, fünf Start-up-Konzepte für eine nachhaltigere städtische Bauumgebung in Phnom Penh, sowie ein Netzwerk an lokalen Nachhaltigkeitspionieren im Bau- und Stadtentwicklungssystem.

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Abbreviations

AM	Actor Mapping Workshop
B4P	Build4People Project
BMBF	Bundesministerium für Bildung und Forschung
CamGBC	Cambodian Green Building Council
CamGCGB	Cambodia's Guidelines and Certification for Green Building
CD	Co-Design Workshop
CPP	Cambodian People's Party
CSR	Corporate Social Responsibility
ESO	Entrepreneurial Support Organization
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
MLMUPC	Ministry of Land Management, Urban Planning and Construction
MOE	Ministry of Environment
NCSD	National Council for Sustainable Development
NGO	Non-Governmental Organisation
PPCA	Phnom Penh City Administration
RGC	Royal Government of Cambodia
SBI	Sustainable Building Incubator
SBA	Sustainable Building Arena
TM	Transition Management
TNC	Transnational Corporation
TT	Transition Team

PART I: Introduction

Chapter 1: Introduction

Cities, built environments and sustainability

Leaving the city centre of Phnom Penh along Preah Norodom Boulevard and National Road 2 to the southeast takes the curious observer past the National Independence Monument, the glittering facades of recently completed high-rises on and along the Koh Pich Diamond Island that was created as an artificial island in the muddy waters of the Mekong. Further down, the line of white SUVs, Tuk-Tuks and motor bikes that one necessarily travels in, passes a chain of Embassy complexes, the intimidating neo-Khmer fortresses of the Cambodian People's Party (CPP) and the Ministry of Interior as well as more high-rises from Sino-Cambodian conglomerates. Crossing over the Bassac River on the jammed National Road 2 the scene changes as one circles the bustling Psa Trey market. The busy street with phone and furniture shops, micro-finance institutions and moving barbecue stalls then finally offers an opening to escape the dust, noise and traffic in the form of the enclosed settlement of Borey Peng Huoth with its massive gates and tree-lined boulevards. It is urban developments like this expansive (and equally expensive) settlement with its private fire brigades and street cleaning services, that have mushroomed around the city's edges as residential spaces for Cambodia's new rich or new consumers and as aspirational spaces for the less affluent. Opulent mansions with white Greek columns, and extensive air-conditioned indoor spaces dominate these car-centric landscapes which used to be wetlands in which local communities were still earning their livelihoods by harvesting morning glory and other vegetables a few years ago. While some projects within the overarching development go by names such as "Star Platinum", many are framed in environmental terms, like "Eco-Melody", "Eco-Sunrise", "Eco-Romance" or "Eco-Delta". When asked about the meaning of the "eco"-prefix, a staff member impishly shared that "they want to be more ecological in the future".

The journey along this axis captures the materialization of a range of characteristics and historical developments that have shaped the city of Phnom Penh and the Kingdom of Cambodia as a whole, including the independence from French colonizers, the authoritarian grip on power of the CPP, the massive inflow of foreign capital into building projects, the conflictual rapid urban development and the opulent aesthetics of the new rich. Meanwhile, projects like "Eco-Melody" are indicative of a society being caught in-between the developmental aspirations of a population that has (finally) seen starkly rising income levels, urban growth, one of the highest GDP-growth rates after long periods of violence, and a fundamental awareness about ecological values – at least in marketing terms.

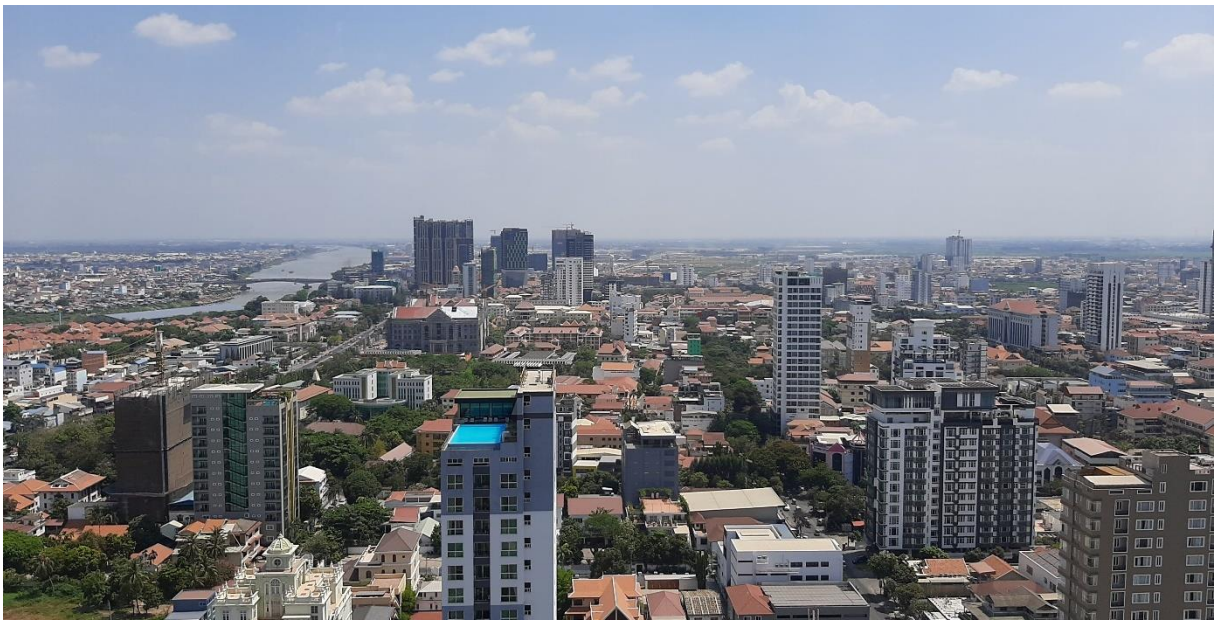


Figure 1: Building the (un)sustainable city of the future (Photo: Ravi Jayaweera).

While wetlands were filled in, bricks were burnt, concrete was mixed and the first high-rise condominiums were erected in the city centre of Phnom Penh, former Secretary-General of the United Nations Ban Ki-Moon addressed a delegation of mayors and regional authorities, arguing that "our struggle for global sustainability will be won or lost in cities" (Ki-moon, 2012). Ever since, global urban policy papers can hardly be imagined without this quote, as UN agencies echo these words (UN ESCAP, 2016; UN Habitat, no date; UNECE, 2020) just like many other actors including real estate developer Quantum AG (2023), financial firm Aviva Investors (Versey, 2018), software company Dassault Systèmes (Wu, 2021), the City of Oldenburg (Stadt Oldenburg, 2023), the Mayor of Tallinn (Kõlvart, 2023), the Inter-American Development Bank (Donovan, 2019), the European Cyclists' Federation (2016), the social movement Klimaentscheid Hamburg (2021), or TAZ commentator VORSTADT-STRIZZI (2022).

And indeed, cities do play a major role in today's sustainability challenges, as they account for 60-80% of emitted greenhouse gases, and three quarter of globally consumed resources (Nagendra et al., 2018). In an urbanizing world, cities now account for more than half of the world's population for the first time in history, leading some to consider the 21st century as the "urban century" (UN DESA, 2018; Elmqvist et al., 2019). Cities have however not only a major role as drivers of climate change, but also as spaces that are heavily – and unequally – affected by climate change and other injustices: Nine out of ten urban areas are located along coastlines, and cities are set to experience deadly heat stress, extreme rainfall events and infrastructure failures (Elmqvist et al., 2019). Urban sustainability is therefore "the dominant imperative for contemporary cities" (Hu, 2023, p. 3). Despite the potentially unifying imperative, the urban reality is diverse – with different institutional settings, local cultures, and varying socio-ecological challenges. Historically, the perspective of urban studies was however limited due to its parochial

contextual backdrop: Scholars theorized European or North-American cities as the norm, while cities outside this realm were ignored or primarily considered through developmental frames (Roy and Ong, 2011; Robinson, 2013).

It has however become increasingly clear that the cities in which the battle for sustainability will have to be won, lie to a large degree outside the Global North: With urban growth and associated building activities predicted to be located primarily in the Global South, it is for example projected that 70% of the additional building energy use demand will be from cities in so-called "developing countries" alone (Ürge-Vorsatz et al., 2015, p. 87). Others argue that it is Asian cities in particular that will be most decisive as they host the largest urban populations and most of the world's megacities while going through rapid urbanization and economic growth (Bai et al., 2010). These forecasts should however not conceal the historical responsibility for past emissions of Northern cities or Northern societies in general (Meyer and Roser, 2010; UN, 1992). Still, they highlight the urgency for a shift away from unsustainable practices that characterise the ways cities in the Global South (and beyond) are currently built, planned and operated.[1]

Current and future urbanization and construction dynamics offer a window of opportunity –or much more a window of necessity – to shift urban construction and planning practices towards sustainability before large parts of the buildings and neighbourhoods have materialised conventionally, associated obdurate infrastructures are put in place and lifestyles have changed accordingly. This thesis seeks to understand how innovative approaches can support this process of moving towards more sustainable building and urban development systems in the Global South.

Addressing the quest for transformative change towards sustainability, the field of sustainability transitions emerged over the last two decades. Sustainability transitions are conceptualized as fundamental and long-term processes of structural change of socio-technical systems towards more sustainable fulfilment of societal functions like mobility, energy or the provision of shelter. Such transitions involve the re-configuration of system elements such as policies, technologies, infrastructures, markets and user practices (Rip and Kemp, 1998; Geels, 2002). Transitions research, then, involves both an analytical part and a more normative one that seeks to actively support transition processes (Loorbach et al., 2017).

As for urban studies, the contextual backdrop of early theorizations on sustainability transitions has been the Global North (primarily Western Europe), leading to a set of implicit assumptions about social and political configurations in which transition processes are thought to evolve. This

[1] Historical emissions of countries in the Global South are marginal – Cambodia contributed only 0,01% to historical carbon emissions by 2021, while Germany for example accounts for 5,73% (Friedlingstein et al., 2022). Current development pathways in such urbanizing societies along energy- and resource-intense, highly unequal, and emission-rich lines are however at odds with sustainable global futures and could still be mitigated before long-term path-dependencies are locked in.

thesis however argues that impactful transition interventions need to be built on an appropriate analysis of given systems in the South, instead of following Northern blueprints. Sustainability transitions research therefore requires a "Southern turn" that considers the diversity of spatio-institutional contexts as a point of departure instead of the parochial environments of Western Europe (i.e. income-rich societies with rather liberal democratic traditions).

This thesis presents a humble attempt for approaching such interventions and the underlying analysis of socio-technical systems beyond the Global North and seeks to contribute in three ways: It firstly seeks to develop an analytical framework to study and understand given urban socio-technical systems in the Global South (Chapter 2), in order to lay the ground for the development of contextualised transition interventions that can influence speed and directionality of transition processes towards sustainability. Developing one such transition intervention, the Sustainable Building Arena (SBA) in Chapter 3, the thesis secondly suggests ways of contextualising transition interventions in heterogeneous settings. Reflecting on the SBA after a first implementation, thirdly, a framework is suggested in Chapter 4 for assessing the effects of implemented transition interventions. A second intervention, the Sustainable Building Incubator, is then in turn studied in Chapter 5. The remainder of this chapter offers a review of the current state of the literature on sustainability transitions research (Chapter 1.1), discusses the research aims and questions (Chapter 1.2), introduces the research project (Chapter 1.3) and the case study (Chapter 1.4), then discusses methodological considerations (Chapter 1.5) and aspects of positionality, transdisciplinarity as well as action research (Chapter 1.6).

1.1. State of Research

Sustainability Transitions

The last two decades have seen a mounting interest in so-called "sustainability transitions" by researchers, and increasingly also by policy makers and practitioners (EEA and Eionet, 2016; EEA, 2017; WBGU, 2011; Wittmayer and Hölscher, 2017; Köhler et al., 2019). Research on sustainability transitions seeks to advance the understanding of how societies can navigate complex and "wicked" sustainability challenges and transition towards more sustainable futures.

Fundamentally, sustainability transitions are conceptualized as long-term processes of structural change of societal subsystems, or socio-technical systems such as the building sector from currently dominant structures to a more sustainable system state; this involves the emergence and institutionalization of new socio-technical orders as well as processes of decline and deinstitutionalization (Köhler et al., 2019). Socio-technical systems are formed around multiple elements, including material artefacts, actor networks, markets, technologies, institutions, norms, cultural meanings, user practices and knowledge. These are understood to be interlinked and to

form temporarily stable configurations with their own path dependencies and lock-ins (Geels, 2004). Dominant configurations that represent a given status quo, are referred to as regimes. These involve "the rule-set or grammar embedded in a complex of engineering practices, production process technologies, product characteristics, skills and procedures, ways of handling relevant artefacts and persons, ways of defining problems – all of them embedded in institutions and infrastructures" (Rip and Kemp, 1998, 338).

Following the multi-level perspective in transition studies, socio-technical transitions have initially been conceptualized as the outcome of the interplay of dominant or incumbent configurations (regimes), protected spaces of innovation and emergence, so-called niches, and wider contextual factors on the so-called landscape level (Geels, 2002, 2004): Niches represent emerging socio-technical configurations where novel ideas and practices are developed. They offer a protected space for experimentation and innovation that can offer alternatives and ultimately challenge incumbent configurations. The landscape encompasses slowly-changing external structures, institutions and processes that influence socio-technical systems. They can exert pressure on regimes and open windows for niches to break through and initiate fundamental transition processes (Geels, 2002; Rip and Kemp, 1998). Transitions are thus understood to be the result of external pressures from the landscape (such as changing societal values, wars, or climatic conditions), internal incoherencies of the regime and emerging alternatives from the niche level. Though temporarily stable, the dominant configurations constantly face pressures from external trends and internal misalignments, tensions and contradictions that require incumbents to realign and engage in reproductive work (Jørgensen, 2012).

Sustainability transitions research therefore studies the interactions of stabilising factors and forces for radical change to understand stability and change of societal subsystems. While initially most research was biased towards niche-induced transition processes and associated developments of emergence, this became increasingly challenged: This work highlights regime-internal dynamics of change and incumbents as key actors for transition processes. Here, scholars started to focus more on these regime-level dynamics and processes of destabilization discontinuation and the decline of dominant orders as the "flipside" of transitions (Turnheim and Geels, 2012, 2013; Turnheim and Sovacool, 2020a; Mori, 2021). Transitions are multi-dimensional and long-term processes (Farla et al., 2012; Haan and Rotmans, 2018) that go through multiple phases (Grin et al., 2010). Here, another bias of transition studies has been a temporal one towards studies in which transition processes have started to unfold, where "change has been most destabilizing", (Martínez Arranz, 2017, p. 127) or where it has been deliberatively sought. The destabilisation perspective has been mostly applied to more advanced transition phases and the phasing out of unsustainable institutions and technologies, while regime

instabilities and their effects in earlier transition phases ("pre-development") have been much less considered. This is despite the presence of instabilities and "seeds of destabilization" across transition phases (Turnheim and Geels, 2012). Furthermore, in an open-ended future with a multitude of innovations, potential pathways and disagreement over the desirability of each of these, transitions are uncertain and contested. They are political processes with diverse actors, vested interests, power struggles, conflicts and unequal benefits for different actor groups or regions (Köhler et al., 2019; van Oers et al., 2021; Avelino et al., 2016; Haan and Rotmans, 2018). Changing power relations are therefore a key dimension of transition processes, and are now, after an initial neglect, considered an "inevitable dimension of social change and sustainability transitions" (Schipper et al., 2019, p. 2). Aspects of power relations, governance or agency are primarily discussed in the research stream on the governance of transitions, where governance refers to the interactions between (state and non-state) actors to pool resources to achieve collective goals (Wittmayer et al., 2017). While any system-level change is necessarily "enacted through the coordination and steering of many actors and resources", change processes can be based on different degrees of intentionality or emergence (Smith et al., 2005, p. 1492).

To overcome the bias towards later transition phases and a dualistic understanding of stability and change, research is needed that addresses the intrinsically connected nature of stability and change that is ingrained in regime structures in early transition phases. On that basis, contextualised transition governance approaches can then be developed.

Transition Governance

Beyond the analysis of processes of transformative change, scholars have developed approaches that seek to influence the speed and directionality of transitions towards sustainability, or "to 'steer' in the midst of uncertainty" (Frantzeskaki et al., 2018a, p. 20). These approaches primarily aim to accelerate innovation dynamics in niches while equally influencing incumbent configurations. Drawing on a range of disciplines, including complexity science, governance studies, action research and transdisciplinary sustainability research, transition scholars have developed transition governance tools like Transition Management or Strategic Niche Management (Loorbach et al., 2015; Kemp et al., 1998; Raven et al., 2010; Kemp et al., 2007; Loorbach, 2010). Such tools support the development of "solution options for sustainability problems and eventually to transform the status quo towards sustainability" (Wiek and Lang, 2016, p. 38). Transition Management aims to support transformative change of socio-technical regimes by mobilizing selection pressures against the incumbent configuration through stakeholder engagement and the support of niche activity. Key principles of Transition Management involve long-term thinking, radical incrementalism, the creation of protected spaces for frontrunners, and the co-production of knowledge (Silvestri et al., 2018).

Following a "goal-oriented governance of system innovations" (Bedtke and Gawel, 2018, p. 25), Transition Management provides collaborative fora for the empowerment of sustainability frontrunners at the science-policy-business interface: It involves four levels of intrinsically connected activities, including a strategic level (convening of frontrunners in a transition arena to create a vision), a tactical level (development of a transition agenda on the basis of the developed vision), an operational level (support of transition experiments), and a reflexive level (monitoring and evaluation of outcomes) (Patterson et al., 2017). Here, frontrunners are understood as sustainability-driven and visionary individuals who hold innovative ideas and who are understood to have the potential to influence change (Hölscher et al., 2019; Nevens et al., 2013). Managing transitions via Transition Management thus does not refer to a top-down command and control management from a "policy cockpit" (Stirling, 2019, p. 16), but the creation of a space for collaboration and empowerment that seeks to support transition processes (Rotmans and Kemp, 2008). Having focussed on societal systems (primarily as sectors) initially, transition studies scholars, started applying Transition Management to spatial units such as cities. This has led to the proliferation of urban living labs or urban transition labs. Transition Management in cities is considered to be shaped by the personal, geographic and institutional dimensions of proximity as well as the interactions between the city level and other scales and domains (Frantzeskaki et al., 2018b; Hölscher et al., 2018; Frantzeskaki et al., 2018c; Roorda et al., 2014).

Though empowerment of frontrunners is a key tenet of Transition Management, its conceptualization and the evaluation of actual transition interventions is limited: While it is acknowledged that empowerment effects are diverse, no holistic frameworks exist to uncover the diversity of empowerment effects. To adequately capture these, encompassing or holistic frameworks are needed for their analysis. It is necessary to study the empowerment outcomes of interventions across heterogeneous contexts to improve interventions and increase their transformative potential.

Sustainability Transitions in the Global South

While a vibrant literature corpus developed around sustainability transitions and transition governance mechanisms in the early 2000s, little consideration was paid to the spatiality of transition processes, as most studies followed an implicit methodological nationalism (Coenen et al., 2012; Binz et al., 2020). Geographers contributed to the emerging research on transitions and emphasized the spatiality of transitions processes: Noting that transitions are spatial processes that unfold unevenly across places and space, scholars have been studying spatial variance and territorial embeddedness of transition processes (Bergek et al., 2015; Strambach and Pflitsch, 2020; Fastenrath and Braun, 2018a), the spatial relations between and within space and places,

as well as the multi-scalarity of transition processes (Hansen and Coenen, 2015; Coenen et al., 2012; Späth and Rohracher, 2012; Binz et al., 2020; Miörner and Binz, 2021; Truffer et al., 2015; Raven et al., 2012). In this regard, place-specific factors, such as localized (informal) institutions and networks, particular consumer demands, and spatial variations of regime formations that lead to place-specific transition processes have been discussed (van Welie et al., 2018; Fastenrath and Braun, 2018b). These considerations gave rise to the discussions on transition processes in cities and of cities, as well as those in the so-called "Global South" or the so-called "developing world" (Hansen et al., 2018; Wieczorek, 2018).

While the literature discusses the "Global South" (Burch et al., 2018; Feola, 2019; Ghosh et al., 2021; Larbi et al., 2021b; Pereira et al., 2020; Novalia et al., 2020; Raj et al., 2022; Schipper et al., 2019), "low-income countries" (van Welie and Romijn, 2018; van Welie et al., 2018), or "developing countries"/"developing world" (Noboa et al., 2018; Poustie et al., 2016; Rogers et al., 2012; Ramos-Mejía et al., 2018; Jain et al., 2017; Hansen et al., 2018; Pant et al., 2015; Mutoko et al., 2014; Wieczorek, 2018), we refer to the Global South in two ways: Firstly, for certain world regions that were "subject to the intersectional stratification and violence" of European colonialism (Arora and Stirling, 2023, p. 1) that are now characterised by a diversity of ontologies and epistemologies and in many cases by unequal access to basic services (Ghosh et al., 2021).[2] Secondly, and analogue to urban studies, where the "Global South" is associated with a "Southern Turn" (Lawhon and Truelove, 2020; Sheppard et al., 2013), the term can be invoked to highlight the "long-term parochialism in the formation of [transition] theory" in order to underline the "need to consider a broader multiplicity of places, histories, and processes" for theorization (Simone, 2020, pp. 604–605). It can thus be used as a short-hand for settings outside the "ordinary contexts" to highlight diversity and heterogeneity; it challenges the Eurocentrism of transition studies that assumes liberal-democratic societies with participatory histories as the norm. It is widely acknowledged that transition research was "initially developed in and applied to developed, Western European economies" (Coenen et al., 2012, p. 105), while later on facing the need to move towards "developing and emerging economies", or "to new parts of the world" (Coenen et al., 2012, p. 105). In fact, Loorbach et al. (2017, p. 619) consider "translating research to developing contexts" to be "[o]ne of the main challenges" for transitions research. It became increasingly noted by scholars that transition approaches implicitly assume contextual characteristics of Western Europe (or the Global North), including the prevalence of market mechanisms, or particular governance arrangements (Feola, 2019; Kenis et al., 2016). Noboa and Upham (2018) meanwhile argue that "little attention has been paid to the limitations of these

[2] This spatial reading however becomes blurred when following Sparke's understanding of the Global South at the "intersection of entangled political geographies of dispossession and repossession" as it can then be located "everywhere but also always somewhere" (Sparke 2007: 117 in Roy, 2016, p. 207).

frameworks for understanding change in developing country contexts, authoritarian regimes, or where countries exhibit a mix of both well- and ill-functioning institutions" (Noboa and Upham, 2018, p. 118).

In the emerging transition literature on and from the Global South, scholars discuss a series of conditions that influence the local unfolding of transition processes: Some have highlighted the greater heterogeneity of socio-technical regimes in Southern contexts (Hansen et al., 2018; Wieczorek, 2018; van Welie et al., 2018). They hence call for the consideration of splintered regimes or the plurality of practices. Such heterogeneity affects particular pathways of change towards sustainability, opening up some, closing down others. The implicit assumptions of the Northern template however considers regimes to be socio-culturally and economically rather homogeneous, stable, formalized, standardized, centralized and [formed by] strong institutions and markets (Wieczorek, 2018; van Welie et al., 2018; Silvestri et al., 2018).

Besides heterogeneity, scholars discuss a range of characteristic conditions for the Global South, including ill-functioning and clientelist institutions, poverty, weak, failing or predatory states, low regulatory enforcement, informalities, external dependencies (donors, knowledge, finance capital, technology), and short-term development objectives (Wieczorek, 2018; Hansen et al., 2018; Hamann and April, 2013; Lawhon and Murphy, 2012). Another frequently invoked aspect is the relation between formal and informal institutions. Here, it is argued that informal institutions have a much larger influence on regimes and transitional processes than in the Global North. Feola (2019) posits that these informal institutions tend to be informed by "traditional" principles and ontologies". Other aspects involve stark inequalities, histories of violent resource extraction as well as institutional mismatches between post-colonial political structures and previously existing institutions and practices (Pereira et al., 2020). Though these characteristics might indeed heavily influence the unfolding of transitions in diverse ways, these readings increase the risk that transition scholars repeat the orientalisation of "the Global South" as the dysfunctional and undemocratic "other", thus reproducing the North/West as orderly and advanced and the Global South as backwards and lagging; hereby, "erstwhile colonies may yet again be placed in the 'savage slot' of colonial modernity" (Arora and Stirling, 2023, p. 3). Instead of essentialising the Global South and creating orientalising dichotomies along North/South, liberal/illiberal, functional/dysfunctional divides (Luger, 2020), we suggest to follow Ramos-Mejía et al. (2018) and Arora and Stirling (2023) to consider the historically grown contextual conditions as threads of a woven fabric, or as pockets of ill- or well-functioning institutions; political-institutional characteristics thus overlap, interact and form contextual assemblages (see Chapter 2). Contextual characteristics like illiberalism or weak states are thus not to be treated as generalisations across the Global South, but as part of contextual assemblages that might be influential in different forms and degrees within Southern contexts and beyond – with different

weaving patters and unequal densities of illiberal threads. We can hereby equally acknowledge illiberal tendencies or informality in the North, and pockets of particularly well-functioning institutions in the Global South.

Furthermore, it should not be forgotten that many countries in the Global South are leading in sustainable living and social solidarity, while having lower emissions and resource consumption levels (Ghosh et al., 2021; Hickel, 2020). Also, it should be highlighted that it was colonial violence, or "colonial relations of pillage and violence" that served as the basis for the concentration of privileges in the Global North (Arora and Stirling, 2023, p. 3). Such historical injustices and present systems of oppression and exploitation have led to calls for just transitions that seek both ecological goals and socio-economic development including inequality reductions (Swilling et al., 2016). These include questions on equity and justice and trade-offs between different groups of current and future generations (Newell and Mulvaney, 2013; Swilling et al., 2016; Cai, 2019; Onsongo and Schot, 2017). It is also important to note that colonial continuities or "colonial history" (Ghosh et al., 2021) is not limited to the Global South as the former colonized regions, but that, in fact, it is the historical heartlands of transitions studies, the Netherlands and the United Kingdom, that have a violent colonial history themselves as the imperialist centres of two of the largest colonial empires. Uncovering coloniality and how it is "woven" into current socio-technical systems should therefore not be limited to the South (Arora and Stirling, 2023). Still, aforementioned conditions like state capture, corruption, or illiberalism arguably tend to overlap to a larger degree in the Global South (World Justice Project, 2022; Freedom House, 2023; Murakami Wood, 2017; Lawreniuk, 2020). Transition scholars have connected such conditions like weaker state institutions with lower regulatory enforcement, or less stable economic and political conditions to higher instability of socio-technical regimes (Ramos-Mejía et al., 2018; Feola, 2019). In this vain, Berkhout et al. claim that less "economic and political commitments to incumbent socio-technical regimes" must be overcome in the Global South (2009, p. 223). While these instabilities would be expected to be drivers of transition processes, socio-technical regime change and niche development, others found that niche actors can actually be too fragmented to coordinate necessary activities (Hansen et al., 2018). It is also contrasted by opposing claims of Noboa et al. (2018) who argue that regime stability can actually be increased through rather illiberal contexts, weak or captured state institutions in the Global South. Here, they posit, incumbents are in a position to address emerging threats "with a severe response" (Noboa et al., 2018, p. 3). Given these diverse views, research is needed that explores the (in)stability of dominant configurations in Southern settings with illiberal tendencies and develops contextualised intervention strategies.

Transition Interventions in the Global South

Only few transition interventions have been implemented and discussed in Southern contexts (van Welie and Romijn, 2018; Poustie et al., 2016; Noboa et al., 2018). Transition Management as a key form of transition interventions has even been criticized for being Euro-centric, lacking contextual considerations, or being "devoid of the sense of place and space" (Pant et al., 2015, p. 210). At the same time, non-reflective transition initiatives in the Global South arguably "risk the reproduction of Western ideals of progress and modernity and might be perceived as a new form of colonisation" (Feola, 2019, p. 5).

First attempts have however been made to apply Transition Management with conceptual adjustments: Here, scholars question whether states can play an active role in supporting socio-technical niches or other transition initiatives in the case of weak, failing or predatory states, or in contexts with limited statehood, or low capabilities to enforce rules, or provide public services (Hamann and April, 2013; Lawhon and Murphy, 2012). Others highlight the importance of safe spaces in the Global South (Pereira et al., 2020; Pereira et al., 2015), or the need to address the heterogeneity and plurality of practices (van Welie et al., 2018). Noboa and Upham (2018) develop transdisciplinary Transition Management to unleash innovative and transformative potential due to its relative protection from outside pressures and the rigid hierarchies often present in illiberal democratic contexts. Here, the focus is laid on informal fora, the building of coalitions and the co-development of knowledge and capacities. Sympathetically acknowledging these first attempts of implementing and adapting Transition Management in Southern contexts, there remains a lot to uncover, including how transition intervention designs can be adapted to particular settings with illiberal or patrimonial characteristics, and in which ways such interventions actually succeed in supporting transition processes. Importantly, discussing the characteristics of transition processes in diverse Southern contexts is not only relevant for the support of transitions in these settings but useful for the advancement of transition studies more generally (Wieners et al., 2015; van Welie et al., 2018).

Urban Built Environments in the Global South

With increased considerations of spatiality, transition scholars also applied concepts to spatial units like cities to study urban transformations, or urban sustainability transitions. Urban transformations are considered to be multi-level and multi-scalar, i.e. span across governance levels (Ehnert et al., 2018), across the levels of transitions' multi-level perspective (Geels, 2002) and across spatial scales (Späth and Rohracher, 2012; Nevens et al., 2013). When considering urban sustainability transitions, contradictions or alignments between socio-technical regimes and their priorities and those of urban or territorial systems are of interest. At the same time, the

analysis should not be limited to the urban sphere. Instead, given the permeable, and multi-scalar relations of socio-technical systems, the local or urban level can rather be seen as a starting point in the search for the spatiality and heterogeneity of dominant socio-technical configurations (Affolderbach and Schulz, 2018b; Binz et al., 2020).

Besides being nodes in multi-scalar networks, and concentrations of people, cities are characterised by their buildings and their built-up space. Besides its bias towards the Global North and later transition phases, transition literature also has a sectoral bias towards energy and mobility. This leaves others, such as the urban building sector under-researched even though they have significant environmental (and social) impacts (Fastenrath and Braun, 2018b; Affolderbach and Schulz, 2018b; Truffer et al., 2022). Research studying urban sustainability transition processes of Southern building systems and supportive transition governance tools are still lacking entirely[3]. This is despite the fact that sustainable (or "green") buildings have been identified as "one of the most significant, cheapest and fastest approaches to reduce greenhouse gas emissions at the local scale" (Preller et al., 2017, pp. 217–218; OECD and IEA, 2013; UNEP and Global ABC, 2016).

The building sector and the wider urban built environment is a particularly important case for system innovation, as it is not only very emission- and resource-intensive, but because it locks in resources, capital, and social practices for decades if not centuries. As illustrated in Figure 2, buildings and associated urban built environments tend to outlive other material artefacts by decades. Unlike in other historical transition cases, innovations in the building sector coexist over extended periods with previous ones (Næss and Vogel, 2012). Also, the way the city, its homes and work places are planned and constructed heavily influence lifestyles and practices across socio-technical systems. The socio-technical system of the building sector meanwhile stretches from the granular level of building materials (Jamieson et al., 2021), to individual buildings, the building practices and imaginaries of individuals and groups (Durdyev et al., 2018), neighbourhood level building projects (Percival, 2017), city-wide plans and processes (Springer, 2017a; GGGI et al., 2019), over national level policies, projects and political configurations (Springer, 2016; Springer, 2017b), all the way to transnational firms, supply chains, and flows of capital, ideas, trends and policies (Nam, 2012, 2017b; Percival and Waley, 2012; Baird, 2014). The building industry is conventionally considered to have low degrees of innovation, or long innovation cycles and mass production, while being shaped by high levels of labour intensity and regionalism, and a separation of design and construction (Rohracher, 2001; Ryghaug and Sørensen, 2009; Pacheco-Torgal, 2017). Meanwhile, it must be noted that sustainability

[3] The only studies known to the author that cover Southern building regimes are those conducted by Jain et al. (2017) and Jain et al. (2020). These stay however on the analytical level and do not develop and evaluate transition intervention tools.

transitions of the building system are far from limited to questions of better technological solutions; instead they need to challenge "the social embedding and the socially interactive process of designing, constructing and using buildings" (Rohracher, 2001, p. 139; Moore and Doyon, 2023). In this study, “sustainable building” is not understood as a coherent and monolithic sector but as a multiplicity of approaches. It is highly disputed what falls into this category exactly. Here, we follow O'Neill and Gibbs (2014) and treat it as a relative concept. Different approaches can then be conceptualized as series of niches within an overarching sustainable building niche. In contrast to O'Neill and Gibbs (2014) we however include the reduction of environmental impacts of the planning, construction and operation of buildings and their negative social impacts in our understanding of sustainable building.

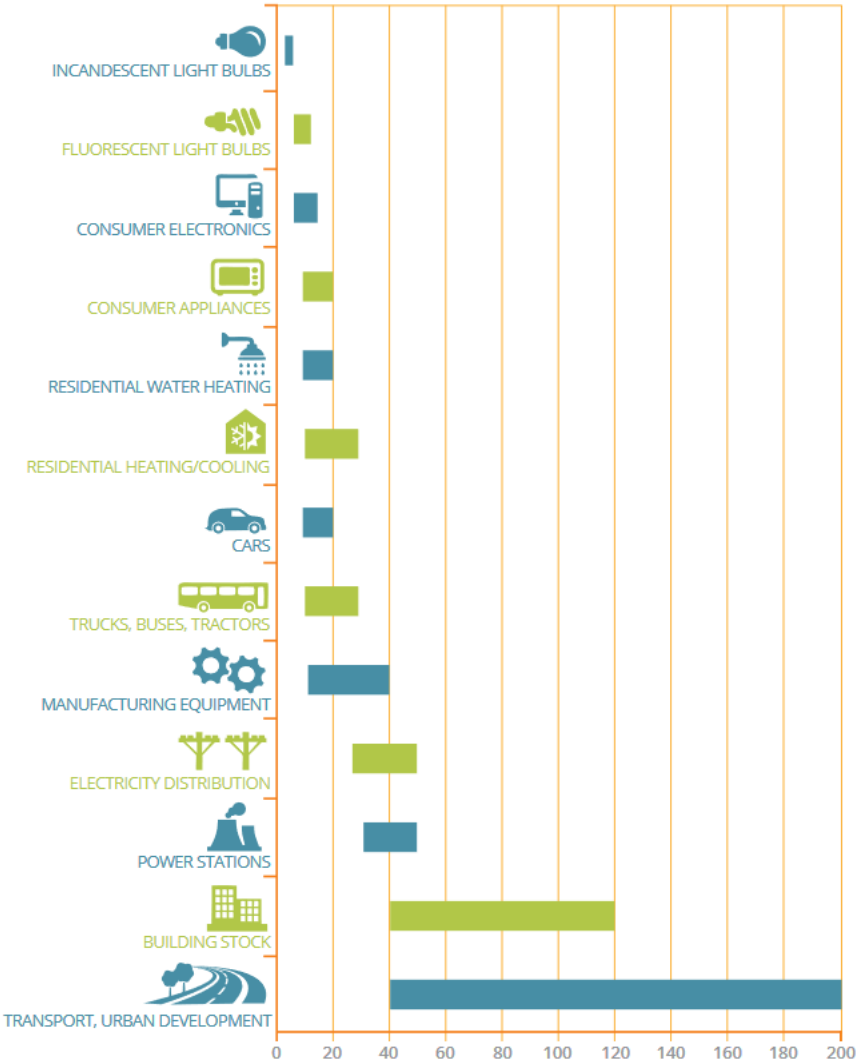


Figure 2: Average lifespans for selected capital stock (Source: EEA and Eionet, 2016, p. 24).

In Southern settings, building sectors are often set in rapidly urbanizing contexts with high urban population growth, construction activities, and low levels of regulation and its enforcement. In Northern settings, in contrast, urban growth tends to be relatively low, building energy demand is projected to stagnate, the majority of the future building stock already exists, and regulatory

levels are rather high (Ürge-Vorsatz et al., 2015). The largest part of future construction activity and building energy demand growth will, like other sustainability impacts, therefore be associated with the Global South. Hence, building transitions in the Global North revolve around a shift from quantity (growth and comfort) to quality (liveability and sustainability) (Loorbach, 2017), while building transitions in settings with high population and floor space demand growth require a shift towards a system offering both quantity and quality.

In short, intense building activities currently take place and are projected to further intensify in rapidly urbanizing societies in the Global South. These have major sustainability implications. This dynamism presents a quickly closing window of opportunity to transition to long-term urban sustainability in these regions. To make use of it, the ways buildings and urban built environments are designed, constructed and operated urgently need to be transformed.

Sustainability transitions research presents itself as a useful frame to approach this formidable task (Noboa and Upham, 2018). Urban sustainability transitions of building systems in the Global South are both spatially and sectorally understudied in the literature. The rapidly urbanizing contexts in the Global South differ strongly from the "parochial" historic backdrop for the development of models and theory in transitions research. Existing knowledge on regime characteristics in heterogeneous contexts is widely insufficient. This includes a limited understanding of contextual relations and dynamics that (de)stabilize dominant configurations in Southern contexts.

Transitions research is furthermore biased towards later transition phases in which transitions "take off" or where change has been deliberatively sought. It does thus not adequately capture ingrained and ever-present instabilities in predevelopment phases. It is therefore relevant to understand characteristics of dominant socio-technical configurations in such contexts that undergo rapid urbanization, or intensified construction activities – which are predominantly in the Global South and often also in contexts with illiberal tendencies.

The transition governance approaches that were developed on the limited analytical basis of Northern contexts, are consequently equally "parochial". As transition governance interventions however need to match given socio-technical systems, the analysis of (de)stabilising effects and seeds of destabilization should be connected to the development of contextualised governance strategies. Hence, contextualised transition interventions could be developed that account for particular spatio-institutional characteristics of heterogeneous contexts that clash with Northern assumptions, be they Southern, illiberal, informal, patrimonial, or related to state capture.

Furthermore, such interventions, then, need to be evaluated for their transformative effects during and after implementation in order to adjust the approaches and improve their transformative potential for other applications. In this regard, the empowerment of frontrunners

requires scholarly scrutiny, as it is a key goal of transition interventions that is yet under-conceptualized and empirically under-researched. Here, a holistic framework is needed that is able to capture the diversity of (dis)empowerment effects, and that can be applied to diverse cases. In the following, we will delineate how the thesis seeks to address these gaps in the literature.

1.2. Research Aim & Research Questions

The study follows the overarching aim to enhance the understanding of sustainability transitions and how these can be supported in heterogeneous contexts of the Global South. While such contexts can involve characteristics of illiberalism, state capture or a higher share of ill-functioning institutions, the Global South shall not be understood as a homogeneous space constituted by backward institutions; instead it refers to heterogeneity, difference, and the multiplicity of spatio-institutional settings that can be inconsistent with the assumptions of transitions studies. The study therefore seeks (a) to develop a more nuanced understanding of regime configurations, (b) to conceptualize contextualised transition interventions on that improved analytical basis, and (c) to evaluate the implemented interventions in a way that accounts for the diversity of empowerment effects.

To this end, the aim is firstly to develop a conceptual framework that allows to uncover previously neglected characteristics of socio-technical regimes in Southern contexts. This framework shall be able to identify factors that stabilize the socio-technical status-quo and those factors that already ingrain instability into this configuration before a transition actually "takes off". Particular constellations of (de)stabilizing factors can create openings for transition interventions that can unlock processes of change towards sustainability. To test the framework, it will be applied to the case of Phnom Penh's building system. This shall lead to the characterisation of its (in)stability configuration and ingrained seeds of destabilization.

On that basis, the study, secondly, aims to conceptualize a contextualised transition intervention that productively addresses the identified (in)stability configuration to support transformative change towards sustainability. Given the embeddedness of the thesis into a wider research project (Build4People, see next chapter), it has been possible to directly implement the developed interventions.

Hence, thirdly, the thesis will evaluate transformative effects of the transition intervention in order to adjust the approach and improve its transformative potential. To that end, the study focuses on the empowerment effects and aims to develop a holistic understanding of empowerment in transitions that integrates the diversity of empowerment effects and moves

beyond isolated empowerment concepts. The developed empowerment framework will then be applied to study the effects of a second transition intervention that was developed and implemented in the project context on the basis of the initial regime analysis.

The thesis thus contributes to the debates on regimes and incumbencies, (in)stability of dominant socio-technical configurations and their geographic specificity, debates on transition governance, transitions in cities of the Global South and finally on empowerment in transition processes. Besides these scientific aims and contributions, the thesis and its underlying action research elements seek to (co-)create knowledge, empower sustainability frontrunners and hereby support transformative change towards sustainability. Guided by these research aims, the study addresses the overarching research question:

How can an analysis of regime (in)stability configurations contribute to a better understanding of urban sustainability transition dynamics in the Global South and a more effective design of transition interventions?

The guiding research questions hence are the following:

(1) How can the dynamics of socio-technical regime change be explained by analysing constellations of (in)stability?
(2) How can strategies of transition governance be adapted to contexts of the Global South?
(3) How can transition interventions in the Global South support the empowerment of sustainability frontrunners?

In the following, the case study and the project context of the thesis will be introduced.

1.3. Project Context

The thesis was developed in the context of the BMBF-funded "Build4People" Project (B4P). The Cambodian-German cooperation started in 2019 with the overall aim to "support and analyse the transformative shift in Phnom Penh's current business-as-usual urban development pathway towards a pathway with higher sustainability and liveability levels" (Waibel et al., 2020, p. 201). Conceptualized as a transdisciplinary project, Buil4People encompasses team members from four universities, an urban planning office and an urban climate research institute from the German side[4], and four Cambodian universities[5], the Cambodian Institute of Urban Studies as well as the

[4] University of Hamburg, University of Magdeburg, Technical University Lübeck (previously University of Stuttgart), Eberswalde University for Sustainable Development, Eble Messerschmidt Partner, INKEK – Institut für Klima- und Energiekonzepte GmbH
[5] Royal University of Phnom Penh, Institute of Technology of Cambodia, Paññāsāstra University of Cambodia, Royal University of Agriculture

Phnom Penh Capital Administration as core partners. To address current urban development trends, the Cambodian-German team approaches urban sustainability in the building sector from six different thematic angles, or work packages, namely "Behaviour Change", "Sustainable Building", "Sustainable Neighbourhoods", "Urban Green", "Urban Climate", "Sustainable Urban Transformation" (see Figure 3). Each of these are covered by a Cambodian-German tandem. The corresponding disciplinary background of the project staff include environmental psychology, civil engineering, urban planning, remote sensing, urban climatology, urban geography and transition studies. The present thesis was written within the project component "Sustainable Urban Transformation" which is based on a cooperation of the Royal University of Phnom Penh and the University of Hamburg.

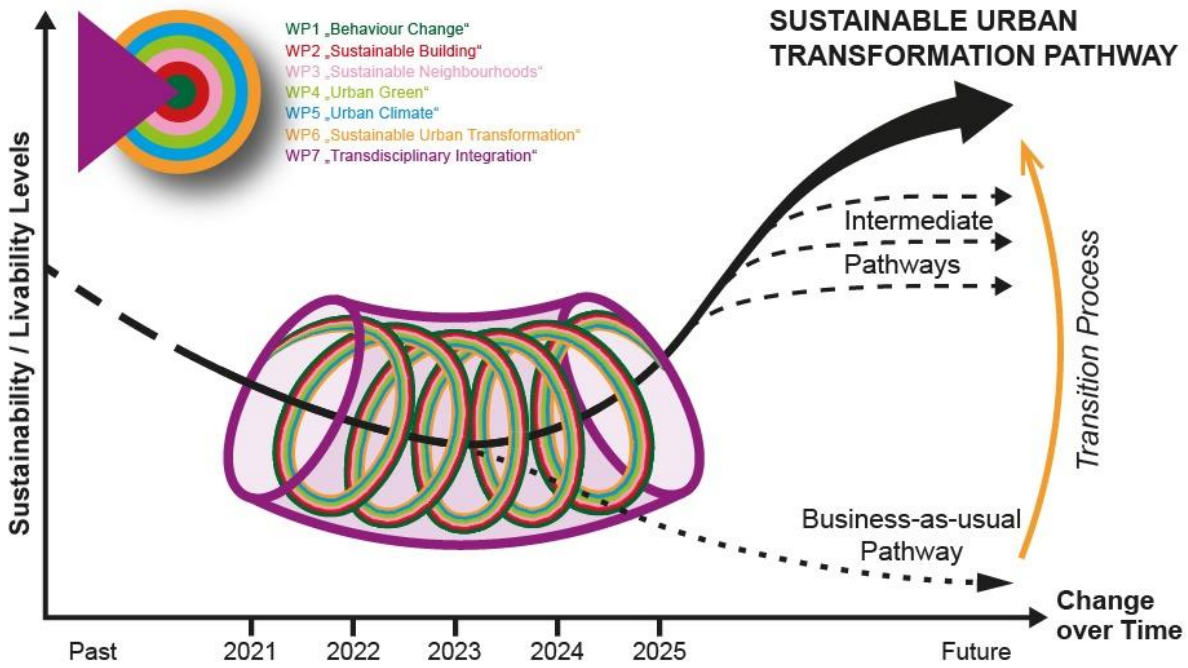


Figure 3: Overall aim of the Build4People Project (Source: Waibel et al., 2020, p. 214).

Following a transdisciplinary design, the B4P project involves three overlapping spheres of "(1) societal and scientific problem-based research; (2) transdisciplinary action research and (3) reflection, refinement & re-integration of created knowledge" (Waibel et al., 2020, pp. 215–216). These will be discussed further in the part on the research methods as far as they concern the thesis (Chapter 1.5).

1.4. Phnom Penh as Case Study

The embeddedness of the thesis in the B4P Project offered privileged access to actors in Phnom Penh and the possibility to actually implement conceptualized transition interventions. As a fast-growing (capital) city of a formerly colonized space (Protectorat du Cambodge) with strongly contrasting institutional characteristics to the more conventional cases in the Global North, it is

an excellent case for the analysis of regime configurations and transition pathways in heterogeneous contexts of the Global South. Even though sustainability transition scholars did not consider Cambodia yet, its recent history has in fact been framed as a "Triple Transition" by others: This "Triple Transition" includes the ambivalent and incomplete shifts "from armed conflict to peace, from political authoritarianism to liberal democracy, and from a socialist economic system to a market-driven capitalist one" (Brickell, 2020, p. 1). These processes are associated with the developments since the early 1990s, and its reform processes as well as the first elections after the Cambodian Genocide and extended periods of violent conflict (Hughes and Un, 2011a). Guided by the United Nations Transitional Authority of Cambodia, the predominantly neoliberal reforms were then translated by local elites, hybridized, or became only partially implemented (Hasselkog, 2009). This led to a political-economic system of "Neoliberalism with Cambodian characteristics", i.e. a patronage system where local elites have been able to preserve a "discretionary arena within a shadow state for political horse-trading amongst former adversaries" (Hughes and Un, 2011b, p. 4) that allows for rent seeking and the stripping of public resources (Springer, 2017b). Besides the extraction of natural resources such as timber (Un and So, 2009), it is the built environment sector that offers one of the most lucrative rent-seeking possibilities in Cambodia (Nam, 2017a). Following the Khmer Rouge urbicide that killed city life and emptied the capital of its inhabitants (Tyner et al., 2014), the appropriation of buildings and land during Phnom Penh's repopulation process of the 1980s/90s was based on informal links. Political elites could distribute land and buildings in exchange for political support. This process of exchanging rent-seeking opportunities like land, building permits, etc. in exchange for loyalty and political support is commonly discussed as (neo-)patrimonial: That is, a system where power is exercised "through networks of patron-clientelism" which is blurred with "legal-rational systems" (Eng, 2014, p. 70; Turner, 2013; Vuković and Babović, 2018; Chandler, 2007; Verver and Wieczorek, 2007).

Besides neo-patrimonialism, authors have discussed Cambodia amongst others as an authoritarian and illiberal setting (McCarthy and Un, 2017a, see also Table 1). Many of these studies highlight the limitations in the rule of law, civic space, democratic freedoms, transparency, participation, or accountability to the general public. Having repeatedly excluded main opposition parties from contesting in elections, closing down the last remaining critical news outlets and jailing activists, the Kingdom is ranked 139th out of 140 countries in the global Rule of Law Index 2022, just ahead of Venezuela and behind Afghanistan (World Justice Project, 2022). The creation of development alternatives has proven difficult in such a setting in which authoritarian regimes "crackdown on emancipatory spaces" (Beban et al., 2020, p. 95).

Neo-Patrimonial (Vuković and Babović, 2018; Eng, 2014; Hughes and Un, 2011; Kimchoeun et al., 2007; Kimura, 2020; Morgenbesser, 2017; Un and So, 2011)
Authoritarian (Lawreniuk, 2020; Beban et al., 2020; Springer, 2017; Un, 2019)
Authoritarian Neoliberalism (Lawreniuk, 2020)
Neoliberalism with Cambodian characteristics, i.e. "nepoliberalism" (Springer, 2017b, p. 244), **"political oligarchy"** (Mialhe et al., 2019)
Sultanism, Political Capitalism (Bafoil 2014)
Illiberal (McCarthy and Un, 2017)
Neoliberal (Springer, 2013, 2011, 2017; Brickell, 2020; Flower, 2019; Lawreniuk, 2020; Louth, 2015; Sokphea, 2017)
Post-Conflict (Öjendal and Lilja, 2009; Biddulph and Williams, 2017; Eng, 2014; Hughes and Un, 2011; Kim, 2012; Chann, 2020)
Weak state (Cashore and Nathan, 2020)
Post-transitional/Transition economy (Cheong Tang and Wong, 2011; Ouyang et al., 2016; Springer, 2010, 2009)
Global South (Urban et al., 2015; Paling, 2012b; Cashore and Nathan, 2020)
Postcolonial (Backhaus, 2020; Nam, 2020)
Developing Country (Calabrese and Cao, 2020; Durdyev et al., 2018)
Lower-middle income country (Ly, 2016)
Asian (Nam, 2017; Öjendal and Lilja, 2009; Paling, 2012a; Percival and Waley, 2012; Turner, 2013), **or Southeast Asian** (Kolnberger, 2013; Louth, 2015; Mialhe et al., 2019)
Developmental state (Hughes and Un, 2011)
Potemkin Democracy (Strangio, 2020)

Table 1: Applied contextual framings for Cambodia.

Driven by a rapidly urbanising Cambodian society, increasing GDP and disposable income levels and the growth-oriented "neoliberalism with Cambodian characteristics", Phnom Penh has seen a spectacular development over the last decades: This is discussed as a "construction boom", a "vertical drive for global city status" (Jamieson et al., 2021), or "speculative urbanism" (Nam, 2012). The city is hence reported to have had the strongest increase in land prices in Southeast Asia since 2000 (Nam, 2017b). The building sector saw annual growth of 17% between 2006 and 2016. It has been the largest contributor to national GDP growth in recent years and attracted most of the foreign direct investments towards Cambodia (World Bank Group, 2020). These processes have primarily materialized in Phnom Penh, that houses more than half of Cambodia's urban population with its more than 2 million inhabitants (NIS, 2019; World Bank Group, 2019). Between 1990 and 2015, its built-up and development areas increased from 4,000 to 25,000 ha (Mialhe et al., 2019). Driven by private investment, this process followed informal and privatised planning logics, while the masterplan is largely left unenforced (Percival, 2017). State actors still hold a crucial role by creating a conducive environment for investments and securing the appropriation of land in what Shatkin (2017, p. 25) considers a "state facilitated land development", which overlaps with the private business interests of the political elites (Paling, 2012). As many projects involve the infilling of wetlands, the dispossession of marginalised communities or ambiguous land rights, large projects require the support from political elites and are based on individually negotiated relationships between developer and state (Nam, 2017a; Paling, 2012). Many projects involve joint ventures of Cambodian and foreign firms and the

development of high-rises in the city centre, “boreys” (private residential compounds) or entire satellite cities at Phnom Penh’s peri-urban fringe (Mialhe et al., 2019; Fauveaud, 2015).

As in other rapidly growing cities, building activities drive demand for emission-intensive building materials such as cement, bricks, steel as well as for sand, energy, land and cheap labour. According to a study by Durdyev et al. (2018) practitioners have low awareness of sustainability. Nevertheless, a handful of buildings in Phnom Penh have been certified as green or sustainable by international standards (USGBC, 2022). In cooperation with donor agencies, the Royal Government of Cambodia (RGC) has passed the “Phnom Penh Green City Strategic Plan” and established technical working groups on sustainable buildings and sustainable cities. The former is tasked to develop a Cambodian tool for green building certifications. An industry-led body, the Cambodian Green Building Council (CamGBC), was institutionalised with the same goal.

Given these spatio-institutional characteristics and the dynamic context with spectacular levels of building activities with long-term lock-ins, Phnom Penh provides an excellent setting for the study of urban sustainability transitions of building systems in heterogeneous contexts of the Global South.

1.5. Research Methods & Data Collection

To realize its research aims, the thesis follows an embedded case study approach: The building system of Phnom Penh serves as the larger case, the (in)stability configuration of the regime and two transition governance interventions targeting the building system form its subcases (Scholz and Tietje, 2002). Case study research has shown its value in creating in-depth knowledge about empirical phenomena and the theorisation of underlying processes. It allows for the explanation of context-specific dynamics, while leaving room for the careful development of theories that can be tested and further refined in other contexts (Flyvbjerg, 2006). The study integrates both qualitative and quantitative data and methods and involves what is discussed as “transdisciplinary action research”, or “action research for sustainability” as well as more “conventional”, or “descriptive-analytical” research (Wittmayer and Schäpke, 2014). Different steps of the research process draw on their own combinations of research approaches, including semi-structured expert interviews, document analysis, participant observations, surveys, literature reviews and the analysis of workshop outputs (see Figure 4).

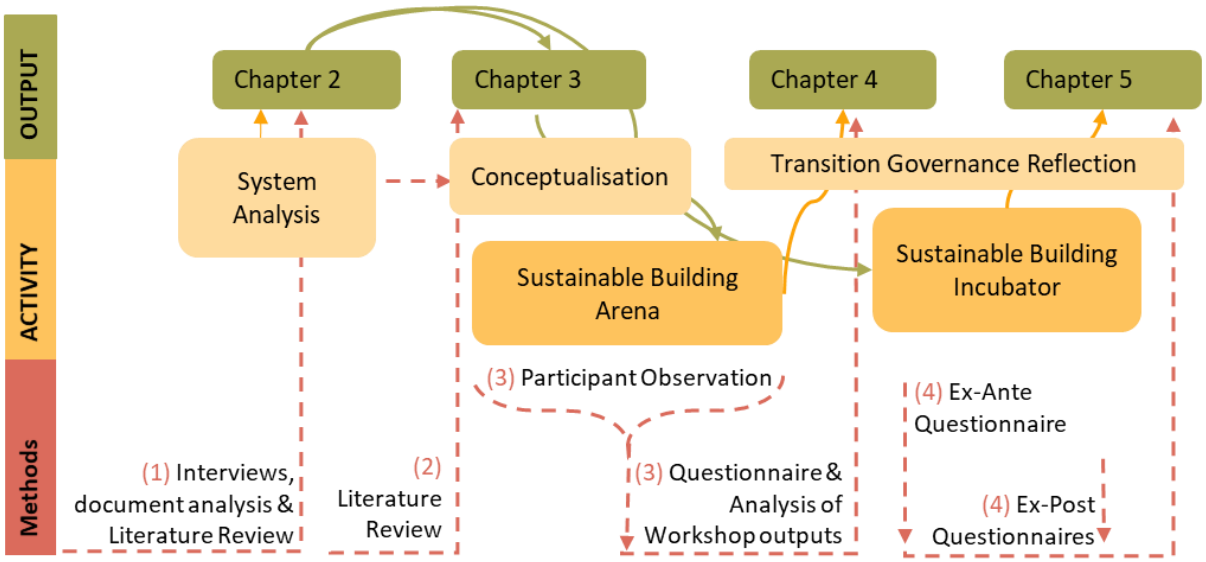


Figure 4: Research methods and steps.

Overall the empirical work is based on six research stays in Phnom Penh from 2019 to 2023 as well as desk research, document analysis and online workshops. Additionally, the research builds on a series of project-related events with numerous informal conversations with building sector stakeholders, urban development practitioners, researchers as well as meetings with staff of the Phnom Penh City Administration (PPCA), the National Council for Sustainable Development (NCSD), research institutions, developers, and urban NGOs.

In a first step, semi-structured face-to-face expert interviews were conducted with 21 stakeholders from Phnom Penh's building sector in 2021 (see Appendix 1). This included policy makers, researchers, NGO representatives, architects, developers, real estate investors, consultants (see Table 2). The interviewees were selected for their expert knowledge and the selection sought to integrate a diversity of actors. They were approached on the basis of desk research, the Build4People project network, and subsequent snowball-sampling. With the consent of the interviewees, the interviews were recorded, transcribed and shared with them for corrections. Subsequently, the transcripts were thematically coded with the qualitative data analysis software MaxQDA for a qualitative content analysis (Kuckartz, 2018). Following a deductive-inductive approach, two rounds of coding were implemented. An initial literature-based category system was therefore inductively adapted on the basis of the empirical material (see Appendix 2). The system analysis additionally builds on an extensive literature review and the analysis of relevant documents, including policy documents and donor reports (see (1) in Figure 4).

Code	Primary Affiliation of Interviewee
A1	Architect, International Office & Independent
A2	Architect, Founder of Local Architecture Firm
A3	Architect, Founder of Local Architecture Firm
C1	Consultant, Public Sector & Industry: Construction & Energy Efficiency
C2	Consultant, Public Sector: Urban Development & Construction
C3	Consultant, Public Sector: Urban Development, Sustainability
C4	Consultant, Public Sector: Urban Development, Sustainability
C5	Consultant, Industry: Engineering & Construction
CA1	City Administration Official, Urban Development & Planning
CA2	City Administration Official, Urban Development & Planning
CA3	City Administration Official, Urban Development & Planning
CA4	City Administration Official, Urban Development & Planning
D1	Developer, Local Real Estate Developer
I1	Investor, Owner of Real Estate Investment Firm
N1	International NGO with a Focus on Urban Affairs
N2	International NGO with a Focus on Urban Affairs
NS1	National State Official, National Council for Sustainable Development
R1	Urban Development Researcher at Local University
R2	Governance Researcher at Local Think Tank
RE1	Real Estate Industry (Consultancy & Research)
RE2	Real Estate Industry (Contractor)

Table 2: Interviewee affiliation.

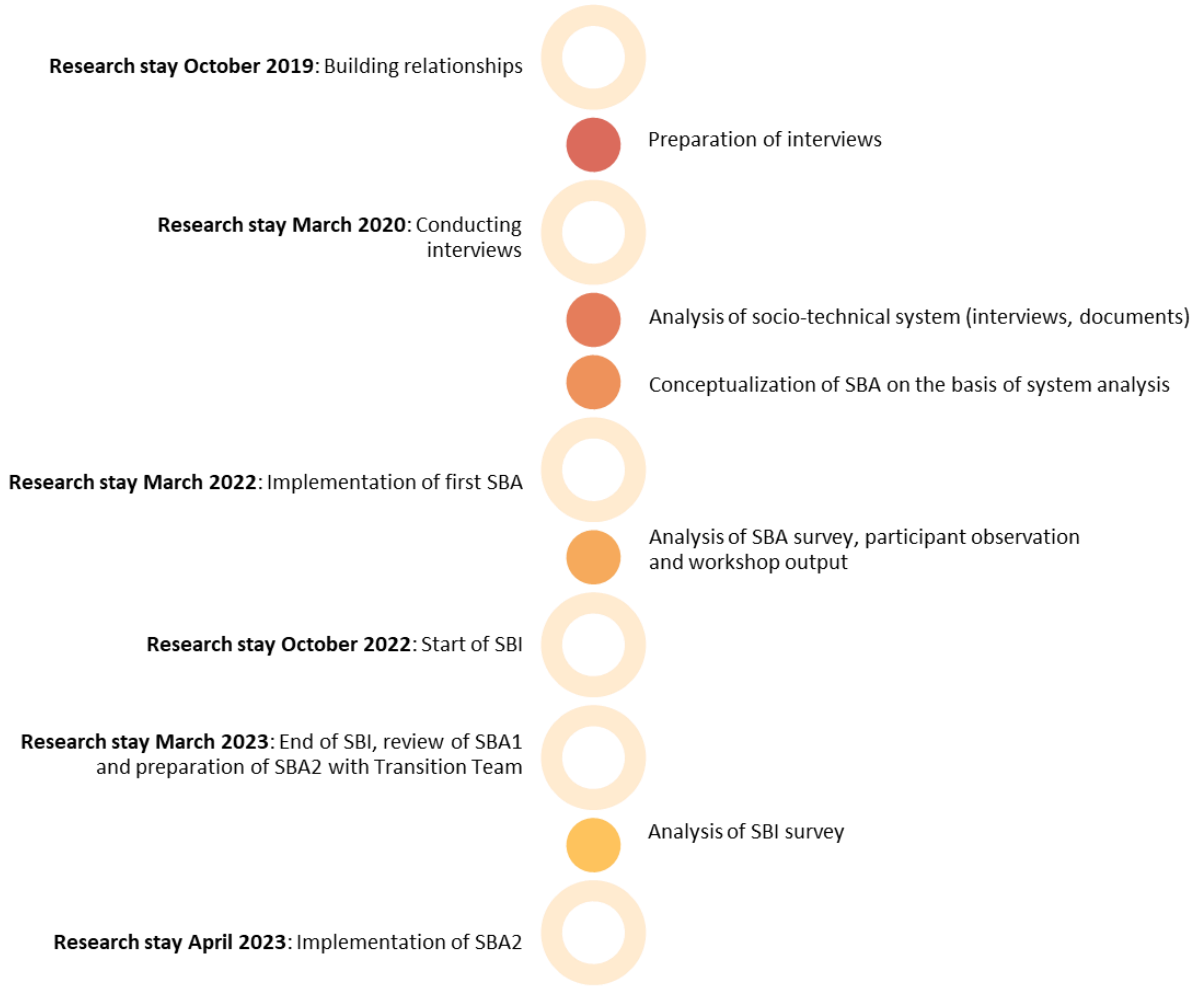


Figure 5: Timeline of research stays.

Based on the first study and additionally reviewed literature, a conceptual framework for a contextualised transition governance approach, the Sustainable Building Arena (SBA), was developed in a second step (see (2) in Figure 4). Having developed the concept for the SBA, the third step, then, builds on its implementation: To study the (dis)empowering effects of the first SBA cycle in 2022, an analysis of the workshop outputs, a participant observation, and an ex-post participant survey were conducted.

The SBA process includes the establishment of a Transition Team (TT) that was formed by six members of the Build4People project (three in Cambodia and Germany respectively) and a group of 5-7 frontrunners from the project network that were motivated to support the process. The Transition Team was convened in 2022 to (a) map the actor landscape and select the frontrunners and change agents that were invited for the first SBA workshop, (b) to make conceptual adjustments to the SBA process before the first cycle, and in 2023 (c) to review the first cycle and make adjustments of the concept for the second cycle[6]. The Transition Team mapped the actors based on their centrality to the sector and its transitions and, following the "Power in Transitions Framework" of Avelino (2017), i.e. according to the power type that they can exercise (transformative power, innovative power, and reinforcive power) (see Appendix 3 for the Actor Mapping Canvas). The selected participants of the first SBA cycle included architects, NGO staff, youth activists, researchers, policymakers, building material producers, and sustainable building consultants, that were considered sustainability frontrunners or change agents in the building sector (see Table 3).

Actor Group	Number of Participants
Business	8
of which entrepreneurs	4
Central Government	2
Local Government	2
Private Regulatory Institution	1
NGO	3
Impact Organisation	1
Academia	4
Total	21

Table 3: Participants of the first SBA cycle.

During the SBA workshop the participants worked in small groups, a facilitator and a participant observer, to discuss Phnom Penh's building and urban development sector, develop a joint problem framing, a vision for the future of the sector and strategies towards its realization. A graphic recorder joined the SBA to integrate common themes from group discussions and

[6] The exact composition of the Transition Team changed over time. The initial members included a property developer, a member from the National Council for Sustainable Development, an urban planner from the Cambodian Green Building Council, one researcher and one architect.

presentations during the process (see Appendix 4-6). Since visual recording is inclusive, allows for multiplicity, and "can create a shared experience with a variety of stakeholders", it is well-suited for co-creative processes like the SBA (Dean-Coffey, 2013, p. 56). Together with the outputs of the participants, including drawings, Lego structures and post-its, the recording was mapped and studied for implicit insights into the (dis)empowerment of the participants. We operationalized the previously developed empowerment framework for the analysis of the outcomes and for the participant observation (see Table 7). The participant observers were previously instructed on how to observe and report on the process, including the interaction dynamics in the small groups.

The analysis of the first SBA cycle was complemented by an ex-post participant survey. The participants were asked to share their (dis)agreement with statements regarding the process design, learning, the empowerment dimensions, and additional psychological items. The material of this part of the study thus involves self-reported empowerment, implicit empowerment indications in the workshop outputs and as perceived by participant observers (see (3) in Figure 4). Some of the authors, including myself, were involved in this process as facilitators, participant observers or members of the Transition Team. The participant survey is therefore used to triangulate the observations and to hereby limit potentially obscuring effects of the authors' double role as facilitator and researcher (Rauschmayer et al., 2015).

Lastly, to study the 4-month long Sustainable Building Incubator (SBI), three surveys were conducted with the participants: This includes one ex-ante survey with all participants, one ex-post survey with participants who dropped out of the programme and one ex-post survey for the remaining participants (see (4) in Figure 4). The survey operationalised the (dis)empowerment framework and added a segment on entrepreneurial skills. Methodological considerations for the individual study steps are introduced in more details in the respective chapters. The next part will discuss considerations of my positionality, and aspects of transdisciplinarity of the research process.

1.6. Positionality, Transdisciplinarity & Action Research

This thesis is intrinsically connected to my work as a researcher at the University of Hamburg and part of the Build4People project since 2019. Being part of the transdisciplinary research project gave me privileged access to many stakeholders of the building system and the local administration of Phnom Penh. It allowed me to have informal conversations on the side of formal events, access individuals for interviews, and motivate them to become part of transition governance interventions that are studied in this thesis. Speaking and interacting with a diverse group of stakeholders, including Government officials, developers, researchers, NGO and local

administration staff, individual consultants, representatives of large conglomerates, entrepreneurs, students, sustainability frontrunners and incumbents gave me a first-hand experience of the local building system. As both the researcher and interviewees are socially situated, power relations affect interviews and interactions. This stretches across diverse factors including class, gender, race, language, bodies and clothing (McDowell, 2010). Coming from a privileged Northern background (Germany) as a junior research team member of an international research project came with ambivalent effects when interacting with stakeholders and decision makers from the building system who are often Western-born or -educated themselves and/or represent elite groups of the Cambodian society. Gains of interviews are generally considered to be unequally distributed with a one-sided flow of information and larger benefits for the interviewer. This emphasis is shifted further to the researcher who is interpreting and narrating the interview results (McDowell, 2010). This thesis, like the overall Build4People project, aims to limit and counter the unidirectional flow of benefits through its transdisciplinary and action research approach: It addresses complex real-world problems together with non-academic stakeholders, develops, implements and evaluates transition interventions that seek co-to create solution-oriented knowledge, to inform transformative change, and then re-integrates the created knowledge (Lang et al., 2012; Waibel et al., 2020; Lawrence et al., 2022).

The ideal-typical transdisciplinary research phases are spread across the following chapters: Framing and understanding the transition challenge and gaining system knowledge is dominant in the first part of the thesis, namely the system analysis (Chapter 2) and the first phases of the transition interventions in which researchers and stakeholders develop challenge framings. This involves understanding the dominant configuration of the local building system, its lock-ins and stabilizing factors, existing barriers to transformative change towards sustainability and the identification of seeds of destabilization and levers for transition processes. Subsequently, the development of transition governance tools on the basis of the initial system analysis in Chapter 3 moves towards the second phase of transdisciplinary research, which is then in full swing during the interventions themselves (Chapter 4 and 5): Having co-developed challenge framings and expanded the system understanding, academic and non-academic stakeholders move on to develop solution-oriented visions (or target knowledge) and coalitions, narratives and strategies (strategic knowledge) (Brandt et al., 2013; Noboa and Upham, 2018). These interventions aim at the co-creation of solution-oriented knowledge with stakeholders, their empowerment and lastly the reintegration of the outcomes such as strategies, coalitions, or enhanced scientific frameworks into societal and scientific practice (Lang et al., 2012). Lastly, and based on the critical evaluation of the interventions, the re-integration of the created knowledge for the revision and extension of theory and intervention designs takes centre stage as the third ideal-typical phase of transdisciplinary research in the empirical Chapters 4 and 5 and the Conclusion (Chapter 6).

This process that can also be understood as a form of participatory action research is particularly useful for integrating different ways of knowing and co-producing knowledge (Wittmayer and Schäpke, 2014; Noboa et al., 2018; Preller et al., 2017). Here, self-reflexivity is of major importance for action researchers. This should include the awareness of own positionality, seeing oneself part of the dynamic that one wants to change, and the openness to adjust principles and processes. Developing and implementing process-oriented transition interventions at the science-society interface implies a diversity of roles for researchers (including myself), such as knowledge broker, process facilitator, change agent, reflexive and reflective scientist (Wittmayer and Schäpke, 2014, p. 483). While this multiplicity of role comes with the danger of obscuring the analysis, the triangulation of data, and the delegation of some selection choices (including the participants of the first Sustainable Building Arena) to the Transition Team, seek to mitigate this (Rauschmayer et al., 2015). Researchers are therefore active beyond the scientific arena and are hence accountable for these activities, including "their role in societal change processes" (Rotmans 2005 in Wittmayer and Schäpke, 2014, p. 492). Following Wittmayer and Schäpke (2014), this responsibility can be addressed by establishing spaces that allow mutual learning about sustainability problems, solutions, and strategies, while being critical of power an underlying ideologies.

1.7. Thesis Outline

This dissertation is based on four individual journal articles that constitute Chapters 2 to 5. In Chapter 2 the dominant configuration of Phnom Penh's building sector is studied as a socio-technical regime. It highlights that regimes are not homogeneous and (de)stabilized as monoliths, instead they are understood to be semi-coherent and unevenly (in)stable: Heterogeneous regime elements are configured in unequal stabilizing lock-in mechanisms, they are under varying pressures, with different regime actors following different responses to pressures, regime-internal contradictions and misalignments. To address the interlinked processes that (de)stabilize the incumbent building regime configuration, the chapter extends the analysis of socio-technical incumbencies by introducing the concept of (in)stability configurations. The concept highlights the intertwined nature of stability and change within incumbent configurations. Here, destabilizing factors are understood as those factors that weaken the reproduction of regime elements and their compatibility, while stabilizing factors support their alignment and reproduction. These factors can open up particular transition pathways while rather inhibiting others and can thus have their own latent directionality. The framework differentiates sources of (in)stability from socio-cultural, economic and political-institutional sources. These broad dimensions allow for the inductive development of sub-categories on the basis of given empirical data. Considering (de)stabilizing factors as locally embedded, multi-scalar and translocal, we

furthermore differentiate these factors by their spatial characteristics (scale, local/translocal) as well as the levels of the multi-level perspective of transition studies. The hereby generated understanding of unevenly (de)stabilized regime configurations is more nuanced than conventional analysis and can be used for the identification of seeds of destabilization and the development of contextualised transition interventions that target specific regime elements. Having applied the framework to study Phnom Penh's incumbent building configuration, the findings show an (in)stability configuration that is characterised by strong political-institutional stabilising effects that are associated with the neo-patrimonial and illiberal system and a set of destabilizing factors within the socio-cultural and the economic dimensions. The chapter indicates that socio-technical regimes in the Global South are not necessarily less stable overall – as argued in the literature – but that their (in)stability configuration can have different profiles.

Building on this, Chapter 3 introduces a transition tool that addresses the previously identified (in)stability configuration. This includes the presence of a number of sustainability-driven actors within the sector that are however fragmented despite their spatial proximity. The chapter therefore proposes the Sustainable Building Arena as a Transition Management approach that offers a platform for sustainability-driven individuals from the building system that creates a protected safe space for these frontrunners to co-create visions, strategies, develop narratives, and form coalitions to ultimately empower these actors. The strong stabilizing effects from the neo-patrimonial relations and state actors called for a de-centring of the state in this process and the careful, selective integration of selected state-affiliated individuals. The concept also suggests the gradual opening of the Arena process over time to broaden the group and its reach while lowering the protection levels, after the initial narratives and visions have been developed by the first group of frontrunners. Developing the SBA, we were able to extract principles for the contextualisation of transition interventions in other cases.

Chapter 4, then, assesses the first Sustainable Building Arena cycle. To this end, the chapter focuses on the (dis)empowerment effects of the intervention. To move beyond narrow empowerment lenses, a multi-dimensional empowerment framework for transition interventions is introduced. Building on psychological, development and transition approaches, it accounts for empowerment effects across motivational, social capital and resource dimensions. To assess empowerment, and the equally possible albeit unintended disempowerment effects, the chapter builds on participant observation of the workshop, an analysis of the workshop output and a participant survey. The findings show strong motivational and social capital increases but lesser gains in terms of resource access. The absence of financial resources for the implementation of generated transition strategies and experiments can lead to disempowering effects.

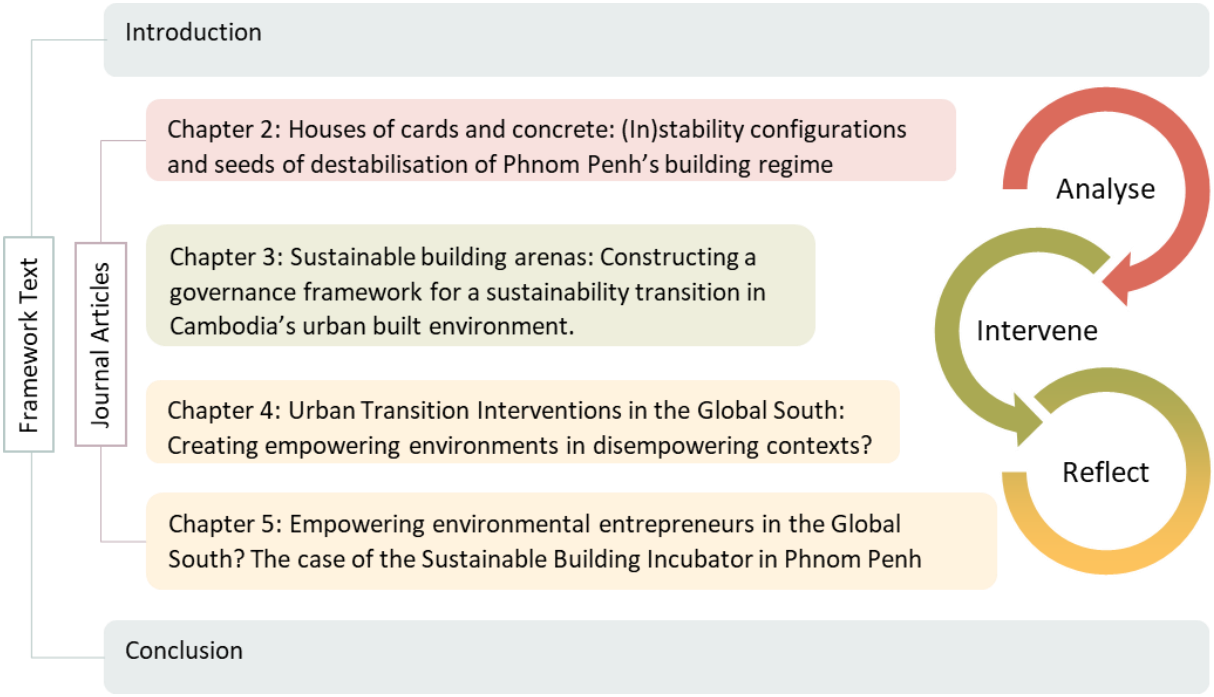
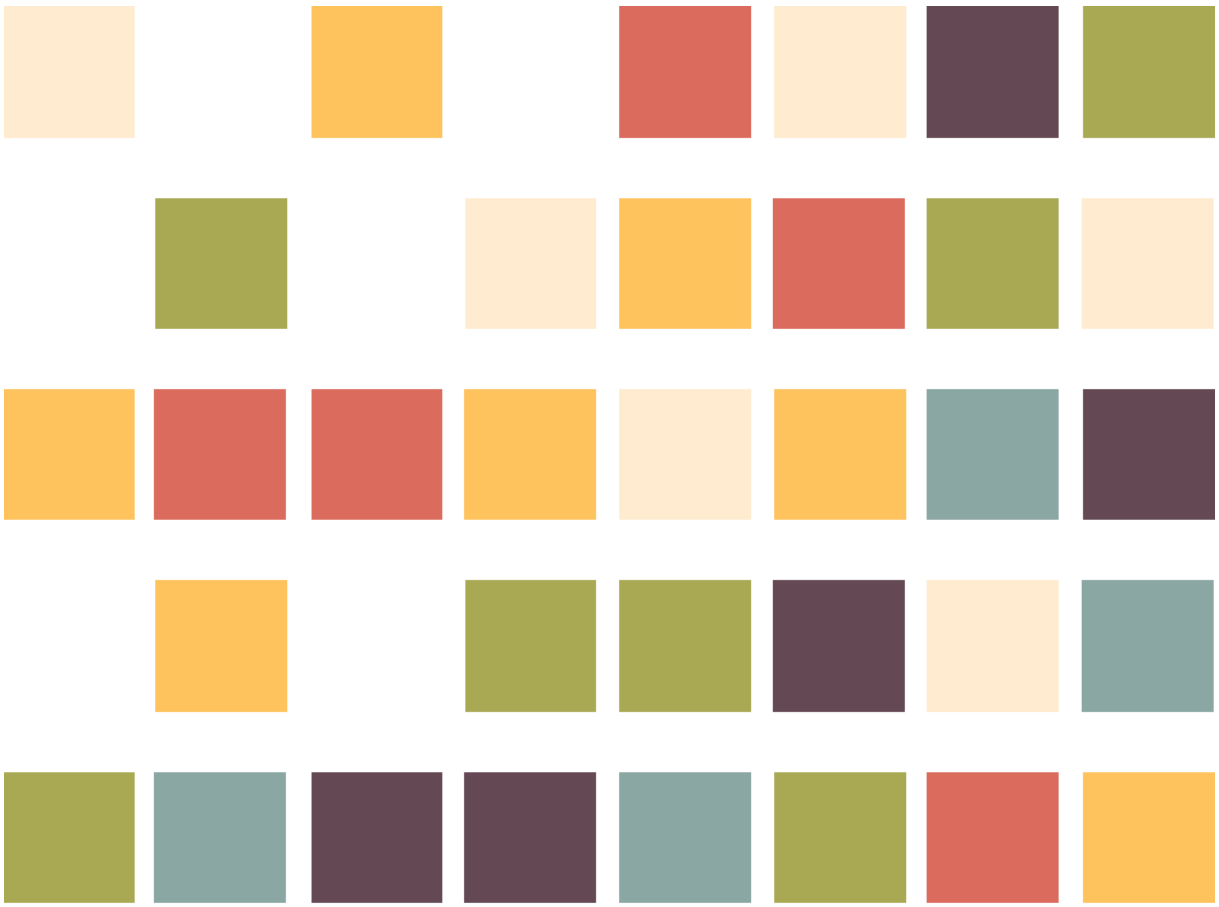


Figure 6: Thesis outline.

Following the implementation of another transition intervention in the context of the Build4People Project, the Sustainable Building Incubator, the previously developed analytical framework is extended to study the (dis)empowerment effects of the incubation programme on aspiring environmental entrepreneurs in Chapter 5. This analysis builds on a longitudinal research design that involved ex-ante and ex-post surveys with the incubator participants. The findings indicate overall positive empowerment effects. However, for participants who did not win the first prize of the programme, some motivational items such as self-assessed levels of "competence" and "impact" decreased during the incubation process. Policy makers and programme organizers should address these disempowering effects in their intervention designs. Finally, the results of the previous chapters are integrated and synthesized in Chapter 6. Here, the overarching research questions are answered. The chapter highlights implications for theory and practice, limitations of the study and offers avenues for future research (see Figure 6).

PART II: Publications

Chapter 2: System Analysis: (In)stability Configurations and Seeds of Destabilisation



Published as: Jayaweera, R., Rohracher, H., Becker, A., Waibel, M. (2023). Houses of cards and concrete: (In)stability configurations and seeds of destabilisation of Phnom Penh's building regime. Geoforum, 141 (2023) 103744. ISSN 0016-7185, https://doi.org/10.1016/j.geoforum.2023.103744.

Houses of cards and concrete: (In)stability configurations and seeds of destabilisation of Phnom Penh's building regime

ABSTRACT

Scholars widely agree that cities and their built environments play a decisive role for a global transformation towards sustainability. This necessitates a shift away from unsustainable practices and constellations in cities towards more sustainable ones – particularly in contexts of the Global South, as they see the strongest current and projected urban growth and related construction activities. Research on urban sustainability transitions has however largely been biased conceptually towards innovation and new technologies, and geographically towards the Global North. While more research recently emerged that addresses the destabilization of dominant orders, it still predominantly considers Northern cases, and those with discernible transition processes. This paper seeks to address these biases and studies factors that contribute to the (in)stability of socio-technical regimes. We argue that (de)stabilizing factors and the particular *(in)stability configurations* they form, must be scrutinised regardless of transition phase as they are ingrained in regime structures before transition processes become apparent. Identifying and characterizing (in)stability configurations and the seeds of destabilization can then support the development of contextualised transition governance strategies. Employing the building sector of Phnom Penh, Cambodia, as an empirical case, this study differentiates sources of (in)stability from economic, socio-cultural and political-institutional dimensions. Our analysis suggests an ambiguous (in)stability configuration with tensions primarily within the socio-cultural and economic dimensions, and a dominance of stabilizing effects from the political-institutional dimension. The paper closes with implications for transition governance strategies and general arguments on the heterogeneity of transition contexts and regime constellations, particularly in countries of the Global South.

Keywords: Urban sustainability transitions, socio-technical regimes, Cambodia, destabilisation, Global South

2.1. Introduction

Despite ambitious sustainability goals at national and global levels, humanity is continuing on unsustainable pathways. Cities and urban growth significantly shape these developments as they account for about 75% of global resource consumption and 60-80% of global greenhouse gas emissions (Nagendra et al., 2018). Urbanization, urban population growth, increasing incomes and shrinking household sizes and their associated demand for residential and commercial space have been fuelling significant building activities and will do so in the future. Since these dynamics are particularly stark in the Global South, it is projected that 85% of growth in building energy use demand will be from urban areas and 70% from cities in "developing countries" alone (Ürge-Vorsatz et al., 2015, p. 87). Investments in buildings and associated infrastructures have long-term effects as they bind resources, social practices and financial capital. At the same time, current and projected building dynamics in cities of the Global South offer a window of opportunity for a transition to long-term urban sustainability. Due to rapid urbanisation processes and the dominance of conventional, resource- and emission-intensive construction activities and their implicated lock-ins, this window is however closing quickly.

Therefore, the ways buildings are designed, constructed and operated need to be urgently transformed. Much promising research in this direction has been conducted in the field of sustainability transitions research. Here, scholars have been studying how societal functions like the provision of shelter through buildings are fulfilled and change over time in *transitions*. Transitions are understood as radical changes of socio-technical systems that involve the re-configuration of system elements such as user practices, markets, industry structures, infrastructures, technologies and policies (Geels, 2002; Rip and Kemp, 1998). Within transitions research, the "Multi-Level Perspective" conceives transitions as the result of dynamics between three levels of structuration: (1) The regime (the locus of established practices and the associated rule-set), (2) niches (loci for radical and experimental innovations and alternative solutions), (3) the landscape (the exogenous and structural backdrop) (Geels, 2002). In an idealised way, such transition processes unfold along successive phases such as pre-development, acceleration and stabilisation. Despite increasing insights and practical experiences with the governance of such transitions in the Global North, the contexts and dynamics of urban sustainability transitions in the Global South are less well understood. In contrast to early transition concepts, the transitions research community is meanwhile putting increasing emphasis on the significance of space, scale, place-specific

factors and regional differences for transition processes (Binz et al., 2020; Hansen and Coenen, 2015; Truffer et al., 2015).

This is particularly relevant for countries in the Global South which are characterised by an often much more heterogeneous make-up of socio-technical regimes, comprising dominant technologies, materials, actors, industry structures, economic and power relations, regulatory practices and policies, and not least different socio-cultural contexts, governance regimes, building traditions and social practices of collaboration. These conditions influence how building regimes are internally structured and respond to pressures for change. Regime characteristics include constellations which are particularly stable and difficult to change, while other regime elements are characterised by tensions and potential instabilities. Such constellations open up or close down particular pathways of change towards a more sustainable building regime. Moreover, socio-political conditions and regime structures in the Global North which have served as a template in the development of transition studies, appear to be more homogenous than regimes in the Global South which vary significantly across spatio-institutional contexts (Wieczorek, 2018). A profound understanding of the particularities of such regimes is thus necessary to develop context-specific interventions to support transformative change in the building sector.

The consideration of regime destabilisation processes for the understanding of transition dynamics has generally increased, as scholars have become more critical about purely niche-driven concepts of change with their focus on the emergence of alternative solutions. Instead, regime-internal processes such as the destabilisation of established institutions and practices due to external pressures or internal reconfigurations are highlighted (Turnheim and Sovacool, 2020b). However, this destabilisation perspective has been mostly applied to more advanced transition phases and the phasing out of unsustainable institutions and technologies, while regime instabilities and their effects in early transition phases ("pre-development") have been much less considered – even though seeds of destabilization are arguably present in any form of incumbency at any time, and probably even more so in more heterogeneous regimes of the Global South which have not gone through the same prolonged period of technological, institutional and economic stability as systems in the Global North. As different forms and sources of regime (in)stability exist, we argue that (de)stabilizing factors, the particular *(in)stability configurations* they form, and the openings they create for intervention and change should be scrutinised even in early transition phases, in order to better understand regime dynamics and potential pathways of change in the Global South and elsewhere.

Our empirical case will be the building sector in Phnom Penh. In line with many other cities of the Global South, the Cambodian capital is characterised by rapid urban growth, high demand for building space and struggles to live up to ambitions of urban sustainability (Baker et al., 2017). However, our analysis is not bound to urban building regimes. Instead, given the fluid, permeable, and multi-scalar relations we find in the building system, the local level serves as a starting point in the search for the heterogeneity of regimes and their spatiality (Binz et al., 2020; Affolderbach et al., 2018). When discussing *sustainable building*, we do not understand it as a monolithic sector but as a bundle of diverse approaches. While it is highly disputed what exactly falls in the category of sustainable building, we follow O'Neill and Gibbs (2014) in treating it as a relative concept. The heterogeneity of sustainable building can then be conceptualized as a series of nested niches within an overarching sustainable building niche (O'Neill and Gibbs, 2014). In contrast to O'Neill and Gibbs (2014) we do however not only consider the reduction of environmental impacts of building planning, operation and construction but also their negative social impacts in our understanding of sustainable building.

This article seeks to make three contributions: Firstly it analyses the problem of sustainability transition under very specific and so far understudied spatial and sectoral conditions: Phnom Penh's building sector is a prime example of a rapidly expanding sector in a context of population growth, urban expansion and low levels of regulation in an illiberal setting in the Global South. In the building sectors of the Global North, in contrast, most of the future building stock already exists, urban population growth is relatively limited, regulation is rather high and building energy demand is projected to stagnate (Ürge-Vorsatz et al., 2015). While transitions research has largely focussed on the latter, the majority of future building energy demand growth and other sustainability impacts of buildings will stem from the Global South. Whereas building sector transitions in Northern contexts primarily require a shift from quantity (growth and comfort) to quality (sustainability and liveability) (Loorbach, 2017), a transition like the one in Phnom Penh with high levels of growth in population and floor space demand require a shift to a system that can offer both quantity *and* quality.

Secondly, the article contributes to the literature on destabilization and regime (in)stabilities in sustainability transitions and their geographic specificity. This is achieved by introducing the framework of *(in)stability configurations*. The approach allows to dissect present regime configurations and (de)stabilizing processes in order to gain a deeper understanding of possible dynamics of change in a particular regime. (De)stabilizing processes are considered as socio-spatial dynamics that are multi-scalar, place-specific and translocal.

Adding, thirdly, to the literature on the governance of sustainability transitions, the paper suggests to link the analysis of (in)stability configurations to targeted transition governance strategies that address ingrained seeds of destabilization as levers of change. Accordingly, we review the existing literature on regime (in)stability in the following section (2.1) before developing our *(in)stability configuration* framework (2.2). We then discuss our methods (Section 3), and apply the framework to our case study, the building sector of Phnom Penh (Section 4). Lastly, we discuss the results and possible transition strategies in Section 5 before concluding in Section 6.

2.2. Analytical Framework

2.2.1 Regime (in)stabilities

Transitions, understood as processes of structural change of societal systems, involve both processes of emergence and institutionalization of new socio-technical orders as well as processes of decline and deinstitutionalization (Köhler et al., 2019). While regimes and regime-like phenomena of incumbency (Stirling, 2019) are associated with temporal stability, this stability is not an automatism. Researchers have hence started to discuss the previously neglected partial instability of regimes and the diversity of dynamics that cause instability. This includes the persistent pressure on regimes from alternative formations and regime internal tensions and incoherencies between actors, technologies and institutions, that result in resistance, or repair and reproduction work of regime actors (Jørgensen, 2012; Geels, 2014). This work highlights the role of regime level dynamics and incumbents as important actors for transition processes. Transition scholars hence started to address regime-level dynamics and processes of destabilization and the decline of dominant orders as the "flipside" of transitions (Turnheim and Geels, 2012; Turnheim and Sovacool, 2020b; Mori, 2021). Most studies of destabilization processes however focus on those transition phases in which change is deliberatively sought, or "change has been most destabilizing" (Martínez Arranz, 2017, p. 127) even though it is argued that "seeds for destabilization are sown long before they take effect" (Turnheim and Geels, 2012, p. 44). Thus, despite the shift towards the study of destabilization processes and their governance (van Oers et al., 2021) – little concern is paid to the preceding destabilizing factors, or the way instabilities are already ingrained into regimes before a transition "takes off" (Rotmans et al., 2001).

Furthermore, within the literature on geographies of sustainability transitions, scholars have been discussing the diversity and place-specificity of regimes (Hansen and Coenen, 2015; Späth and Rohracher, 2012). In this context, greater instability and heterogeneity of regimes

in the Global South has been highlighted by some (Hansen et al., 2018; Wieczorek, 2018). While such instabilities might be expected to be supportive for niche development and regime change, previous studies found that actors are actually too fragmented to coordinate niche activities and that such instabilities can therefore rather impede niche development (Hansen et al., 2018). The authors connect higher regime instability to less stable political and economic conditions, weaker and less efficient state institutions, low enforcement of state regulation, etc. (Ramos-Mejía et al., 2018; Feola, 2019). Meanwhile, Berkhout et al. argue that in the Global South, less "economic and political commitments to incumbent socio-technical regimes" must be overcome (2009, p. 223). Noboa et al. (2018) however claim that characteristics of illiberal contexts including authoritarianism, state capture, oligopolies, etc. – that are particularly prevalent in the Global South (Lawreniuk, 2020; Murakami Wood, 2017) – may actually increase the stability of the status quo. Here, they argue, incumbents can address potentially threatening processes "with a severe response" (Noboa et al., 2018, p. 3).

Instead of reproducing mutually exclusive categories and hereby supporting a liberal/illiberal dichotomy that orientalises the Global South as an illiberal space (Luger, 2020), we suggest contextual assemblages where diverse political-institutional characteristics overlap, interact, and hereby form "institutional pockets" (Ramos-Mejía et al., 2018), while being in conflict with liberal-democratic assumptions of the transitions literature. In the case of Cambodia, this includes discussions on the role of the Cambodian State as a developmental state (Hughes and Un, 2011b), (neo-)patrimonialism (Un and So, 2011), illiberalism (Bafoil, 2014; McCarthy and Un, 2017b), authoritarianism (Lawreniuk, 2020), or the post-conflict and post-socialist context (Hughes and Un, 2011b).

With these contrasting views on regime (in)stabilities in the Global South and a limited understanding of the seeds of destabilization in early transition phases, it seems vital to learn how stability and instability are intertwined in regimes, particularly those outside of the Global North. To address the interlocking of (de)stabilizing factors and overcome the dualist conceptualization of „stability and change as mutually exclusive" (Strambach and Pflitsch, 2020, pp. 1–2), we introduce *(in)stability configurations* in the following part.

2.2.2 Seeds of Destabilization and (in)stability Configurations

Instead of understanding regimes as homogeneous and "flat", we propose a more differentiated analysis of regimes through their *(in)stability configurations*. We argue that regimes are not (de)stabilised as monolithic entities but that regardless of transition phase,

heterogeneous regime elements (in terms of incumbent firms, social practices or technologies) are under varying (de)stabilizing pressure and equally vary in their responses. Increasing use of social media, for example, can have a stronger destabilizing effect on the norms of everyday practices than on other aspects, like building technology (Kuokkanen et al., 2018). Equally, regime elements cannot be assumed to be homogeneously stabilized: Some regime elements, actors and rules are more aligned than others, and are therefore more stable; regime rules are however always only semi-coherent, never entirely aligned (Geels and Schot, 2007; Ghosh and Schot, 2019). This implies contradictions, conflicts, weaker linkages (Geels, 2002) and seeds of destabilization (Fuenfschilling and Binz, 2018). A multitude of inter-related (lock-in) mechanisms stabilizes regimes elements in unequal ways: Sunk investments in machines, for example, may lock-in production processes, but not as much user preferences (Geels, 2011). Furthermore, regime actors have different capacities and strategies to react to destabilizing pressures and therefore vary in their responses (Turnheim and Sovacool, 2020b). Despite their interconnectedness, individual regime elements and their relations are thus *unevenly (in)stable*.

To better comprehend this unevenness, we introduce *(in)stability configurations* of regimes as time, place and context-specific constellations of stabilizing and destabilizing factors that are intertwined and affect the reproduction and alignment of regime elements. Destabilizing factors are those that weaken or threaten the reproduction of regime elements and their compatibility, while stabilizing factors support these (Turnheim and Geels, 2012). (De)stabilizing factors can (de)stabilise (multiple) regime elements in ambiguous and heterogeneous ways, potentially opening up particular trajectories for change while inhibiting others. (De)stabilizing effects therefore have their own latent directionality. Moreover, (de)stabilizing effects also come with their respective temporality, some affecting regime elements as ruptures, like sudden landscape shocks (wars) while others, like demographic changes, are following the longue dureé of centenary change (Raven et al., 2012). Other scholars, such as Pel and Boons (2010), highlight the contrasting time frames of regime elements themselves, such as long-lasting road infrastructure in contrast to short-term traffic management.

While seeds of destabilization can offer cracks or openings towards particular trajectories, the way transition processes actually play out is also dependent on an array of other pressures, interventions and contingencies. Considering the (de)stabilising effects, we can differentiate sources of (in)stability based on different dimensions of the respective socio-technical system. (De)stabilizing effects can be connected to socio-cultural, economic, or political-institutional

sources across the system (Fastenrath and Braun, 2018a). These three broad dimensions allow the inductive development of sub-categories for each dimension based on the empirical material at hand. While other, more conventional regime-level framings have their merit, our approach allows us to work closely with the empirics of the respective case and to integrate sources from different levels of the socio-technical system. The categories shown in Figure 7 are the result for our particular case study. Different categories might come up in other cases. Still, numerous categories within the three dimensions relate closely to the conventional analysis developed by Geels (2002). System elements that are grouped into the seven dimensions of Geels are integrated into our three-dimensional framework, too. The "user practices" dimension of Geels, for example, is partially associated with the socio-cultural dimension (user preferences) while effective demand is associated with the economic dimension. Unlike Geels, we do not refer to individual sub-regimes that form around particular actor groups (suppliers, research networks, user groups), but to different dimensions of socio-technical systems, - including its niche and landscape levels – that can be the source of (in)stability. Following the multi-level perspective we therefore differentiate between regime-internal sources of (de)stabilising factors based on frictions, conflicts and incompatibilities, and (in)stabilities that are induced by landscape pressures or by emerging alternatives or niches.

Furthermore, our framework considers (de)stabilizing processes as socio-spatial dynamics that are locally embedded, yet translocal and multi-scalar: While regimes (just like niches) are themselves multi-scalar and translocal (Truffer et al., 2015; Binz et al., 2020; Fuenfschilling and Binz, 2018), their constituting elements can be (de)stabilized from various but interconnected geographical scales, as well as across places and space. This also involves (re-scaling) dynamics between territorially embedded regimes and regime structures that are institutionalized at the global level (Miörner and Binz, 2021; Fuenfschilling and Binz, 2018). The (in)stability configuration is thus both characterised by (local) place-specific factors, including informal institutions, particular demand (Hansen and Coenen, 2015) and spatially diverse relations across space and scales and their interaction. These relationships and interdependencies of processes of (de)stabilization within and between localities, spaces and scales significantly shape the (in)stability configuration and call for the socio-spatial characterisation of (de)stabilization dynamics. Accordingly, we differentiate between (de)stabilizing factors on different scales and localities; to keep it simple, we consider local/translocal factors and local, national, global scales of (de)stabilizing factors.

Figure 7 illustrates our framework: Different parts of the surface represent regime elements, including actors, institutions, and technologies. These are subject to (de)stabilizing dynamics (differentiated by dimension, structuration level, scale and locality) that mould the surface into a three-dimensional shape, the (in)stability configuration. The more compatible and secured the reproduction of particular regime elements, the flatter the (in)stability configuration in that part of the surface.

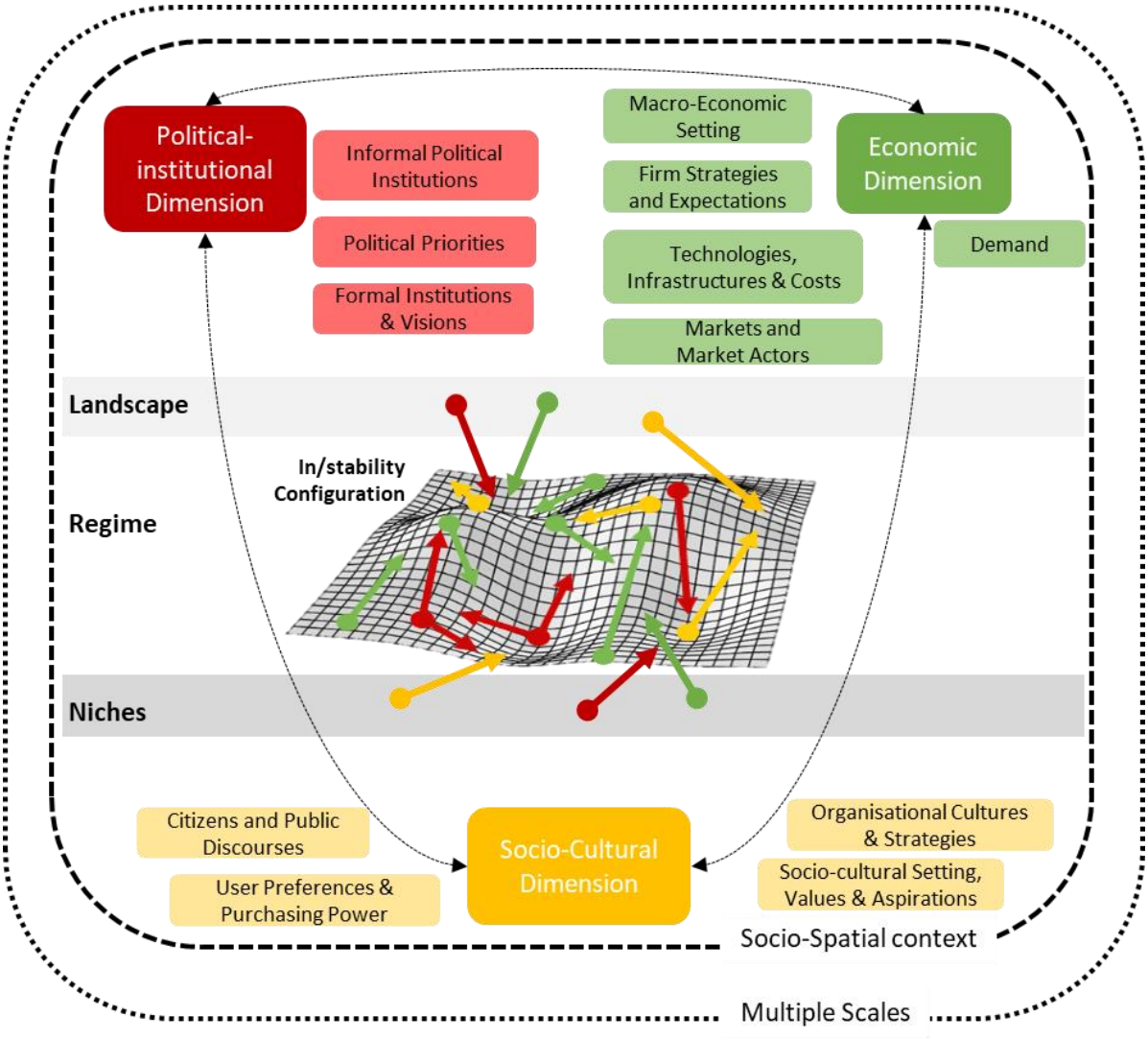


Figure 7: (In)stability configuration framework (building on Geels, 2002, Fastenrath and Braun, 2018a).

We claim that the analysis of regimes through their (in)stability configuration is helpful to add nuance to regime understandings in the South and beyond. The identification and characterisation of (in)stability configurations and the seeds of destabilization – how sources of instability are already ingrained in the regime – can support the development of contextualised transition strategies. Based on the (in)stability configuration, different consequences for transition interventions are imaginable: Some regime elements might be

stabilised by complementary factors, others subject to destabilizing pressures with ambiguous outcomes, while others lean towards more sustainable ones. Others then might be stabilized locally, while facing destabilizing pressures from factors at other scales. Therefore, depending on the (in)stability configuration, actors can select intervention target(s), specify the means, and potentially the combination with other interventions in order to strengthen destabilizing dynamics and weaken stabilizing ones in ways that support a transition towards sustainability.

2.3. Methods

The study follows a qualitative case study approach to identify and characterise sources of (in)stability and their effects. It is based on semi-structured interviews with 21 stakeholders from the building and urban development sector in Phnom Penh, a document analysis as well as from informal exchanges with stakeholders during several stays in Phnom Penh from 2019 till 2022.

Interviewees were predominantly recruited from the network of an ongoing research project and subsequent snowball sampling. The selection of interviewees was based on their knowledge of Phnom Penh's building and urban development sector and aimed at the inclusion of diverse actors' perspectives. Since many actor roles are blurred or fluid (Kranke and Quitsch, 2021) and individuals are active beyond singular actor roles, pinpointing definite affiliations is difficult. Nevertheless, Table 24 gives the primary affiliation for the interviewees, including architectural firms, developers, consultancies, investment firms, academia, NGOs, and state officials. Interview transcripts are referenced with abbreviations of actor categories and the interview number within that category. For direct quotes the paragraph number within the transcript is stated.

Code	Primary Affiliation of Interviewee
A1	Architect, International Office & Independent
A2	Architect, Founder of Local Architecture Firm
A3	Architect, Founder of Local Architecture Firm
C1	Consultant, Public Sector & Industry: Construction & Energy Efficiency
C2	Consultant, Public Sector: Urban Development & Construction
C3	Consultant, Public Sector: Urban Development, Sustainability
C4	Consultant, Public Sector: Urban Development, Sustainability
C5	Consultant, Industry: Engineering & Construction
CA1	City Administration Official, Urban Development & Planning
CA2	City Administration Official, Urban Development & Planning
CA3	City Administration Official, Urban Development & Planning
CA4	City Administration Official, Urban Development & Planning
D1	Developer, Local Real Estate Developer
I1	Investor, Owner of Real Estate Investment Firm
N1	International NGO with a Focus on Urban Affairs
N2	International NGO with a Focus on Urban Affairs
NS1	National State Official, National Council for Sustainable Development
R1	Urban Development Researcher at Local University
R2	Governance Researcher at Local Think Tank
RE1	Real Estate Industry (Consultancy & research)
RE2	Real Estate Industry (Contractor)

Table 4: Cited interviews and interviewee affiliation.

Interviews were undertaken in person in Phnom Penh during 2020 on the condition of anonymity. Interviewee affiliation is kept general to avoid identification. While generally important, this is of even larger relevance in the Cambodian context, where critical research is particularly sensitive, leading to some researchers publishing under pseudonyms and sensitive research being primarily driven by NGOs, development agencies and their agendas (Schoenberger and Beban, 2017). The interviews were conducted at a location of the interviewee's choice and lasted an hour on average (from 15 min to two hours). The questions focused on change-enabling and inhibiting factors and the role of key actors. The interviews were generally conducted in English; an interview with a German native speaker had some passages in German, which were translated for quotation by the lead author.

Following the interviewee's consent, the interviews were recorded, transcribed, and shared with the interviewees for corrections. MaxQDA qualitative data analysis software was used for subsequent thematic coding. The data was subjected to a qualitative content analysis (Kuckartz, 2018) and two iterative rounds of coding, which followed a deductive-inductive development of the categorization system. Having taken the three socio-technical dimensions and some initial categories from the literature, the category system was then inductively adapted based on the empirical material.

2.4. Analysis

2.4.1 Phnom Penh's Building System

Like many cities in the Global South, Phnom Penh has seen rapid growth of its population and built environment in the past decades: Its built-up and development areas increased six fold since 1990 (Mialhe et al., 2019). The building sector has rapidly grown since the early 2000s and became the main driver of national GDP growth and the main recipient of FDIs (World Bank Group, 2020). These developments have been discussed as a "construction boom", or a "vertical drive for global city status" (Jamieson et al., 2021) and reportedly caused Phnom Penh to have the strongest land price increase in Southeast Asia since 2000 (Nam, 2017b). Diverse factors have spurred these developments, including increasing housing demand for low-income migrant workers and high-end residential units for Cambodian and foreign elites, inflow of investment seeking financial capital, housing financialization, possibilities for economic development, money laundering and personal enrichment based on land and real estate speculation (Mialhe et al., 2019; Nam, 2017b; Fauveaud, 2020; Brickell et al., 2018). With more than 50% of building projects under construction in Phnom Penh being housing projects, the sector is predominantly residential (MLMUPC, 2022; CBRE, 2022).

Phnom Penh's building sector can be traced back to the repopulation processes after the Khmer Rouge urbicide in the 1970s: Occupying, or erecting buildings was based on informal links between public and private sectors. With the commodification of real estate in 1989, political elites could distribute land and real estate through "social and clannish networks" in exchange for political support and hereby „cement their power" (Flower, 2019, p. 2419; Fauveaud, 2014). This furthered the highly hierarchical structure of the sector in a context that is generally discussed as (neo-)patrimonial: Here, rent seeking opportunities (land, building permits, etc.) are offered in exchange for political support and loyalty in networks of patrons and clients, while blurring with legal-rational systems (Eng, 2014). Some argue that this has placed informal patron-client networks over formal accountability systems, leading to what some consider a "shadow state", or a "conflation of the CPP [ruling party] and the state" (Springer, 2017b, p. 238). Urban growth and the remaking of the cityscape – primarily through high-rises in the centre, and enclosed and private residential compounds (boreys) and satellite cities at the fringe – have thus been driven by private investment and followed informal and privatised planning logics (Percival, 2017). The state however still plays a significant role by creating a conducive setting for investments and supporting private actors

with the appropriation of land, etc. in a "state facilitated land development" (Shatkin, 2017, p. 25).

As building systems in other rapidly growing cities, construction is dominated by major resource demand for emission-intensive building materials such as cement, bricks, steel and sand as well as energy. Given the projected future household increases and current levels of sustainability impacts, Phnom Penh's building regime requires a transition from a quantity-orientation (growth and comfort) to a system state that is able to build quantities, and quality in terms of sustainability and liveability (Loorbach, 2017). While no research from a sustainability transitions perspective has been conducted on the building sector, a previous study has shown low levels of awareness of sustainability aspects amongst building sector practitioners in Cambodia (Durdyev et al., 2018). The authors observed "poor" adoption of sustainable construction practices and consider its future implementation to "not look promising" (Durdyev et al., 2018, p. 14). Nevertheless, both a government-led body (Technical Working Group on Sustainable Building) and a private sector-led body (Cambodian Green Building Council) were established to foster green building practices. Their emergence and institutionalisation will be further discussed in the next section. Furthermore, multiple buildings, primarily with office and industrial usages, have been certified as green or sustainable in Phnom Penh (USGBC, 2022).

We will now turn to the analysis of our empirical material to better understand the (in)stability configuration of Phnom Penh's building regime and to look for seeds of destabilization and possible trajectories towards urban sustainability.

2.4.2 Sources of (in)stability in Phnom Penh's Building Regime

As argued before, the analysis of (in)stability sources and their (de)stabilizing effects is useful to understand the (in)stability configuration and identify seeds of destabilization. Our analysis follows the three system dimensions according to Fastenrath and Braun (2018a), namely the economic, political-institutional and socio-cultural dimensions. In the analysis of our empirical material such as interviews with representatives of the building sector and public administrations, we use these three dimensions as high-level codes within which we then group empirical insights about the building sector in Phnom Penh and its change dynamic, frictions and lock-ins into deductive-inductively developed subcategories (see Table 5). In the following, we discuss the characteristics of the Cambodian building sector as well as the

(in)stability configurations of its constitutive elements along these categories developed in the coding process.

Economic Dimension	Political-Institutional Dimension	Socio-Cultural Dimension
Macro-Economic Setting	Political Priorities	Socio-Cultural Setting, Values & Aspirations
Firms' Strategies and Expectations	Formal Institutions & Visions	Citizens and Public Discourses
Technologies, Infrastructures & Costs	Informal Political Institutions	User Preferences & Purchasing Power
Demand		Organisational Cultures & Strategies
Markets and Market Actors		

Table 5: Structure of the analysis.

Economic Dimension of (in)stability

Being a key pillar of the political-economic setting in Cambodia, Phnom Penh's building regime is closely connected with and dependent on wider economic developments. As these often lie beyond regime boundaries, incumbents have closely aligned the regime with these parameters. Still, economic tensions emerge from within and beyond the regime.

Macro-Economic Setting: Phnom Penh's "building boom" is a manifestation of the inflow of foreign, primarily Asian, capital, which is part of the multi-faceted integration of the building regime into and dependency on international markets and networks. The inflow depends on attractive investment conditions, thus influencing national policy makers. In a fragmented market, where FDIs flow unequally into different market segments, (de)stabilizing pressures affect segments heterogeneously: The dependence on external finance can be a source of destabilization – especially for those market segments and building typologies such as condominiums that currently see the largest FDIs. The COVID pandemic showed that market segments that are stronger integrated into global networks in terms of funding or sales (e.g. high-end segment), were strongly affected by the interruptions of the international circulation of people, goods and capital than "local projects" (Pisei, 2022; N2). This points to the fragmentation of the regime, where segments can have different – but interlinked – (in)stability characteristics.

Firm Strategies and Expectations: Attracting profit-seeking FDIs requires firms to follow and reproduce profit maximising and cost, risk and turnover minimizing strategies. In a competitive and cost-driven market, assumed increases of production costs stabilise current and impede sustainable building practices. As an interviewed investor however noted, it is

expected cost increases that reproduce current practices, while sustainable ones might in fact be cheaper (I1). Changes in the perception of cost structures can therefore influence and destabilise firms' strategies. In fact, some interviewees already consider sustainable practices that are developed in niches, such as the use of compressed earth blocks to be competitive for larger projects in the local market (A1).

Besides cost increases, incumbent firms associate unfamiliar or more experimental sustainable building practices with project complications and prolongations (I1). Given high sales prices and a volatile market, firms follow risk-averse and quick turnover strategies to feed buildings as quickly into the market as possible. These largely prohibit experimental projects and stabilize current practices on the regime level. Interviewees believe that sustainable building practices would increase the import requirements due to limited local resource availability, including materials and capacities for their use. This makes sustainable building projects potentially more costly, lengthy, and furthermore risky, as dependencies on external actors and the uninterrupted international flow of goods further increase.

Technologies, Infrastructures and Costs: While most demand for basic building materials for the dominant concrete, steel, brick construction projects can currently be sourced domestically, higher value-added building materials are primarily imported. Compared to expected future demand, production capacities are small, even for basic materials (Pisei, 2021, 2022; Bodach, 2019). At the same time, an architect shared that production sites for more sustainable materials such as compressed earth blocks can be installed specifically for projects and be financially amortised within a single large project (A1). In contrast to other industries and contexts, the relevance of sunk costs in fixed material infrastructures can thus be considered to be rather low. Relatively little stability therefore stems from investments in these. Meanwhile, small-scale change towards sustainability reportedly occurs driven by efficiency-induced cost-reductions: Interviewees highlighted a change from individual air-condition units to centralised systems with smart controls (R1). These might lower emissions and costs through increased efficiency and destabilise the predominant use of individual AC-units. Yet, it stabilises and further normalises the large-scale use of air-conditioned indoor space. This destabilization might therefore *win the battle* against inefficient single-unit AC units, while *losing the war* against large-scale air-conditioning. As such, this might be understood as an incumbent-led reconfiguration process that is based on savings and small technological change.

Demand: Meanwhile, local demand slightly increased for (certified) sustainable buildings and supported the emergence of sustainability-oriented market actors. Demand is reportedly driven by some local pioneers, but predominantly by international organisations and TNCs that moved into green certified offices. Many of these do so to follow their headquarters' sustainability requirements. An industry actor accordingly shared: "[A]wareness is now solely coming from the multinationals" (RE1_2, p. 176). Global-level regime actors of different socio-technical systems, including, Daimler, or Coca Cola have hereby been supporting the emergence of niche actors within the building system in Phnom Penh. Almost all sustainability certified buildings are therefore offices or industrial buildings (USGBC, 2022). This demand can cause regime internal tensions as sustainability aspects must be integrated into these projects.

Markets and Market Actors: The FDI-led "building boom" caused an oversupply in high-end segments of the residential market in Phnom Penh (CBRE, 2022; N2). This increases the need for market differentiation and – according to an architect – could "open the door" for actors interested in experimental and more sustainable practices with lower profit margins, with certified green units being a key option (A1, p. 170). Meanwhile, local actors – both niche and incumbents – have implemented small-scale experiments with sustainable building practices and materials, including prefabricated wooden construction units, bamboo elements, compressed earth blocks, etc. Also, on a small level, sustainable building consultancies and certification firms have been established, either as local branches of global firms, or as local start-ups. Interviewees accordingly argued that "you start to have some real actors" (A1, p. 138), even though they "don't have a platform" for exchange, yet (A3, p. 138). As niche actors, these firms have identified business opportunities, or cracks in the status quo, and aim to use these to strategically further sustainable building practices – amongst others through experimentation, and institutional work (as discussed below). Still, destabilizing effects from the emerging actors and experiments that can be associated with niche-level activities, might still be considered relatively weak, as multiple interviewees voiced that the "market is not mature enough" (C5, p. 21), or that green building "is too early for this country" (R2, p. 35). Nevertheless, developers have marketed a number of recent projects in Phnom Penh as "eco" or "green", including "Eco-Collection", & "Eco-Village"; however, as the green or ecological dimensions are neither explained, nor recognizable, interviewees consider these processes as "greenwashing" (I1, p. 124). Still, they can be understood as regime responses to socio-cultural changes to which we turn below.

In summary, the economic dimension indicates both (de)stabilizing effects, the emergence of sustainability-oriented market actors, small-scale demand and emerging sustainable building practices, but at the same time very stable regime constellations, including risk-averse and quick turnover strategies, speculative and volume building activities and a dominance of international investment structures. Still, low levels of sunk costs in dominant technologies, ongoing experiments and eco-marketing, partial oversupply and the possibility of competitive sustainable building practices indicate threats to the reproduction of the regime.

Political-Institutional Dimension of (in)stability

Besides – and closely connected to – these economic sources of (in)stability are those associated with the political-institutional dimension, including political priorities, formal(ised) institutions and visions, and informal political institutions.

Political Priorities: With GDP growth being a key development priority and a cornerstone of political legitimacy in Cambodia, and the urban building sector a key pillar for GDP growth, building projects are closely connected to notions of economic growth, profitability, and the attraction of FDIs (R2), thus stabilizing practices along these lines. National development priorities therefore manifest in Phnom Penh's urban built environment. Following decades of conflict and the post-socialist transition in the early 1990s, building sustainability has not been a governmental priority: "[I]f you look at where this country was 20 years ago, [...] it was basically a war zone, […] it's just not the first thing that springs to mind" (C3_4, p. 86). A key dimension of the stabilising factors thus relates to the post-conflict and post-socialist setting where developmental and FDI-attracting priorities have been dominating political agendas, thus stabilizing an investor-friendly policy space.

Formal Institutions & Visions: Despite the dominant political priorities, several formalised institutions emerged in Cambodia within the field of urban and building sustainability, including the Cambodian Green Building Council (CamGBC) and two inter-ministerial Technical Working Groups on "Green Buildings" and "Sustainable Cities", both led by the National Council for Sustainable Development (NCSD). NCSD and CamGBC currently both develop national guideline and certification schemes for green buildings (CamGCGB & CAMEEL). In contrast to the inter-ministerial working groups that are supported by Korean development finance, CamGBC was founded by individuals from the sector that are engaged with green building consultancies and contracting on a niche level. An interviewed state official shares, that the CamGBC proposed a private-led certification system to the

government, but "of course we could not agree to that" (NS1, p. 29). Potentially destabilizing, private-led and niche-level momentum is hereby contained by the state. These formalised and still formalizing institutions and their emerging certification systems are subject of institutional work and struggle between actors, with both niche and regime associations. Still, both aim to create spaces of experimentation for sustainable building practices. Formally, the state has controlling influence over the private CamGBC, as in Cambodia the latter needs clearance from public bodies for any formalization step (RE1_2). Interviewees also note inter-ministerial struggles: The Ministry of Land Management, Urban Planning and Construction (MLMUPC) generally oversees building activities, while the Ministry of Environment (MOE) and the associated NCSD are driving green building programmes (N2). This indicates intra-state differences in terms of their association of status quo and stability (i.e. regime, MLMUPC) and innovation, destabilization and change (niche level, NCSD/MOE).

Meanwhile, a consultant argues that institutional overlapping and the fragmentation of state agencies slow regulatory impulses (C2). Thus, a „silo" setting (R1, p. 60) coexists with numerous "ineffectual" inter-ministerial working groups: "[T]here are a dime a dozen, they exist on paper. […] No one makes a decision and so nothing gets progressed" (C2, p. 75). Therefore, interviewees are generally rather sceptical that significant destabilization effects can be realised on the basis of laws and regulations in the near future, arguing that "Cambodia is not in a good place to do a lot of regulation" (A2, p. 93). Interviewees are equally reserved on the actually-existing pressures based on laws and regulations –stating that generally little regulation exists (C1; A2), or that existing ones are not operational or enforced (A3; CA3_4). While regulations might theoretically exert strong pressures, their articulation by enforcement would be necessary to initiate real world effects and potentially destabilise current practices. However, low levels of formalized rules also leave room for experimentation and potential destabilization: Developers can choose and follow a building code out of the global pool of existing rules, leading most international developers to use their "home" code (C5).

Still, several formalised and government-endorsed normative visions on urban and building sustainability have been passed. This includes the "Phnom Penh Green City Strategic Plan" (GGGI et al., 2019), or other strategic or vision documents passed by the government that touch on urbanization but not specifically on sustainable building. Instead of supporting niche-level activity, these documents directly target the regime. The driving force behind such processes and sustainability discourses are reportedly international development institutions in Cambodia. Some visions or plans propose sustainability-themed ideas that partially

question the status quo, but interviewees are rather sceptical regarding the actual destabilizing effects, due to very limited buy-in from political elites and the absence of dedicated funds (N2; C3_4).

Informal Political Institutions: The limited impact of formal regulations can be directly linked to the building regime's embeddedness into a (neo-)patrimonial setting at the landscape level where personal and unequal relationships of mutual help and obligations form patron-client networks. A consultant argues: "Patrimonial influences, nepotism and all that drives everything here. If you do not have a powerful supporter, things do not happen" (C2, p. 87). A lack of buy-in from powerful individuals within the patrimonial networks, can thus inhibit deliberatively sought processes of change. An investor therefore argued, that when drawing up sustainable building mechanisms, "you have to keep in mind that there's a certain amount of money the government makes" (I1, p. 286). In this context a clear disentanglement of private and state actors is often difficult, as a NGO representative argues: "[G]overnment and private sector is the same in this country" (N2, p. 221). Here, close inter-personal and inter-firm relationships stabilise current practices. Discussing the introduction of new materials in the building sector, an investor argued that actors would rather stick to their existing materials due to the existing relationships with the supplier: "I can help my buddy that owns the concrete plant or tree farm versus help this foreign guy bringing in his material" (I1, p. 122). Stabilizing effects of socio-political commitments thus also spill over into material dimensions.

To establish good relations with key government and party actors, industry actors implement projects as corporate social responsibility projects or *Sang Song* (Khmer: "doing construction"). It involves the construction of buildings such as schools by private actors that are officially opened by and then associated with party elites or the governing party in exchange for preferential access or protection (Craig and Kimchoeun, 2011). These practices – though aligned with the prevalent agenda, and potentially used as fig leafs – offer some room for unorthodox and experimental activities, as they do not necessarily have to abide to the regular guiding principles (including profit maximisation, etc.). *Sang Song* and CSR practices thus exhibit ambivalent (de)stabilizing effects. Still, while the introduction of the affordable housing policy (RGC, 2017) brought pilot affordable housing projects closer to the political agenda and initiated Affordability *Sang Song*, green building regulation might offer the opportunity for Sustainability *Sang Song* – potentially demonstrating the feasibility of such practices in the local context.

The (neo-)patrimonial setting allows powerful incumbents to stabilise current practices in a number of ways: Firstly, incumbents reportedly actively seek and negotiate the selective enforcement of regulation. Negotiations are based on political power, and how actors are "connected with local politics" (N2, p. 34). Some see lax enforcement also as a result of a lack of finances and capacities at the sub-national level (CA1), or a response to the FDI-dependency, to make investments in Cambodia's real estate more attractive (I1). Secondly, resourceful actors can reportedly influence the development of new rules in their interest, perpetuate the process or affect its enforceability at the outset (C2). Interviewees question whether the unenforceable character of much policy is accidental or planned (CA3_4, p. 2) and referred to the "back-firing" of regulation and that additional regulation can further disadvantage "honest" actors, as in the case of anti-corruption reforms (A2). Thirdly, incumbents employ non-transparency and information hoarding strategies to restrict market access. These stabilise current configurations in the interest of well-informed incumbents. Lastly, interviewees argue that the reinforcive power of political elites allows them to render a number of themes around governance, or law enforcement "politically off the paper", as "no-go[s]", or "off topic[s]" (R1, p. 108; RE1_2, p. 122; I1, p. 290).

To summarise, within the political-institutional dimension, current practices are strongly stabilised along the interests of patrons and their networks. The embeddedness of the building regime in this setting (dis)empowers regime actors unevenly. Our analysis thus shows strong stabilizing landscape effects within the political-institutional system dimension. Here, it is primarily the embeddedness in patrimonial networks, their influence over processes of regulatory enforcement and development, the limited buy-in to passed laws and visions, and the prevalence of political priorities of economic growth by real estate developments that stabilise the reproduction of the regime. Meanwhile, ongoing institutional work by niche actors, emerging formal green building institutions and the support of international development institutions initiate some destabilizing momentum.

Socio-Cultural Dimension of (in)stability

Finally, socio-cultural sources of (in)stability can relate to ways of thinking, beliefs and knowledge that are shared by larger groups. In the case of Cambodia, the influences of different periods and (colonial) regimes have shaped the societal functioning in diverse ways (Berkvens, 2017; Springer, 2009a).

Socio-cultural Setting, Values & Aspirations: Socio-culturally, interviewees argue, Cambodia is a "dynamic context" and "in a position where things can shift quickly", as people

are "extremely concerned with what is cool, what is the latest […] less worried about conserving but rather worrying about getting stuck" (A2, pp. 117–119). According to the interviewees some urban groups, particularly the young generations, are „picking up everything green" (RE1_2, p. 30), want to „be more responsible", (A2, p. 117), or develop an explicit interest in sustainable housing (C5, p. 128), while „demanding the latest instead of conserving previous consumption practices" (A2, p. 117). With increased levels of awareness and interest in sustainability and more critical consumption practices, these groups question and threaten the reproduction of dominant configurations, or how Phnom Penh is built and developed. Interviewees connect these destabilizing dynamics to increased exposure to global discourses and higher education – aspects that are arguably more pronounced in Phnom Penh than elsewhere in the country (A2; C5).

Interviewees, meanwhile, see Cambodian households to be significantly influenced in their decisions by „big players, those big VIPs" (A1, p. 130). These are important role models that can communicate guidance, desirability and trustworthiness for status-seeking households that might be directed towards sustainability: "[E]veryone wants to look like the top […] we are in Cambodia, people lack of education, lack of models, lack of rules, lack of policies, so they need to have drivers, something that represents trust, confidence, prosperity " (A1, pp. 130–134). While their practices currently stabilise the status quo, multiple interviewees see destabilising potential through a trickle-down environmentalism led by the "big players", and yet a researcher argues: "someone has to trigger the gun" (R2, p. 106). While the hierarchical character of Cambodia's society might suggest top-down processes of change, emerging mixed belief systems and the experimentation on the niche-level render this more ambiguous.

Citizens and Public Discourses: A series of deadly building collapses across the country raised national awareness on building safety, regulation and quality (Narin, 2019). Following these incidents, interviewees expect incumbents to face more societal scrutiny and potentially a "turning point" for the sector (C3_4, p. 74). Whether this will venture beyond safety to also encompass broader sustainability concerns remains open, however. So far, civil society actors and the media have had other (sustainability) priorities, including waste management, traffic, or air pollution (C3_4). Nevertheless, interviewees indicated destabilizing effects linked to the emergence of the group of young, highly educated and globally connected, urbanites with higher incomes, as they become more "demanding" than previous generations. Referring to inter-urban competition, an industry consultant claimed that these groups would even leave Phnom Penh if liveability is not increased (C5, p. 169). These "more demanding" and sustainability-interested groups question dominant practices and together with the building

collapse-induced increase of public scrutiny, increase the legitimization needs of incumbents within the political-institutional dimension: As these groups are reportedly less satisfied with political legitimacy based on GDP growth and political stability alone, political legitimacy might be diversified and include aspects of quality of life, or sustainability. This is supported by Verver and Wieczorek (2007), who argue that post-Khmer Rouge generations are less likely to accept the status quo in exchange for political stability. Considering these changes, more vocal civil society activities, and a stronger questioning of current practices of incumbents become more feasible and partially already visible.

User Preferences & Purchasing Power: Meanwhile, financial planning horizons and income levels of many households have increased. This landscape level factor destabilises those housing decisions that have been based on short-term calculations, and opens up possibilities for (sustainable) building practices with higher upfront costs for households, including renewable energy sources (A2). A more ambiguous role is played by the diverse connotations of building materials in Cambodia: According to an architect, wood and nature-based solutions that are propagated by some niche actors, are associated by some with luxury and status, by many however with rurality, the past, and poverty (A3). Stronger destabilising effects and a shift towards sustainable materials are imaginable if such solutions become discursively decoupled from the latter and more aligned with aspirational attributes. Still, for the previously discussed household groups of young, educated urbanites, interviewees note a nascent shift towards more sustainable (or sustainability-branded) projects. The aforementioned eco-marketing practices can be understood as a strategic response of incumbents to these dynamics.

Organisational Cultures and Strategies: While priorities, ideas and demands shift – at least in some groups – interviewees shared that many firms are "very, very old school" and thus, as previously discussed, follow risk averse strategies and reproduce prevailing practices (A1, p. 38). Socio-cultural orthodoxies of incumbents concern market perceptions, value considerations, and calculatory practices that stabilise the status quo. Thus, for example, incumbent developers maximise indoor space and the number of rooms within a unit because these parameters are the main orientation due to their standardised marketability. In contrast, marketing a larger share of high quality outdoor space is not standard practice in a comparable way (A2). While incumbents largely follow "old-school" and conservative strategies, some advertise units in the language of environmentalism to indicate a cultural shift following sustainability discourses, values and demand of some building users as discussed above.

Others, including niche actors and also some incumbents meanwhile experiment with new ideas, including building materials and designs (A1; A3; D1).

To summarise, we see that socio-cultural factors are fluid and primarily have destabilizing effects on the regime – that is, destabilizing effects towards practices that are considered more aspirational by these groups. These could then in turn be potentially more sustainable. While some aspects such as the emergence of globally-oriented, sustainability-interested groups of educated urban youth and more vocal citizen groups, extended financial planning horizons, and the discursive effects of the building collapses indicate destabilizing effects, the dominance of conservative organisational cultures supports the reproduction of the status quo. Meanwhile, the effects of other elements such as the diverse connotations of building materials or the hierarchical setting are rather ambiguous. A summary of the identified (de)stabilizing factors across the socio-technical dimensions is shown in (Table 6). We will turn to their discussion in the next session.

De/stabilising Factor	Destabilising Effect	Stabilising Effect	Directionality of Destabilisation	MLP-Locus	Scale
Economic					
Oversupply in some housing market segments	x		Potentially sustainable	Regime	Local
COVID-induced slump in building activities and funding	x		Potentially sustainable	Landscape	Local/Global
Emerging market demand for sustainable practices	xx		Sustainable	Regime/Landscape	Global/Local
Small-scale experiments with sustainable practices	xx		Sustainable	Regime/Niche	Local/Global
Cost-reducing technologies	x	x	Potentially sustainable	Regime	Local/National/Global
Relatively low-levels of sunk costs	xx		Potentially sustainable	Regime	Local/National
Fast amortization of production investments due to large project size	x		Potentially sustainable	Niche/Regime	Local/National
Firms' strategies of profit maximization and cost minimization	x	xx	Potentially sustainable	Regime	Local/National/Global
Risk-averse and quick turnover strategies of firms		xx	Rather unsustainable	Regime	Local/National/Global
Integration in international networks (markets, finance)	x	x	Potentially sustainable	Regime	Global
Eco-Marketing/Greenwashing	x	x	Potentially sustainable	Regime	Local/National
Political-Institutional					
Establishment of formal green building institutions	xx		Sustainable	Regime/Niche	National /Global
Passing of state-endorsed sustainable building & city visions	x		Sustainable	Regime/Landscape	National/Global
Building activities & urban development as key pillar for GDP growth and political legitimacy	x	xx	Rather unsustainable	Landscape	National
Other developmental priorities		xx	Rather unsustainable	Landscape	National
Overall limited regulation	x	xx	Potentially sustainable	Regime/Landscape	National
Weak enforcement capacities of municipalities		xx	Rather unsustainable	Regime/Landscape	Local/National
Overlap & fragmentation of state agencies		xx	Rather unsustainable	Landscape	National
Industry embeddedness in patron-client networks	x	xx	Potentially sustainable	Regime/Landscape	National
Perpetuation and influence over policy process		xx	Rather unsustainable	Regime	National
Limited enforcement of existing regulations		xx	Rather unsustainable	Regime	Local/National
Green *Sang Song* or CSR Activities	x	x	Potentially sustainable	Regime	National
Information hoarding & intransparency		xx	Rather unsustainable	Regime	National
Establishment of discursive "no go's"		xx	Rather unsustainable	Regime/Landscape	National
Need to diversify political legitimacy	x		Potentially sustainable	Landscape	Local/National
Socio-Cultural					
Fluid and dynamic socio-cultural setting with changing user demands and a global trend orientation of building users	xx		Potentially sustainable	Regime/Landscape	National
Emergence of a *critical* group of building users (higher income, educated, globalized)	xx	x	Potentially sustainable	Regime/Landscape	Local/National
Hierarchical and "VIP-driven" socio-cultural setting	x	x	Potentially sustainable	Regime/Landscape	National
Ambiguous connotations of alternative building materials	x	x	Potentially sustainable	Regime/Landscape	National
Longer financial planning horizons of households	xx		Potentially sustainable	Landscape	Urban/National
Building collapses & public awareness	xx		Sustainable	Regime/Landscape	Local/National
Socio-cultural orthodoxy of Industry actors		xx	Rather unsustainable	Regime	National
Other foci of civil society groups		xx	Rather unsustainable	Landscape	National

Table 6: Summary of (de)stabilizing effects (xx indicates stronger effects than x).

2.5. Discussion: (In)stability Configurations & Seeds of Destabilization

Our results indicate a heterogeneous (in)stability configuration with a number of ingrained seeds of destabilization. The configuration is characterised by diverse and ambiguous (de)stabilizing dynamics across system dimensions, scales, space and levels of structuration. We note the relative alignment of destabilizing effects including emerging belief systems and groups of globally-oriented, sustainability-interested urban youth, extended financial planning horizons of households, discursive effects of building collapses (socio-cultural), ongoing institutional work by niche actors and emerging formal green building institutions (political-institutional), as well as the emergence of sustainability-oriented market actors, experimental projects, small-scale demand, and destabilizing market effects of oversupply (economic dimension). Other factors such as the diverse connotations of wood and nature based solutions meanwhile have ambiguous (de)stabilizing effects. While Turnheim and Geels (2012) argue that it is primarily economic drivers that generally cause transitions that are mediated by socio-political factors, our findings suggest that in the case of Phnom Penh's building regime, destabilizing effects are concentrated within socio-cultural and economic dimensions, whereas the strongest stabilizing effects can be associated with political-institutional factors. While noting stabilising and destabilising effects across all dimensions, no major transition processes are yet observable that would indicate a "take-off" or acceleration phase.

Modifying earlier claims (Hansen et al., 2018; Wieczorek, 2018), our study shows that regimes in the Global South are not *per se* less stable than in the North, but what differs is the profile of (in)stability constellations across different regime dimensions. Political-institutional system characteristics that stabilize the building regime – namely its embeddedness into a (neo-)patrimonial system, authoritarian and illiberal tendencies, low regulatory enforcement, a strong shadow state and weaker and less efficient state institutions – are system characteristics that are discussed for Global South contexts by others. However, in contrast to previous findings (Hansen et al., 2018), these factors may *stabilize* incumbent configurations rather than *destabilizing* them. Here, they can be associated with strategies of regime resistance, an "informality from above" (Roy, 2009), "state capture" (Loehr, 2012) or "gray spacing" (Avni and Yiftachel, 2014). The findings strongly resonate with Noboa and Upham's argument that regimes in illiberal contexts can be stabilised by "state capture" (2018). This suggests that socio-technical systems in contexts with a comparable political-institutional setting, or similar "institutional pockets" (Ramos-Mejía et al., 2018), in or outside the Global South might see similar stabilization dynamics. Considering the strong stabilization through

networks of patronage and their domination over state agencies (state capture), practices of rent seeking and asset-stripping (Springer, 2017b), the existence of a "benevolent state" - as conventionally assumed in transitions studies – can no longer be taken for granted (Lawhon and Murphy, 2012; Rock et al., 2009). Consequentially, this should be reflected in transition governance approaches in such contexts, possibly involving a de-centring of the state in transitions strategies. Even Larbi et al. (2021a) who found that in the context of a "repressive dictatorship" in Curitiba, progress towards an urban sustainability transition was made due to "enlightened leadership", consider this approach to be "fraught with risk". While the stabilising effects of political–institutional factors prevail in our case, they still bring some destabilizing potential, too: The relative absence of regulation creates space for change-inclined actors to experiment; developers can draw on regulation or guidelines of their choice, and experimental actors and their innovative ideas are less limited by regulations – which is rather common in more mature systems (Smith, 2007). Regarding Hansen et al.'s (2018) observation that Southern regimes are in a "state of flux", our case indicates unequal fluidity: While many factors such as socio-cultural ones are dynamic, political elites and incumbents have been able to reproduce political structures. Phnom Penh's building regime and its local context thus are not characterised by less, but rather high levels of political and economic stability compared to the Global North (Un and So, 2009; Hughes and Un, 2011b). This stability is however "bought" in exchange for democracy and equity, as argued by Ear (2013). In a fragmented market, meanwhile, different market segments are subject to different, or splintered (de)stabilizing dynamics, as we saw in the case of the more globally exposed high-end condominium segment. While our findings support Berkhout et al.'s (2009) assertion that economic commitments might be less relevant in Asian contexts, our study indicates that *different*, and not necessarily less, commitments are prevalent: Here, it is primarily the socio-political commitments to patrons, clients or wider social networks that must be overcome and much less those commitments to particular technologies or material infrastructures – less stable regime dimensions thus coexist with dimensions that are more resistant to change in the (in)stability configuration of Phnom Penh's building regime.

A reason for the relatively low levels of economic commitments is the integration of parts of the building regime in translocal, international economic structures: Our study shows a high regime reliance on foreign sources, including knowledge, building materials, technology and even regulation; adding to Rip and Kemp (1998, p. 369) we could identify an exogenous "science, technology, finance and regulatory base". Relatively little regime stability thus relates to local sunk costs, investments in technologies, production facilities and other economic

commitments. The exogenous base highlights the translocal, relational and multi-scalar characteristic of the "local" building regime. Consequently, several destabilizing factors go beyond local or national scales. This includes donor-support, sustainability discourses, socio-cultural effects of globalized media consumption, or TNCs that follow global sustainability standards in their local buildings. TNC activities showed that even global regime actors of other socio-technical systems can support local niche-formation within the building system, as exemplified by firms such as Daimler or Coca Cola. This also explains the fact that most existing certified sustainable buildings are either office or industry buildings. Other translocal actors involve international development organisations and emerging local branches of international (engineering) consulting firms that can both mobilise knowledge through their "inter-office knowledge communities" (Faulconbridge, 2013, p. 339). This highlights the crucial role of the relations between global niches and territorially embedded niches, and even global regimes of other socio-technical systems and local niches and associated re-scaling processes (Miörner and Binz, 2021). This indicated that a practice (such as compulsory green building certification for some TNCs) can be associated with a higher level of structuration globally (global regime), while simultaneously being part of a niche locally.

While the geographies of transitions literature postulates that the proximity of the urban level translates into social proximity of transition agents, this was rather negated by interviewees in our case: Despite the spatial proximity, frontrunners are reportedly not connected through any (in)formal platforms. This fragmentation of actors has been discussed as an impediment of niche development in other contexts of the Global South, too (Hansen et al., 2018). Our case suggests a multidimensional marginalisation of niche actors that goes beyond the structural marginalisation vis-à-vis regime actors: In an illiberal, authoritarian setting, destabilising innovations might be read as opposition and can be met with a "severe response" (Noboa and Upham, 2018). Livelihoods, meanwhile, are not as secure as in Northern settings, innovators cannot fall back on a welfare state if experimentation is unsuccessful; and they can draw on much less funding for experimentation and innovation than their Northern counterparts.

While some short-term shocks (building collapses) were noted to affect the (in)stability configuration, most destabilising factors have been affecting the regime over extended periods (households' extended financial planning horizons). Meanwhile, the regime temporality of accelerated urban development in Phnom Penh and quick turnover strategies is however at odds with the expected deceleration through sustainable building practices. The directionality that was noted for some of the (de)stabilising effects should be understood as latent, as the

trajectories are subject to multiple pressures, including the politics of transition processes and deliberate forms of destabilisation (van Oers et al., 2021).

Without disputing that the multiplication and persistence of destabilizing effects is useful for a transition to take off (Turnheim and Geels, 2012; Martínez Arranz, 2017), we argue that a closer look into the destabilizing effects as part of (in)stability configurations is useful: It can address the multiplicity of transition processes (Hodson et al., 2017), shed light on potential cracks and trajectories towards sustainability and can be a baseline for the development of targeted transition governance strategies, i.e. *contextualised fertiliser for the seeds of destabilization*. Without naively targeting the management or planning of transitions (Block and Paredis, 2019), our study indicates promising entry points that might support destabilization processes and a sustainability transition for Phnom Penh's building regime: These involve the furthering of the socio-cultural sources of instability, showcasing the economic feasibility of sustainable practices and supporting the emerging sustainability-oriented innovators. The emergence of niche actors (and experimental regime actors) might be supported by strategic activities of coalition building and co-development of visions and strategies to counter their fragmentation and enhance transformative capacities and knowledge – for example through transition arenas (Noboa et al., 2018; Wolfram, 2016). The combination of local and translocal networks that might be useful in general, would be of particular importance in our case, where local niche actors might "jump scale" and collaborate with global niche and regime actors, including donor organisations, in order to counter the political-institutional stabilizing mechanisms on the national-level (Avelino et al., 2020). Such coalitions, that could equally include Cambodian "VIPs", might develop strong narratives and alternatives that further question the stabilizing practices of "the core alliance" at the national regime level (Geels, 2014, p. 26). As Hansen and Nygaard (2013) warn that short-term project horizons of local niche-global donor organisation cooperation can limit benefits, cooperation should involve institutionalised forms that transcend project timeframes. Discursive strategies could involve the linking of dominant "modernity" and "progress" narratives with "liveability" and "sustainability" and hereby support the diversification of the legitimization base for ruling factions, or the alignment of natural building materials and sustainable vernacular design with aspirational categories. Sustainability education and awareness raising on building-related sustainability themes can further the socio-cultural destabilization processes. The operationalization of "Sustainability Sang Song" might be another strategy to address the place-specific institutions by using the particular room for experimentation while showcasing the economic feasibility of sustainable practices. Strategies can thus

simultaneously address multiple stabilizing and destabilizing factors. As destabilization pressures do not automatically imply a move towards increased levels of sustainability, strategies could furthermore involve targeting destabilizing pressures with ambiguous directionalities and steering them towards higher levels of sustainability. The regime's embeddedness in a (neo-)patrimonial setting and the observed political-institutional stabilization dynamics render overly policy- or state-focussed approaches less promising and suggest a de-centring of the state in local transition strategies. However, carefully negotiated coalitions with change-inclined individuals within state agencies might still be worthwhile.

2.6. Conclusion

This paper has sought to contribute to research that aims to open up transitions studies to the diversity of incumbencies beyond the Global North and cases where transitions have already accelerated or "taken off". Doing so, we proposed an analysis of *(in)stability configurations* to better understand the intertwinement of stability and change in early transition phases. We have argued that *seeds of destabilization* are already ingrained in regime structures before transition processes become apparent and that the identification and characterization of these seeds and the cracks and trajectories towards urban sustainability that they potentially open up can support the development of contextualised transition strategies.

Employing the building sector of Phnom Penh as a case, we studied the sources of (in)stability across economic, socio-cultural and political-institutional regime dimensions. Our findings suggest an ambiguous (in)stability configuration with tensions primarily across socio-cultural and economic dimensions, and political-institutional forms of stabilization. Instead of technological or economic commitments that must be overcome, it is here primarily the normative, or social commitments to patrons, clients and the individual networks. Applying our (in)stability configuration framework also allowed us to identify openings, or seeds of destabilization that can be the basis for transition interventions. These openings shall not be understood as deterministic, but as informing the contours of potential transition trajectories towards sustainability. Further studies might apply and extend our framework for other cases to identify (in)stability configurations and develop contextualised transition interventions. Different typologies of (in)stability configurations might then be developed across transition contexts. Meanwhile, the "de-centring" of transitions research to and within "southern regimes" and the analysis of heterogeneous transition contexts including the Global South, illiberal democracies, etc. remains critical (Preuß et al., 2021): The majority of transitions that are required to realise sustainability globally, are arguably embedded in contexts unlike the

classical liberal-democratic transition contexts. As it is these cases that are actually rather exceptional, one might paraphrase Jennifer Robinson (2013) and argue that a shift towards "ordinary transitions" in diverse and heterogeneous contexts still remains highly desirable in transition studies.

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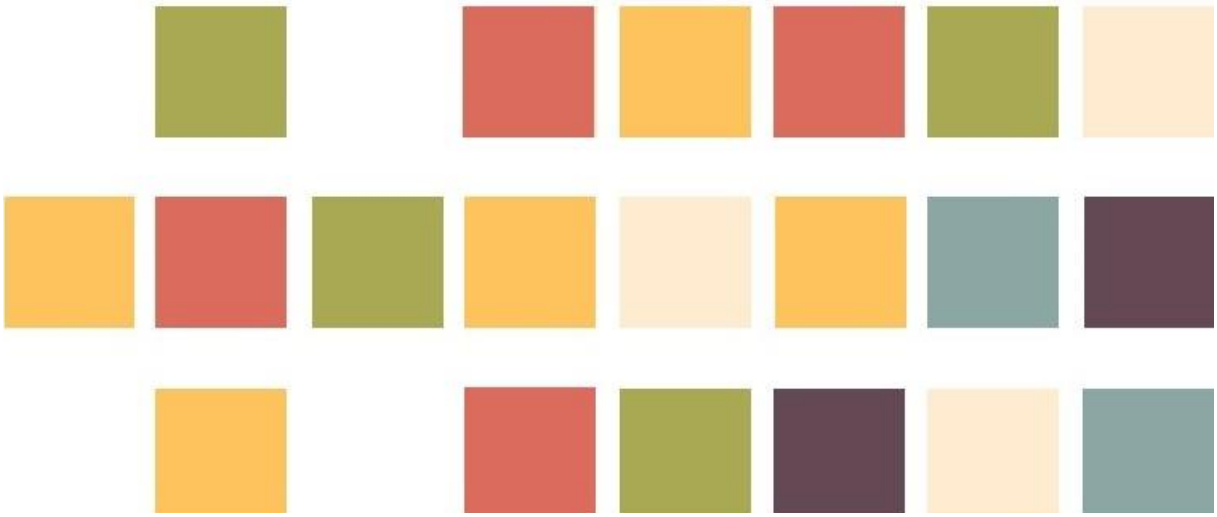
Chapter 3: Constructing a Transition Governance Framework



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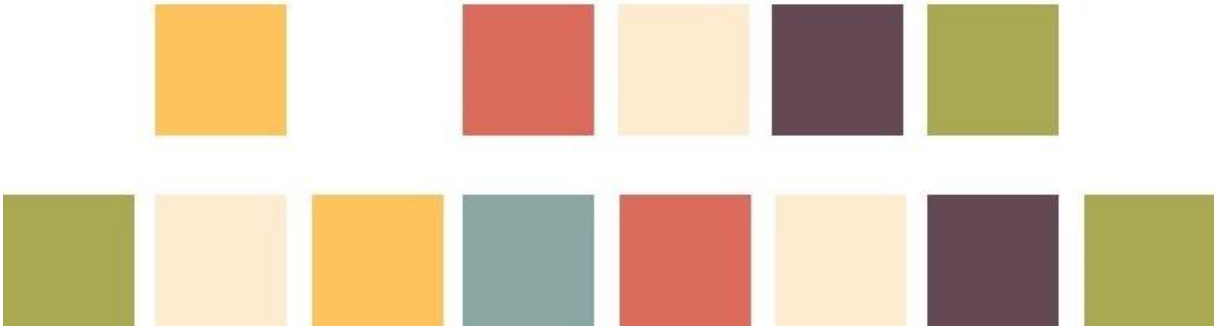

Sustainable building arenas: Constructing a governance framework for a sustainability transition in Cambodia's urban built environment

Abstract

Transition governance approaches for the building sector have been discussed for more than a decade. Very little work has however moved beyond the socio-political contexts of the Global North to scrutinize the spatial-institutional challenges of sustainability transitions in the Global South, or more illiberal contexts. Consequently, this paper introduces a transition governance framework, a Sustainable Building Arena (SBA), that addresses the contextual particularities of the urban building regime and its de/stabilizing factors in the case of Cambodia to inform transformational change. The design of the SBA draws on the literature on urban Transition Management, Transition Management in the Global South, as well as transdisciplinary Transition Management arenas, and extends these concepts to Cambodia's urban built environment. It furthermore builds upon the results of an extensive analysis of the socio-technical system and an evaluation of residential buildings in Phnom Penh, including indoor environmental conditions. The SBA is conceptualized as an informal institution and as a protected and co-creative space at the science-policy-business-civil society interface. It allows sustainability-minded but often marginalized actors to co-produce and pluralize knowledge - including the co-development of problem framings, visions and transition strategies – and facilitates cooperation, as well as the creation of alternative discourse coalitions and networks of social capital. Overall, the paper argues that such scientifically grounded and participatory processes, that are attentive to and designed for the particular spatial-institutional context, can indeed support the development of actionable knowledge, the empowerment of marginalized actors and support collective action for transformative change in the built environment sectors in contexts outside the Western liberal norm of transition studies.

Keywords: Urban sustainability transitions, Global South; transdisciplinary research; Transition Management, Cambodia

3.1. Introduction

Transition governance approaches for the urban built environment sector have been discussed for more than a decade. Little work has however moved beyond the socio-political contexts of the Global North to scrutinize the spatial-institutional challenges of sustainability transitions in the Global South, or illiberal contexts (Novalia et al., 2020; Köhler et al., 2019). While most transition knowledge and concepts stem from the Global North, many sustainability challenges are however located in the Global South (Pereira et al., 2020; Nagendra et al., 2018). As their spatial-institutional and particularly their socio-political contexts differ starkly, it requires meaningful understanding of heterogeneous contexts and urban sustainability transition processes, i.e. processes of "non-linear change for sustainability that profoundly transforms cities and the systems they form part of" (Wolfram, 2016, p. 121) and furthermore adequate transition governance frameworks (Noboa et al., 2018; Noboa and Upham, 2018; Noboa et al., 2019). This is pertinent as transition challenges are just as much related to politics, institutions and governance as they are to technology (Newton, 2017, p. 22; Noboa and Upham, 2018).

Consequently, this paper introduces a transition governance framework, a Sustainable Building Arena (SBA), that addresses the contextual particularities of Cambodia's urban built environment regime and its de/stabilizing factors to support transformational change. We argue that the context-sensitive SBA framework and its key principles, including a differentiated inclusion of actor types and changing actor constellations throughout the SBA process, as well as the breaking of hierarchical relations in the SBA context are also useful for applications in other heterogeneous transition contexts. The paper therefore aims to add to the literature on sustainability transitions, particularly those in cities of the Global South and seeks to contribute to the global challenge of delivering sustainability in cities and the urban built environment. This framework brings together the literature strands on urban Transition Management (2.1), transition governance frameworks for the Global South and illiberal contexts (2.2), and research on Cambodia's transition context (3). These will be briefly discussed in the next part, before the SBA is subsequently outlined (4).

3.2. Review of Relevant Literature

3.2.1 Urban Transition Management

Transition Management (TM) is a theory of societal change management that builds on complexity science and governance theories. It is both an analytical and an operational tool. As an operational governance approach, it aims to support large-scale structural change of socio-technical regimes towards sustainability by mobilizing selection pressures against the dominant socio-technical formation of the regime through stakeholder engagement and the support of niche activity

(Roorda et al., 2014; Frantzeskaki et al., 2018b; Kemp et al., 2007; Wittmayer et al., 2018). TM applications aim to change institutional structures, practices and cultures, and therefore "work at the fringes of existing institutions" (Wittmayer and Loorbach, 2016). Key principles of TM involve long-term thinking, radical incrementalism, and a focus on systemic insights, social and institutional learning and co-creation. The operational framework of TM distinguishes four levels of governance activities, namely a strategic, tactical, operational, and a reflexive level. Governance activities on the strategic level involve long-term and system-level aspects, including the development of a shared understanding of current challenges and a desirable long term vision for the system. This involves the establishment of co-creative fora where selected actors engage cooperatively. On the tactical level, participants of the transition arena shift the focus to the mid- and short term and to sub-elements of the system to break down the vision into a set of achievable steps (Transition Agenda). The operational level then involves the actual planning and implementation of specific projects or experiments in the short-term, while the reflexive level finally deals with monitoring and evaluation activities (Hölscher et al., 2018; Wittmayer and Loorbach, 2016). The literature on transdisciplinary research highlights that such fora offer promising possibilities for the co-production of knowledge at the interface of policy, science, business and civil society (Lang et al., 2012).

After an initial focus on societal systems (as sectors), transition scholars, recently, increasingly applied TM to spatial units such as cities. Different concepts, such as urban living or transition labs, were developed for its operationalization on the city level (Frantzeskaki et al., 2018c; Frantzeskaki et al., 2018b; Walsh, 2018; Nieminen et al., 2021). Key aspects of applying TM in cities involve geographic, personal and institutional proximity and interactions between scales and domains. In urban TM, participants are considered to take part not only as professionals, but equally as inhabitants who might identify more with the city and can hereby connect more through a shared purpose (Wittmayer and Loorbach, 2016). TM has however been criticized for being Euro-centric, lacking contextual considerations, or being "devoid of the sense of place and space" (Pant et al., 2015, p. 210; Noboa et al., 2018). We will therefore move forward to discuss approaches that attempt to contextualize (urban) TM to heterogeneous settings of the Global South.

3.2.2 Transition Management in the Global South

Only in recent years have scholars begun discussing transitions outside of the Western European heartland of transition studies. In the Global South, characteristics of socio-technical regimes, their spatial-institutional contexts and processes of regime de/stabilization processes arguably differ significantly from those in the North (Hansen et al., 2018; Larbi et al., 2021b; Jayaweera et al., 2023). Scholars have identified a number of tendencies that can characterize transition

processes and transition contexts in the Global South. Some, such as Hansen et al. (2018) and Wieczorek (2018) argue that the instability and diversity of regimes are generally higher and connect this to instable political and economic conditions. Here, institutional differences are frequently highlighted, including weak or illegitimate states, low regulatory enforcement and mixtures of partially functioning informal and formal institutions (Ramos-Mejía et al., 2018; Feola, 2019). These are contrasted by the implicit assumption of the conventional transitions literature of liberal democracies with strong institutions and markets (Silvestri et al., 2018). Furthermore, stark inequalities, histories of resource extraction, and mismatches between post-colonial political structures and previously existing institutions and practices are raised as relevant influences on transition contexts in the Global South (Pereira et al., 2020). Therefore, discourses on just transitions stress the relevance of approaches aiming at systemic change leading to increased levels of both sustainability and human well-being (Swilling et al., 2016). With these different regime and transition characteristics, euro-centric (Silvestri et al., 2018; van Welie and Romijn, 2018; Pant et al., 2015) and culturally biased (Tukker and Butter, 2007) TM approaches must be contextualized to or designed for heterogeneous transition contexts of the Global South (Lachman et al., 2018). Some studies have initiated first attempts to do so, by applying Transition Management context-sensitively or with conceptual adjustments (van Welie and Romijn, 2018; Poustie et al., 2016).

Having adapted Transition Management methodologies for the application in the water infrastructures in urban Sub-Saharan Africa, Silvestri et al. (2018) recommend the consideration of the plurality of practices within a socio-technical system in the Global South, (land) ownership, traditional forms of decision making, and a participant selection sensitive of local interpretation of power dynamics, tensions and conflicts of interest. To address the effects of illiberal political contexts in the Global South, – i.e. contexts where democracy is institutionalised but repressed through weak states, state capture or other forms of authoritarian influences – Noboa et al. (2018) and Noboa and Upham (2018) have built on Transition Management and transdisciplinary research to design "Transdisciplinary Transition Management Arenas" (Hagan, 2017). Hereby, the authors aim to create informal fora, where stakeholders build coalitions, co-develop knowledge and capabilities, to prepare policy options in anticipation of the opening up of policy windows in illiberal democracies – however without scrutinizing the actors involved and the selection process of participating stakeholders. Still, they highlight that in illiberal contexts, incumbents can address emerging and potentially threatening processes "with a severe response" (Noboa et al., 2018, p. 3). The creation of "safe" spaces is therefore crucial for urban transitions in such contexts in the Global South. This is also highlighted in the concept of "safe enough" or "transformative spaces", which emphasizes that these transformational fora remain political and conflictual, despite guiding principles of collaboration, dialogue and reflexivity (Pereira et al., 2020). These spaces or

fora shall not only allow for the co-production of knowledge, but shall crucially also empower participating actors (Avelino, 2009; Hölscher et al., 2019). This empowerment can be understood as "the process through which actors gain the capacity to mobilize resources and institutions to achieve a goal" (Avelino, 2017). A variety of transformative capacities or capabilities are discussed that are required for urban actors to "purposefully initiate and perform" urban sustainability transitions (Wolfram, 2016). Avelino highlights that the empowerment involves not only the access to resources and institutions and the adequate strategies for their mobilization, but importantly also the willingness for these endeavours. This intrinsic motivation of actors can be connected to their perceived level of impact, competence, meaning and choice (Avelino, 2017). We will now move forward to discuss the spatial-institutional context of our case study, Phnom Penh, Cambodia.

3.2.3 Spatial-institutional Transition Context: Phnom Penh, Cambodia

Cambodia's recent past has seen various societal change processes. To grasp this multiplicity, scholars employed the term of Cambodia's "triple-transition", considering the more or less realized transitions "from armed conflict to peace, from political authoritarianism to liberal democracy, and from a socialist economic system to a market-driven capitalist one" (Brickell, 2020, p. 1). The United Nations Transitional Authority of Cambodia was tasked to guide this process and is one of many governance interventions, targeting Cambodia's political economic setup. Studies show that their effects are usually not as planned (Hasselkog, 2009), often leading to hybridizations of intended – mostly Western-based – ideas and local norms, notions and interpretations (Lilja and Öjendal, 2009), or its rearticulation, and transformation by local elites (Springer, 2017b). This includes the resistance to the donor-driven institutionalization of Western principles of transparent processes in order to preserve a "discretionary arena within a shadow state for political horse-trading amongst former adversaries" (Hughes and Un, 2011b).

Cambodia has thus proved to be a difficult context for such interventions, especially those pushing for liberal democratic principles (Hasselkog, 2009). The resulting political-economic system is therefore discussed as "Neoliberalism with Cambodian characteristics", i.e. a patronage system where local elites have been able to transform, and rearticulate neoliberal reforms focussing on rent seeking and the stripping of public resources (Springer, 2017b). It is commonly argued that the Cambodian society is characterized by hierarchical structures and a high power distance, patron-client relations, passivity, low levels of trust and cohesion, and being disinclined to change and participatory decision-making (Hasselkog, 2009; Coventry, 2017; Berkvens, 2017). At the same time, it is acknowledged, that socio-political structures in Cambodia are in a "continual state

of flux", requiring a constant critical re-evaluation of such conventional characterizations (Coventry, 2017). Still, social structures are discussed as multifaceted, with "rhizomic" interpersonal relations extending beyond the public-private dichotomy, including kinship, patron-clients, clans, families, and other socio-economic organizations (Verver and Koning, 2018; Fauveaud, 2016). Civil society and civil society organizations are observed to be weak, often suffering from state suppression (Young, 2017; Paling, 2012), with emancipatory spaces under "state crack down" (Beban et al., 2020) and therefore few remaining "public arenas of exchange" (Pereira et al., 2015). In this climate, the participation in civic activities, particularly those aimed at the empowerment of citizens and advocacy is aggravated – especially when potentially upsetting prevalent power relations (Coventry, 2017). The donor-driven decentralization process meanwhile has been patchy, with still limited power and resources on the subnational level as well as unclear functions, resulting in a lack of local capacity to respond to citizens' needs – thus lowering the interest of communities in local planning processes (Chheat, 2014).

Regarding the rapidly changing urban built environment in Cambodia, particularly in Phnom Penh, scholars critically discuss the poor implementation of plans, forced evictions, unsustainable city development, socio-economic inequality, social segregation, accumulation by patronage, and challenges related to institutional capacity, basic service provision, and a lack of clarity in roles and responsibilities, etc. (Baker et al., 2017; Fauveaud, 2017; Springer, 2017b). In this context, urban development is dominated by private- and project-led planning and visioning practices and individually negotiated relationships between developer and state (Paling, 2012). This also encompasses the increase of real estate development where many land areas, including seasonally flooded catchment zones were (re)filled and transformed (Nop and Thornton, 2019). Previous studies found that current socio-technical regime practices and incumbencies are stabilized amongst others by (neo-)patrimonial structures (Jayaweera et al., 2023). It was shown that it is therefore primarily these social and normative commitments that must be overcome for a transition rather than economic or technological ones – as primarily discussed in the Global North. It has also been shown that stabilizing effects of (neo-)patrimonial structures are particularly strong in the built environment sector because it offers one of the highest rent-seeking possibilities (Nam, 2017a). Initiatives (and policies) that circumvent or destabilize (neo-)patrimonial networks are therefore regularly blocked by incumbents (Springer, 2017b). Still, the Cambodian Government has initiated first steps towards 'Green Building' policies. Furthermore, a number of sustainability-oriented actors and sustainability-themed marketing practices has appeared – joined by the emergence of a group of educated, young, globally-connected urbanites with relatively high incomes and changing values and demands – and thus potentially offering transformational potential (Jayaweera et al., 2023).

3.3. Conceptualizing a Sustainable Building Arena

Overall, the SBA shall provide the framework for the constitution of a co-creative and 'safe enough' space where knowledge and transformative approaches for the urban built environment are co-developed. As a multi-actor dialogue and co-creation platform, the SBA aims to support the co-development of transformative capacities and knowledge, alternative discourses, as well as processes of coalition building and networking. It aims to empower change agents by facilitating interaction, coalition building, and the co-production and communication of knowledge while „protecting" the interactive space from dominant positions with interests in the status quo. It thus aims to support the participants' capacities to initiate and drive transformative change towards urban sustainability. It is conceptualized as a reflexive space, where the co-creation of knowledge is realized through deep interaction of different stakeholders during two cycles of TM workshops, to allow for transformative learning. We will now discuss general considerations of the SBA, before moving to the different phases of the process.

3.3.1 General Design Considerations of the SBA

The SBA is conceptualized as an institutional site that aims to support social innovation for transformational change towards sustainability in Cambodia's built environment sector. Here, we want to stress a number of points that are partially discussed in the literature and that are of particular significance for the specific context of the Cambodian urban built environment and add a few conceptual contributions. These relate to the establishment of a 'safe enough' space, the involvement of actor groups and the temporal curtailing of hierarchical relations in a Southern transition context characterized by (neo-)patrimonialism.

A fundamental task is the design of the SBA as a safe or 'safe enough space' (Pereira et al., 2020) that shields away selection pressures and allows participants to co-produce knowledge and collaborate on ideas, problems, strategies and actions (relatively) freely. While the protection and creation of "safe" or "safe enough spaces" is generally relevant, it is of utmost importance in illiberal cases like Cambodia, as change-oriented fora are repressed and crushed. To this aim, it is crucial to minimize the control of incumbents that exercise reinforcive power aimed at the reproduction of the status quo. The SBA is therefore designed as a closed space where access is rigorously restricted to selected participants and internal communication is – at least initially – forwarded to the outside in a very controlled way. This active shielding (Smith and Raven, 2012) shall support the free communication and exchange of ideas and builds on – and supposedly builds itself– trust amongst the participants. Considering the five dimensions of "safe spaces" of (Pereira et al., 2015), it is thus the emancipatory and empowering dimension that is a key focus of the SBA by means of shielding and hereby supporting free expression. The degree of shielding the safe space is set to diminish over time, as knowledge co-production, narratives, network formation,

trust-building, etc. are advanced. Moving from a strongly shielded site, the platform is broadened for the second workshop cycle to increase its momentum, systemic effects and reach out to a wider set of actors. It becomes clear that the safety or protection of the governance niche is highly contingent on the critical selection of its participants, and that as the involvement of different types of actors increases, the level of shielding sinks.

Therefore, the SBA framework pays particular attention to the selective inclusion of and focus on participants during the SBA process. Generally, participants are 'visionary people', that are able to think out of the box, and that are intrinsically motivated. They are innovators or have shown their interest in themes of urban built environment sustainability in some way. Importantly, they become part of the SBA process as individuals, rather than as representatives of affiliated institutions. This is repeatedly highlighted during the events to limit institutional influence and to create a common good mind-set beyond institutional roles (Nevens et al., 2013; Wittmayer et al., 2018). The SBA moves beyond other TM frameworks and considers not only actors that are affiliated with relevant state institutions, firms, NGOs, civil society groups or academia, but also frontrunner youths as current and future urbanites and building users. This also allows to better account for the plurality of transformative agency in cities of the Global South, as postulated by transdisciplinary development researchers (Novalia et al., 2020). As brought forward by others, "frontrunners" are key actors for the SBA and the focus of the first SBA cycle is on this group of solution-driven actors from the building and urban development sector that innovate and that primarily exercise innovative power (Haan and Rotmans, 2018; Avelino, 2017). Applying the framework of Haan and Rotmans (2018), we however argue, that in an illiberal context like Cambodia, this group should be joined by a substantial share of actors that might be considered as 'connectors': That is, actors that have far reaching networks within and beyond the sector, and who are able to navigate through the rhizomic social structure, incl. (in)formal interpersonal relations, the networks of patron-clients, of kinship, etc.; they can support coalition building, negotiate relationships with patrons and can potentially link innovations from niches to socio-technical systems, and support institutionalisation processes in the mid- to long-term - i.e. they can exercise transformative power (Haan and Rotmans, 2018; Avelino, 2017). Their stronger involvement in the SBA addresses the contextual primacy of the need of overcoming social commitments instead of economic or technological ones and the heightened relevance of the politics of alliance building (Marshall et al., 2018). Further actors involved in the SBA are system-oriented topplers, i.e. actors that can support the change and phase out of existing institutions, and supporters, whose endorsement can provide legitimacy and increase momentum (Haan and Rotmans, 2018). For a setting with restricted access to information and information politics, we add an additional actor role to the actor typology of Haan and Rotmans (2018): the 'informant',

i.e. actors that can access information due to their position or networks and that are willing to share it with other change agents.

Within our framework, the primacy of different actor groups shifts throughout the SBA process. While all these types of actors are generally required for the SBA process, the focus lies on frontrunners (and to a lesser degree on informants) in the first cycle and moves to the more diverse group of change agents in the second (including connectors). This goes along with a general broadening of actor groups from workshop cycle to workshop cycle, to develop innovative solutions and more progressive or radical documents and narratives which are then later on discussed with a broader, more system-oriented and potentially less sustainability-driven actor group.

Another critical design feature addresses the breaking down of hierarchical relations. Collaboration is thus organised by facilitators in small, informal and heterogeneous groups to overcome regular interaction patterns and engage participants actively. These groups are useful for initiating lively discussions, support the building of relationships and collective learning and knowledge generation processes. In our setting, it is applied to (temporarily) limit the effects of the hierarchical relations that are characteristic for the Cambodian context (Preller et al., 2014; Preller et al., 2017; Hussain et al., 2012).

3.3.2 Phases of the SBA

Contextualization

Based on a literature review of Transition Management concepts for urban areas, the Global South and illiberal democracies, and an analysis of the socio-technical system in Phnom Penh, the transition researchers developed a contextualized concept for the SBA process. A key step then is the selection of the members for the "Transition Team" (TT). The TT members are chosen based on their role in the urban built environment sector, and their intrinsic motivation and dedication to urban sustainability. They are drawn on from existing relationships, snowball sampling and the extensive field work of the initial system analysis (Jayaweera et al., 2023). To start the arena process, the TT meets for an Actor Mapping Workshop and maps stakeholders from the urban built environment sector according to a framework that considers their exercised power, actor types, and their relevance for a regime transition (Avelino, 2017). This mapping informs the inclusion of actors in the SBA. In a subsequent workshop, the draft SBA concept is discussed and reified collaboratively with the TT. The two SBA workshop cycles thus build on the preceded actor mapping workshop (AM) (who?) and the co-design workshop (CD) (how?) (See Figure 8, where the grey scale indicates decreasing levels of shielding).

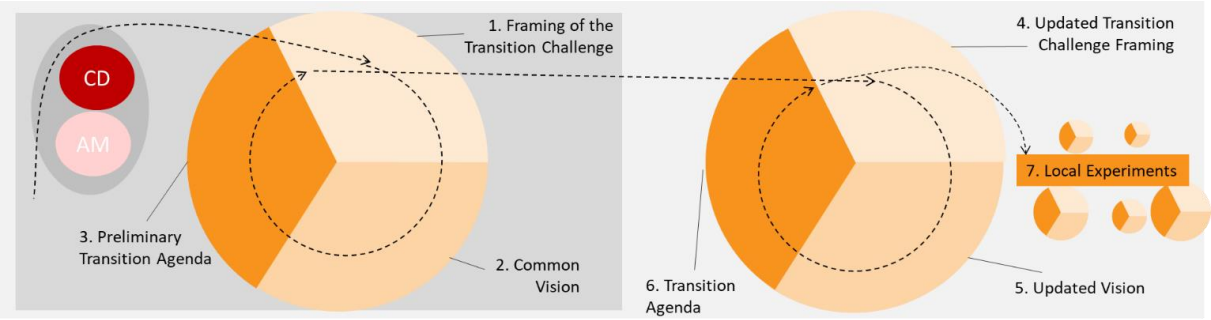

Figure 8: SBA Process (Own diagram).

Framing of the Transition Challenge

The first phase of the SBA aims at the co-development of a participatory framing of the transition challenge. It starts with an inspiring TT input based on the system analysis. Participants can furthermore optionally draw on additional input in the form of "Challenge Cards" that highlight individual transition challenges from the system analysis. This input is combined with the knowledge held by the participating stakeholders in a transdisciplinary dialogue process (Noboa et al., 2018, p. 5). This involves the identification, articulation, hierarchization and integration of problems in small groups. The collaborative framing of the transition challenge arguably supports participants to familiarize themselves with the different positions and values in the group and to overcome institutional perspectives (Roorda et al., 2014).

Vision Development

In the second phase, the participants co-develop and express their key priorities and principles for their envisioned futures of the local building and urban development system as well as images and narratives of desirable futures in a common vision. To get participants into future mode and move beyond conventional ideas, facilitators can highlight the dramatic changes of the recent past.

Strategy Development

In the third phase, back-casting methodologies are used to connect the future scenarios and narratives to the present in order to develop concrete transition pathways and strategies. Hereby, a first draft version of a "Transition Agenda" is established. To define, prioritize and further elaborate transition pathways, groups work on individual transition pathways to further operationalize the vision(s). Participants then identify short-term actions, i.e. transition experiments and "spin-off activities", and possibly a technical roadmap that align with these pathways. The transition agenda thus involves visionary images, pathways, and ideas for short-term action, with the actors seeing themselves and their networks as an essential part of both the future and the pathways towards the envisioned future (Roorda et al., 2014).

Evaluation and Monitoring

The evaluation is undertaken during and after the workshop cycle with silent observers and ex-post questionnaires. A key focus here is the evaluation of (dis)empowering effects of the workshop as perceived by the participants with their individual interpretative styles regarding the four dimensions impact, competence, meaning and choice (Avelino, 2017). Another aspect that is evaluated is the degree to which the SBA can support transformational capacities and the co-creation of actionable knowledge.

Second Cycle and Beyond

Having moved through the three levels of challenge framing, vision and strategy development, a second round of the SBA is implemented at a later stage. Based on the results and the reflexive process of the first cycle, the design of the second cycle is adapted; a larger group of participants then updates and expands the challenge framing and the vision and develops a "final" transition agenda. The second cycle therefore has a stronger focus on the subsequent operationalization of the transition agenda in local experiments and in connecting the innovations, narratives, etc. to the existing socio-technical system. As argued above, the shift of focus involves a shift in the composition of the participant groups in the second SBA and decreased levels of protection: Participants of the first cycle continue to play a key role, yet they will be joined by additional participants, primarily those that can be considered 'connectors', and also 'topplers', and 'supporters'; this equally involves a shift of focus from innovative power to transformative power.

3.4. Conclusion

If the battle for sustainability will be won or lost in cities, the development of urban transition governance approaches for heterogeneous contexts is of significant relevance. This paper has sought to contribute to this challenge by conceptualizing a transition governance framework that is well-adapted to the spatial-institutional context of Cambodia's urban building regime. Based on a literature review and a system analysis, the SBA has been conceptualized as an informal institution and as a protected and co-creative space at the science-policy-business-civil society interface. It allows sustainability-minded actors to co-produce and pluralize knowledge - including the co-development of problem framings, visions and transition strategies – and facilitates cooperation, social innovation, as well as the creation of alternative discourse coalitions. Hereby the SBA seeks to empower transformative change agents to increase pressure on the current building & urban development regime and support the emergence of niche innovations while destabilizing and disrupting current pathways within the built environment. The SBA thus aims to support a transition towards a sustainable built environment through niche-level urban and building policy development, and empowered change agents with expanded

transformative capacities that apply co-created knowledge and strategies, leverage newly created coalitions in order to develop and experiment with material, regulatory, normative, and discursive practices that lead to the reconfiguration of the dominant built environment regime and towards a more sustainable built environment.

Key contributions of the paper are the increased actor-sensitivity and temporality concerns in the TM process: The SBA framework distinguishes two workshop cycles and differentiates the degree of shielding (decreasing), and the actor composition of the Arena. The group of participants is broadened from particular transformative actors (focus on frontrunners) to a diverse group of transformative actors, while moving from more sustainability-driven individuals to a potentially less sustainability-driven group over time. This shall support the initial development of innovative solutions and more progressive or radical documents and narratives that are then further developed with the broader group. We argue that, generally, the role of 'connectors' is of increased relevance in illiberal contexts of the Global South, since it is primarily the social commitments, rather than technological or economic ones, that must be overcome here, when pursuing a sustainability transition. Consequently, questions of coalition building, networking, etc. are of increased importance. Connectors should therefore play an increasing role in the SBA. We furthermore add a new actor role, the informant, which has a significant role in an environment of information politics and hoarding. Contrary to other adaptations of TM to illiberal contexts, we furthermore include frontrunner youth in the SBA process as current and future urbanites and building users to account for the diverse transformative agency. Overall, the paper argues that scientifically grounded and participatory processes, that are attentive to and designed for the particular spatial-institutional context, can indeed support the development of actionable knowledge, the empowerment of marginalized actors and support collective action for transformative change in the built environment sectors in contexts outside the Western liberal norm of transition studies. At the same time, we are well aware of the significant challenges to the governing of socio-technical transition processes, and do not aim to propagate the idea of "cockpit-ism" where transition managers steer systems with their frameworks (Hajer et al., 2015; Stirling, 2019). Instead we see transition researchers in a modest role as policy entrepreneurs, and boundary makers, that set the stage and collaboratively work with other stakeholders to co-produce knowledge, and support the building of coalitions. As the SBA is currently being implemented, subsequent studies are planned that offer empirical evidence and a critical evaluation of the application of the SBA in Phnom Penh and relate the insights to other contexts. This evaluation will scrutinize the empowerment effects of the SBA, and how a transition governance intervention like the SBA could support the expansion of the transformative capacities of change agents (Wolfram, 2016; Castán Broto et al., 2019). We generally argue

however that the SBA framework can already be applied and expanded in other contexts of the Global South, particularly illiberal contexts with scarce public information.

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Chapter 4: Empowerment in the Transition Arena

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Urban Transition Interventions in the Global South: Creating empowering environments in disempowering contexts?

Abstract

Changing power relations and the empowerment of frontrunners are considered crucial preconditions for sustainability transitions. This paper looks into the empowerment of actors in the context of a transition intervention in the Global South. We argue that empowerment is of particular importance in contexts of the Global South or those with illiberal characteristics. A holistic understanding of empowerment is needed to improve transition governance instruments in heterogeneous institutional environments. Therefore, we introduce a multi-dimensional empowerment framework that integrates empowerment effects in terms of resources, willingness and social capital and apply it to an ongoing transition intervention in the building sector of Phnom Penh. We hereby explore in which ways and to what degree an urban transition governance intervention can contribute to the empowerment of frontrunners in the Global South. Our results indicate that empowerment effects were particularly noticeable in the social capital and willingness dimensions. While mental resources were expanded, a lack of financial means persisted. The study highlights the need to stronger engage with resource-related empowerment as well as the need for transition studies to develop interventions that succeed in balancing the creation of empowering safe spaces and the selective integration of state actors in illiberal contexts in the Global South and elsewhere. Finally, it also demonstrates that the application of a multi-dimensional empowerment framework supports a differentiated analysis of transition interventions, much needed given the complexities of the construction sector in the Global South.

Keywords: empowerment, transition management, sustainability transitions, change agents, Global South, Cambodia

4.1. Introduction

Many societies in the Global South face rapid urban population growth. This often results in hasty building and infrastructure development that can lead to long-term lock-ins in unsustainable configurations. Similarly, Cambodia's urban population grows rapidly, while the country follows a neoliberal growth-driven agenda that has sustained high economic growth rates and increased income levels, while drastically increasing resource and energy consumption, environmental degradation, and limiting social equity, and civic space (Young, 2017; Hughes and Un, 2011a; Ear, 2013). These dynamics have been materialising in the urban built environment of Cambodia's capital, Phnom Penh, over the last two decades: River sand is extensively drenched from the Mekong and filled into wetlands to convert them into privatized building land. Gated communities (boreys) are constructed on the city's outskirts, high-end condominiums in the centre, while low-income populations are evicted. Despite official sustainability rhetoric, a widely ineffective regulatory system, a lack of political will, and a weak civil society are stated as hurdles for a shift to more sustainable practices (Young, 2017; Baker et al., 2018; Fauveaud and Bertrais, 2023).

Within the field of transitions research, authors study how societal functions such as energy, mobility, or the provision of shelter, are related to stable socio-technical system structures (e.g. car-based mobility) which can under particular circumstances undergo transformative changes, so-called transitions. These are non-linear, long-term and fundamental processes that include the re-configuration of infrastructures, technologies, institutions and values (Geels, 2002; Loorbach et al., 2017). Besides the more analytical dimension of transition research, the conceptualization and implementation of transition governance approaches that actively aim to influence transitions towards sustainability has proliferated, primarily with a focus on European cities and energy or mobility sectors (Truffer et al., 2022). Transition governance interventions, like Transition Management (TM), seek to influence the speed and directionality of transitions and have recently also been applied to cases outside of the Global North (van Welie and Romijn, 2018; Poustie et al., 2016; Nastar et al., 2018; Loorbach et al., 2017).

At the same time, transition scholars have started to consider the role of power (relations) and empowerment more prominently (Avelino, 2017; Raj et al., 2022). Changed power relations are now seen as an "inevitable dimension of social change and sustainability transitions" (Schipper et al., 2019, p. 2). To foster transition dynamics, many transition governance approaches, therefore, seek to empower sustainability frontrunners and change agents. Following the multi-level perspective of transition studies, these frontrunners are innovators that develop and experiment with new solutions and practices in so-called niches. They usually take a marginalised position within socio-technical systems where dominant configurations of the status quo are temporarily stable and characterised by various forms of incumbency (or regimes) (Geels, 2002). Transition

interventions can however also initiate disempowering effects, be it through exclusion, despair, or else (Avelino, 2017; Miraftab, 2004). While (dis)empowering effects of transition governance interventions have rarely been studied, this holds even more true for cases outside of the dominant transition study contexts of liberal democracies of the Global North (McCrory et al., 2020). Understanding the diverse (dis)empowering effects of transition interventions in diverse spatio-institutional settings is however of major interest as this knowledge is required to develop and improve contextualised transition strategies. This study, therefore, seeks to explore in which ways and to what degree urban transition governance interventions can contribute to the empowerment of frontrunners in an ongoing intervention in Phnom Penh, Cambodia, a setting that can be approached both as "Global South" and an "illiberal democracy" (Hughes and Un, 2011a; Brickell and Springer, 2017).

Though only recently taken up in transition studies, empowerment has been discussed for decades in other academic disciplines and approaches, including development studies, psychology, management, or urban studies (Roy, 2010). While most work on empowerment aims to "shift power relations in favour of relatively less powerful people" (Pettit and McGee, 2020, p. 4), different literature strands emphasise various forms and target groups. As empowerment involves "different kinds of empowerment outcomes" (Hölscher et al., 2019, p. 177), analytical approaches should mirror this diversity, yet, we argue, existing lenses are rather piece-meal, as they consider single, or two dimensions of empowerment outcomes. To grasp the (dis)empowering effects more holistically, we propose a multi-dimensional understanding of (dis)empowerment that expands empowerment frameworks in transition studies and incorporates aspects from social psychology, and development studies.

Applying a single case study approach, we draw on an ongoing transdisciplinary research project, which implements a "Sustainable Building Arena" (SBA), a TM framework adapted to the local context of the building sector in Phnom Penh. We thus approach the SBA as a "facilitated empowerment process" to explore its (dis)empowering effects and to refine the ongoing intervention (Hölscher et al., 2019, p. 183). The study builds on a participant observation, a participant survey and the workshop outputs. After reviewing the literature on empowerment across disciplines in the following part, we will develop our multi-dimensional empowerment framework (Chapter 4.2.3). Subsequently, we discuss the material and the methods and introduce the studied transition intervention (Chapter 4.3). We will proceed with the analysis of our data (Chapter 4.4), discuss the results (Chapter 4.5) and close with a conclusion (Chapter 4.6).

4.2. Empowerment in Sustainability Transitions

Some transition concepts like the multi-level perspective primarily aim to analyse transition processes, while others, including TM and strategic niche management, directly seek to influence their speed and directionality: TM aims to "facilitate radical long-term change through the empowerment of transformative agency by building up capacities and developing new network coalitions with shared transition agendas" (Loorbach et al., 2020, 253). Empowerment, as envisaged by TM, shall take place through (re)defined roles and responsibilities and new relationships that are mediated through processes of co-creation that also reflect own roles and responsibilities. Raj et al (2022) distinguish (dis)empowerment types in the context of grassroots innovations that are based on the mobilization of resources, and those that are identity-based (or combinations of these). Empowerment in terms of resource mobilisation relates to changes in "strategic and instrumental reasoning and organisational abilities", while identity-based concepts refer to reconfigurations of worldviews, or social identities (Raj et al., 2022, p. 380).

Hölscher et al (2019) argue, that TM builds on several empowering design elements, including the group composition, the process setting, the development of a system change perspective and the provision and co-creation of knowledge. TM or transition governance labs can hence be understood as "governance niches" that are "protective spaces of empowerment "(Raj et al., 2022, p. 376). In transition studies, the group that is primarily to be empowered includes so-called "frontrunners", "pioneers" or "innovative niche players" (Loorbach et al., 2015, pp. 61–62). These are understood as highly sustainability-committed individuals which can potentially drive transition processes (Hölscher et al., 2019).

Meanwhile, another foundational concept of transition studies, strategic niche management, also aims at the empowerment of niche actors or niche empowerment (Smith and Raven, 2012). Here, niches are understood as "spaces of empowerment", where projects or technologies are shielded from the selection pressures of the system; here, "empowerment" is thus a "process that makes niche innovations competitive vis-à-vis regimes" (Sengers et al., 2016, p. 155). Some forms of empowerment are sought without changing selection contexts (fit-and-conform), while others aim for structural changes that result in a more favourable selection environment for niche actors (stretch-and-conform). According to Raven et al (2016), niche actors seek empowerment through "outward-oriented socio-political work" that includes networking, narrative work, and the alignment of socio-technical narratives with socio-political agendas.

The initial neglect of considerations of power, politics, and (dis)empowerment within transition studies has been rightly criticized in general (Avelino, 2017; Raj et al., 2022), but is arguably of even greater importance for transitions in the Global South: Here, scholars argue, "power relations are "particularly complex" (Ghosh et al., 2021, p. 108), and the actionable transition knowledge

needs to be especially "power sensitive" (Schipper et al., 2019, p. 2). Furthermore, the empowerment of change agents is crucial because civil society is often rather weak and alternative policy options "are particularly marginalised" (Noboa et al., 2019, p. 87). This can include lesser availability of public funding for experiments or innovation programs, the absence of welfarist support, and political marginalization in illiberal settings that can trigger a "severe response" when innovations pose a threat to incumbents (Noboa et al., 2018, p. 3; Jayaweera et al., 2023). While TM emerged in the context of retreating Northern welfare states, the state plays a different role in other contexts. The role of informal institutions is foregrounded, while some conventional assumptions about market mechanisms, power relations and decision-making logics are considered ill-suited for Southern contexts (Feola, 2019; Hansen et al., 2018; Wieczorek, 2018; Kenis et al., 2016). Transition governance interventions, which were originally developed in the Global North and then applied to more heterogeneous contexts, must therefore be met with even greater scrutiny. Therefore, Raj et al (2022) rightly argue that research on empowerment is particularly needed for contexts outside the Global North that might challenge established frameworks (2022). To develop our empowerment understanding that can address the diversity of empowerment effects and that can be applied to contexts in the Global South, we will now turn to empowerment discussions in the development literature.

4.2.1 Empowerment & Development

A state of disempowerment has been discussed in development studies as a key reason for poverty and marginalisation for decades (Friedmann, 1992). Empowering the poor has been proposed as a solution for overcoming poverty and became a key development paradigm. Multilateral institutions saw the empowerment of the poor (and women) as an enabler of quality of life, human dignity, good governance, and pro-poor growth (Narayan, 2002). The empowerment of these marginalised groups was suggested via a plethora of ways, including property rights (Pradhan et al., 2019), entrepreneurship (Sahrakorpi and Bandi, 2021), local participation, decentralization or accountability of the state (Uddin, 2019). While once the "subversive, emancipatory tools of activists" (Miraftab, 2004, p. 239) driven by scepticism regarding the political will for systemic change of the state and "those in power" (Sen and Grown, 1987, p. 81), empowerment approaches became associated with neoliberalization and governments: Scholars have discussed this as a paradigm shift from state-led development towards a more individualized self-development through empowerment for the Global South (Sharma, 2008), while empowerment discourses in the Global North became associated with retreating welfare states (Miraftab, 2004; Heeg and Rosol, 2007).

Some scholars, therefore, call for the repoliticisation of empowerment by disengaging from its neoliberal associations with individual responsibilization and returning to its radical goals of transforming structures of domination – or unsustainable socio-technical systems (McEwan and Bek, 2006; Miraftab, 2004). Critical perspectives also highlight that one should be wary of the disempowering effects that empowerment-seeking activities can initiate: Empowering one actor can disempower others, actors can utilize empowerment discourses with ulterior motives, or activities that intend to be empowering can actually increase disempowerment levels –for example by increasing a sense of helplessness or powerlessness (Miraftab, 2004; Szántó, 2016). Furthermore, critics note that individuals should not be understood as "passive recipients" of empowerment programmes but that actors empower themselves in settings that might be more or less empowering (Quinn and Spreitzer, 1997). Others highlight that many empowerment approaches evade material dimensions of power and domination as well as confrontational and more conflictual elements (Boje and Rosile, 2001; Eisenstein, 2017). Lastly, it is discussed that empowerment should not be understood as an end result of single events, but as a continuous process (Roy, 2010).

With these critical perspectives in mind, we turn to social psychology, a field from which we can draw further insights to expand our understanding of empowerment effects of transition interventions.

4.2.2 Psychological Empowerment

In social psychology, empowerment has long been considered essential to enable "people, organizations, and communities to gain mastery over their affairs" (Rappaport, 1987, p. 122). By considering the process of empowerment from a psychological point of view, we connect the external contextual dynamics that actors are embedded in, to their internal mental structures that are expected to be crucial for their engagement. In doing so, we aim to analyse how external factors contribute to people's willingness, sense of efficacy and perceived ability to pursue a certain goal that they set within the sphere of their engagement. When individuals or groups of people set intentions and embark on projects with certain objectives, it is crucial to consider the ongoing process of activating (individual, social and public) resources. The way these engaged actors will experience their ability to implement the prospected changes and achievements can be an essential factor for the (transition) process.

Drawing on the social psychology literature, Avelino (2017) and Hölscher et al. (2019, p. 179) already relate empowerment in transitions to actors' "increase of intrinsic motivation towards self-efficacy". According to Thomas and Velthouse (1990), this intrinsic motivation [to act] depends on the assessment of the task according to the attached value (meaning), ability to make

a difference (impact), self-determination (choice), and belief in own capacities (competence). Beyond individual empowerment, and a sense of self-efficacy, collective empowerment and collective efficacy, the belief that joint action can lead to the realization of a common goal is relevant (Pel et al., 2020). Therefore, the analysis of empowerment effects can be applied to different dynamics on an intrapersonal level (self-empowerment), interpersonal level (mutual empowerment), and as a collective social process (social empowerment) (Pigg, 2002).

Our multi-dimensional empowerment framework shall tackle the question of what external factors enable individuals, and (individuals in) groups, to maintain or increase their intrinsic motivation, belief in their self- and collective efficacy, and allocate their resources for the envisaged outcome of their sustainability engagement – enabling individuals with their capabilities through multiple levels (Rauschmayer et al., 2015). Whereas a core analysis of the individual perception of their intrinsic motivation, competence, and the meaning and impact of their action can lead to implications for participative designs, we consider the integration of these aspects within a multi-dimension transition empowerment framework crucial to capture the complexity of the dynamics in different fields. This integration responds to scholarly calls for stronger integration of psychological aspects into transition studies (Upham et al., 2020).

4.2.3 Multi-dimensional Empowerment Framework in Sustainability Transitions

Reviewing the literature on empowerment across disciplines, it becomes clear that the diversity of (dis)empowerment effects requires a comprehensive approach to capture the empowerment conditions and outcomes of transition interventions. Instead of considering isolated understandings of (dis)empowerment, we propose to frame the empowerment of marginalized frontrunners across the dimensions of (1) resources, (2) willingness and (3) social capital. This means that a frontrunner's capacity to act and take up an active role in sustainability transitions can be increased (and observed) through changes in resource accessibility, willingness to act and social capital levels. In the context of transition interventions, these empowerment effects are contingent on (4) the conducive design of the intervention (e.g. process design), and (5) the social learning processes that are initiated. We therefore understand TM as a facilitated empowerment process which seeks to create empowering conditions that can initiate the self-empowerment of actors by increasing the level of participants' capacities to act and take up an active role in transitions as the outcome of the empowerment process. We differentiate these outcomes along the three dimensions of resources, willingness, and social capital. For these empowerment processes to occur and positive outcomes to take place, empowering conditions need to be given (see Figure 9). Studying transition interventions through this lens of empowerment processes and outcomes across three dimensions that are contingent on empowerment conditions, allows scholars to capture the diversity of (dis)empowerment effects and allows them to refine transition

interventions to increase their potential effects in their quest for sustainability. Individual or two-dimensional empowerment outcomes have been studied in the literature but not with an encompassing approach that is offered here (Raj et al., 2022; Hölscher et al., 2019; Avelino, 2017; Hölscher et al., 2018; Schreuer, 2016). The empowerment dimensions and conditions are elaborated on below.

Empowerment Dimensions: Resources, willingness & social capital

In the resource dimension of empowerment, we consider the increase of frontrunners' abilities or capacities to mobilize resources for the achievement of their goals (Avelino, 2017; Schreuer, 2016; Noboa et al., 2019). This includes access to resources and institutions but also strategies for their mobilisation. Resources, meanwhile, can be financial, but equally cognitive resources, including knowledge and insights into complex sustainability challenges (Loorbach et al., 2015; Farla et al., 2012).

Our second empowerment dimension refers to the willingness or intrinsic motivation of frontrunners to influence envisioned transition processes. This involves increased levels of self-efficacy. We follow (1990) to consider self-assessed meaning, impact, choice and competence as constitutive elements of intrinsic motivation and decisive for whether actors have or "gain a sense of power to contribute to sustainability transitions" (Avelino, 2017, p. 513). To move beyond individualistic empowerment, we equally include collective efficacy or the belief in meaningful joint action.

Our third dimension of empowerment relates to the social capital of frontrunners. This includes the strengthening of networks, of trustful and reciprocal relationships to influence sustainability transitions. This shall lead to "empowered and autonomous communities of practice" (Wolfram, 2016; Ghosh et al., 2021), or "communities of purpose". An essential part of this process is the reflection on and (re-)definition of individual and institutional roles and responsibilities within the envisioned sustainability transition and the creation of a group identity (Hölscher et al., 2018; Noboa et al., 2019).

Empowerment Conditions: Social Learning & Process Design

For empowerment effects to occur across dimensions, social learning processes must take place. These involve new knowledge and skills (first-order learning) but also changes in interpretative frames (second-order learning), that build on collective and individual processes of reflection, innovation and experimentation. In contrast to Schäpke et al. (2017), we do not consider social learning to be an impact of transdisciplinary TM interventions, but rather a necessary condition for and constitutive process of empowerment in such interventions. Co-produced knowledge can

then however still be an outcome of the empowerment process in the sense of mental resources (Schäpke and Rauschmayer, 2014).

Meanwhile, social learning requires a supportive setting itself. We, therefore, consider the collaborative setting, or the "Process Design" of the transition intervention as another empowerment condition. This involves a methodology and facilitation that is conducive to trustful and open exchanges, the establishment of a group composition that creates a "safe space" for the frontrunners to interact freely, and that supports co-creation, ownership and the participants' openness to reflecting their position (Schäpke et al., 2017; Hölscher et al., 2019). As interventions are placed in space and time, socio-political and socio-cultural factors affect the collaborative space and require contextualised process designs to create empowering environments.

Figure 9: Multi-Dimensional empowerment framework (Own diagram).

In sum, this gives us an empowerment framework that integrates diverse empowerment effects across three dimensions that are contingent on two empowerment conditions. While some of the dimensions of our approach have been studied individually (or in pairs), no encompassing concept has been brought forward that accounts for the diversity of empowerment effects across social capital, resources and willingness. The better these outcomes can be measured in their diversity and complexity, the more the interventions can be improved to successfully support transition processes towards sustainability. Grounding the framework in the development studies and social psychological literature gives us a higher sensibility towards aspects of livelihoods, informality, and disempowering effects. Following the criticisms discussed above, we consider empowerment not to be simply "handed out" by others, but as the result of self-empowering change agents in more or less empowering settings – without ignoring the material dimension of power. We are equally sensitive to the disempowering effects that all empowerment initiatives bring with them (Avelino, 2017). To allow for a better understanding of local dynamics in diverse contexts in a decolonial manner (Ghosh et al., 2021), the concept is open to extensions and adaptations for local contexts: In the case of Cambodia for example, relational aspects of empowerment, including respect were found to be of particular relevance (Doneys et al., 2020).

These can be integrated into the social capital dimension. In the following, we will apply the framework to an ongoing transition intervention, the Sustainable Building Arena in Phnom Penh.

4.3. Materials & Methods

Following a system analysis of the local building sector (Jayaweera et al., 2023), the authors developed the SBA framework as a contextualised TM intervention that seeks to support the empowerment of change agents (Jayaweera et al., 2022). In the context of an ongoing research project, the authors started the SBA process in March 2022. As the SBA is ongoing, the study of its (dis)empowering effects is an essential part of its reflexive process: Assessing (dis)empowering characteristics, identifying arising problems or missing elements, allows for the refinement of the process design to better support transformational processes.

The SBA framework has been conceptualized as an iterative and contextualized form of TM that moves beyond once-off workshop designs and adapts Northern-derived design features to the specific settings in Cambodia. The SBA follows a three-phased approach, involving a problem framing part, a second part focussing on the co-development of visions, and a third part linking the vision(s) to the problem framing to develop transition strategies. The framework furthermore introduces considerations of the varied involvement of different actor groups over time in the TM process and the establishment of a 'safe enough' space in a Southern transition context characterized by (neo-)patrimonialism. Regarding the involvement of actor groups, the SBA is implemented as an iterative process with multiple rounds of SBA cycles. Members of the research project, including the lead author, invited local project partners to become part of a Transition Team to drive the SBA process, support the implementation and collaboratively make final conceptual decisions. This included an Actor Mapping Workshop that laid the groundwork for the selection of sustainability frontrunners (see Figure 10). In this step, the team members mapped actors following the power type they can exercise (transformative, innovative and reinforcive power, based on Avelino (2017)) and their centrality to the sector and its transition. The selected participants of the first SBA cycle included architects, NGO staff, youth activists, researchers, policymakers, material producers, and sustainable building consultants, that were considered sustainability frontrunners or change agents in the building sector. They were convened in a highly shielded space to protect the platform from the control of incumbents and reinforcive power to develop strong narratives and visions and to support their networking. In subsequent SBA cycles, previous results are validated and updated, while the actor group is widened towards incumbents; the level of shielding thus decreases.

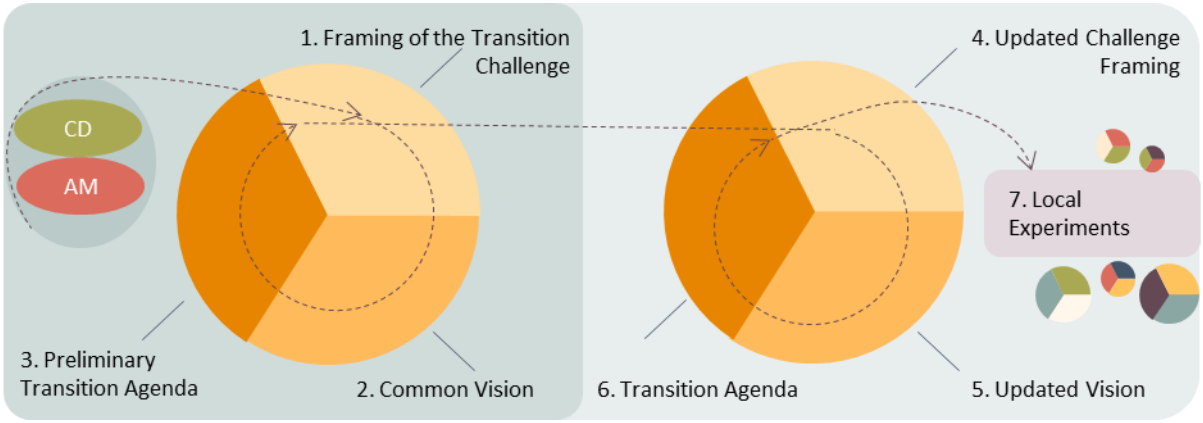

Figure 10: SBA process, incl. Actor Mapping Workshop (AM) and Co-Design Workshop (CD) (Adapted from Jayaweera et al., 2022)

The participants were assigned to work in small groups with maximized diversity (sectoral background, gender, etc.) and could rely on a range of methods, including post-its, drawings or Lego visualizations. Each group included a facilitator and a participant observer. The latter were instructed on how to observe and report on the process, including the interaction dynamics of the participants. Following individual brainstorming and small-group discussions, the groups presented their results in the plenum. The process was joined by a graphic recorder who integrated common themes from group discussions and presentations (see Figure 11 - Figure 13). Visual recording is considered to be well-suited for the co-creation of knowledge, learning and for ways of knowing: It is inclusive, allows for multiplicity, a multimedia learning environment, and has the potential to "create a shared experience and expression with a variety of stakeholders" (Dean-Coffey, 2013, p. 56). It furthermore constitutes a visually pleasing documentation and discursive artefact that can be used for narrative work and the public communication of visionary results.

With the first SBA cycle in Phnom Penh as a case study, our analysis builds on a participant observation, an ex-post survey of the participants, and the analysis of the generated workshop output. We mapped the output of the workshop sessions and studied them for insights into the empowerment of the participants: Building on Avelino (2017, pp. 29–31), we screened the participant observation documentation and the workshop output for implicit aspects of our empowerment framework. Additionally, we conducted an ex-post participant survey. Here, the participants were asked to share their (dis)agreement with a range of statements regarding the empowerment dimensions, the process design, learning processes, and additional psychological items. To address the ubiquitous mobile phone and emoji usage in Cambodia, the survey was phone-optimized and response options were emojis on 5-point Likert scales ("1" = "Strongly disagree", "5" = "Strongly agree") (Gummer et al., 2020). We assumed equidistant characteristic value of the five emojis that represented degrees of (dis)agreement. Participants were also able to give written answers in several open-text fields. We calculated scale values for „self-efficacy"

(S102-105) and „collective efficacy“ (CE01-04) by calculating the means of the items. Considering the sample size (all 21 participants filled out the survey) and the singular measurement at one point of time, we can only report descriptive statistics of the measures of interest. Table 7 illustrates the operationalisation of our (dis)empowerment framework in the survey, the participant observation and the workshop outputs. The material thus involves a combination of self-reported empowerment, empowerment indications as manifested in tangible outcomes and as perceived by participant observers. Some of the authors, including the lead author, were involved in this process as facilitators, participant observers or members of the Transition Team. To limit the potentially obscuring effects of the authors' "double role", the participant survey is used to add more distant data to these observations (Rauschmayer et al., 2015).

Aspect	Operationalisation in Output Analysis & Participant Observation	Operationalisation in Participant Survey
Empowerment Condition: Learning & Knowledge Creation	Developed outputs include generation of knowledge. Production of outputs includes new tasks and skills. Developed products address sustainability problems. Developed products attribute responsibility for sustainability problems to the local community, developed products outline the role of the community in causing/solving sustainability problems. A shared vision and narrative of a sustainable future is developed including radical change.	The knowledge generated is relevant to current circumstances. The knowledge generated contains ideas that question the status quo. The knowledge generated helps to understand the processes of transformation. The process enriched the understanding of the problem by including new perspectives. The process facilitated the development of future scenarios and strategies. The workshop process genuinely articulated social needs.
Empowerment Condition: Process Design	Participants understand and follow the methodology. Engaging and productive discussions and interactions of group members are observable. Participants observably feel safe to share radical ideas. Changes in the arena discourse and participants' ways of behaviour are observable. Outputs are decided upon by participants in self-determined ways. Changed and more motivated discourse in the group on solving sustainability problems is observable. Developed outputs address sustainability problems.	The selected participants were suitable for the participatory process. Facilitation of the process was satisfactory. Participants were able to express their ideas and opinions freely. The methodology was useful for the participatory process' purposes.

Empowerment Dimension: Social Capital	Outputs highlight the value of trust or depend on the development of trusting relationships. Outputs highlight or are based upon common rules. Outputs build or express shared values (e.g., vision). Outputs build upon or value new contacts and networks. Outputs include the establishment or maintenance of (joint, purpose-oriented) initiatives. Outputs build upon joint action and relate to sustainability. Outputs include collaborative action and dialogue towards solving sustainability challenges. Outputs related to the actions of new actor(s) make the sustainability orientation explicit.	Participants have common (individual or institutional) aspirations regarding the future of the building and urban development system in Phnom Penh. Active participation of all sectors (Private sector, Government, NGOs, Academia, etc.) is needed for the successful implementation of transition strategies. Participants have the potential to articulate joint actions for supporting a transformation. The setup of the workshop offered a collaborative platform for sustainable building frontrunners that otherwise did not exist (yet) in Phnom Penh. The SBA supported the building of trust between me and other participants. Participants agree that Phnom Penh's building and urban development system requires a sustainability transition.
Empowerment Dimension: Resources	Outputs generated involve new resources (e.g., natural or cultural resources, technologies) concerning sustainability.	The workshop supported my capacity to access resources and institutions for sustainable building practices in Phnom Penh. The workshop supported the development of strategies to mobilize resources and institutions for sustainable building practices in Phnom Penh.
Empowerment Dimension: Willingness	Participants are observed as being intrinsically motivated for arena activities. Participants possess the skills needed for the tasks they are to carry out in the arena.	The workshop supported my willingness to access resources and institutions for sustainable building practices in Phnom Penh. I can make a difference. I am good at what I do. I care about what I do. I can determine what I do.

Table 7: Operationalisation of empowerment framework (building on Schäpke et al., 2017; Noboa et al., 2018, 2019).

In the next part, we present our findings following our framework, firstly on the empowerment conditions (social learning and knowledge, process design), then on the empowerment dimensions (social capital, resources, willingness).

4.4. Case Study: (Dis)Empowerment and the Sustainable Building Arena

4.4.1 Empowerment Condition: Social Learning & Knowledge

The participants generated a range of outputs during the first SBA. The co-produced knowledge is summarised in Figure 11-Figure 13. The discussions related both to the sectoral level (building

designs, building materials, etc.), and the urban level of Phnom Penh (low walkability, spatial fragmentation, etc.) and involved technological, ecological and social justice concerns. Key aspects in the problem framing phase related to the mismatch between (affordable) housing needs and existing projects, high resource and energy demands for current building construction and operations, lacking materials, capacities and skill sets for sustainable practices and a weak regulatory framework and enforcement (see Figure 11). The co-developed vision equally addresses both urban and sectoral elements. This includes calls for an affordable, accessible, integrated and inclusive city that shifts from a focus on "Me-space" towards more "We-space" to realize a “Green Phnom Penh for All”. At the same time, the participants envision a building and urban development sector that is driven by a thriving local sustainable building community, fair and sustainable building materials that are part of circular practices, powered by renewable resources, and nature-based solutions (see Figure 12). Participants were thus able to address sustainability problems and to co-develop a shared vision and narrative for a sustainable future that involves radical changes. The preliminary transition strategies meanwhile cover regulatory changes, awareness and capacity-raising programs, and demonstration projects (see Figure 13).

The participants widely agree that the SBA-generated knowledge is relevant to the current circumstances in Phnom Penh while equally agreeing that it questions the status quo (91% agree or strongly agree respectively) (mean 4,5). This points to the possibility for participants to share radical views despite the presence of selected government officials. Meanwhile, 95% of the participants (strongly) agreed that the workshop genuinely articulated social needs (mean 4,4). The diversity of participants’ perspectives was positively noted, with more than 90% of the respondents sharing that the understanding of the problem was enriched through the inclusion of new perspectives (mean 4,4). While slightly less consensus prevails that the generated knowledge helps understand transformative processes (80% [strongly] agree) (mean 4,1), more than 90% shared their (strong) agreement that it facilitated the development of future scenarios and strategies (mean 4,3).

Figure 11: Problem framing (Source: Pen Uddam)

Figure 12: Vision for 2040 (Source: Pen Uddam)

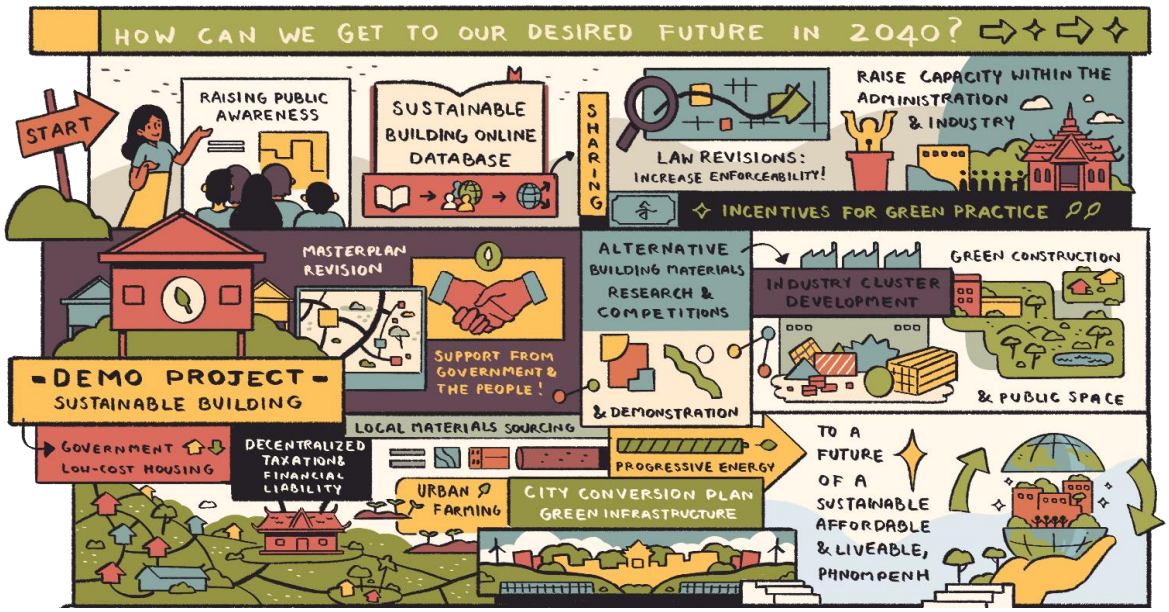

Figure 13: First draft of transition strategies (Source: Pen Uddam)

4.4.2 Empowerment Condition: Process Design

The discussion of radical ideas and the connected social learning processes indicate that the SBA realised a key target – allowing frontrunners to freely interact in a safe space and share opinions and ideas: All participants agreed that they were able to express their ideas and opinions freely, 86% agreed strongly (mean 4,9). This is supported by participant observers who noted very engaged discussions with a diversity of speakers. The selection of participants was equally well perceived, with two-thirds agreeing strongly, and the remaining third agreeing, that the group was well selected. Convening a safe space that includes a diverse set of frontrunners, including policymakers or government officials proved to be a balancing act. Due to the selective invitation of frontrunners based on the actor mapping, only those individuals could be selected that were known by Transition Team members. This points to potentially disempowering effects for those frontrunners who were not part of the SBA.

While 95% of respondents (strongly) agreed that the facilitation was satisfactory (mean 4,7), the methodology of the SBA received slightly lesser agreement levels with 14% of the respondents staying neutral, while the rest (86%) agreed or strongly agreed that the methodology was useful (mean 4,3). Unfortunately, "neutral" participants did not indicate any reasons for their reservation in the open text fields of the survey. However, the facilitators and participant observers equally noted challenges: Being organized independently from state agencies or other larger organizations, the process could not count on envoys who were sent by their organization: Instead, the SBA is conceived as individual-led and participants were invited as pioneering individuals; they had to make time or request time off from regular tasks – again potentially

disempowering those who cannot join. To accommodate this, the Transition Team limited the first SBA cycle to a single day, instead of the initially planned three days. With this very limited time, the integration of the results of different groups remained sketchy. Thus, unlike in other cases, the SBA did not formally integrate group results into a singular problem framing, vision and transition agenda beyond the visual recording.

4.4.3 Empowerment Dimension: Social Capital

While social capital formation and maintenance require interactive platforms, these have been lacking for frontrunners in Phnom Penh's building sector: 81% of the participants (strongly) agreed that the Arena offered a collaborative platform for frontrunners that did not yet exist locally (mean 4,1). Meanwhile, the participants raised an "active and dynamic green building community" as a visionary element for the future. The workshop outputs thus equally indicate an interest in stronger networks and increased social capital. The participant survey shows that the frontrunners largely consider their aspirations for the future of the city and its building and urban development sector to be compatible: 91% (strongly) agree that the individual participants share common aspirations (mean 4,4). This is also evident in the SBA outputs, where the vast majority of positions and values are shared or complementary. Accordingly, the large majority (86%) believes that the participants have the potential to articulate joint actions for supporting a sustainability transformation (mean 4,4). The relatively safe arena setting and the open communication within the group supported trust-building processes for at least 81% of the participants (who agreed or strongly agree) (mean 4,1). The first SBA already led to the institutionalization of a group of participants as a "Community of Sustainable Building Innovators" in cooperation between the implementing research project, a local think tank, (Future Forum Cambodia), SBA participants and individuals from their networks. Led by the local think tank, of which one researcher participated in the SBA and supported by the research project, regular evening sessions have subsequently been organised, where frontrunners discuss SBA-related themes. A new actor (network) thus emerged through the SBA that continued collaborative action with other groups and supports the formation of social capital.

4.4.4 Empowerment Dimension: Resources

In the first SBA phase, participants in all groups raised various resource-related empowerment needs across financial, knowledge and material forms: This included the "lack of large-scale green finance", "lack of incentives for green buildings", "lack of green finance mechanisms", or the "absence of renewable energy incentives". Participants also highlighted that existing (financial) resources are drawn to conventional projects due to high profit margins. Regarding knowledge and capacity resources, the frontrunners noted "limited knowledge of how to build with modern

materials", and an overall "lack of sustainability knowledge" but also a "lack of green building designs, strategies, projects and public buildings". Likewise, human resources and skills are considered scarce, with participants highlighting a "lack of qualified engineers and construction companies" or a "lack of capacities, installation measurement supervision, and technical know-how". Besides the financial, knowledge and human resources, other problems were raised regarding technological resources: Here, the groups highlighted the "lack of options for building sustainably", a "lack of sustainable building materials", a "lack of technology", the absence of locally produced green construction materials and a general "import dependency".

Accordingly, the visions indicate empowerment needs in terms of resources and involve locally produced sustainable building materials (material resources), a knowledgeable and qualified workforce (human resources) and economic incentives and financing options for sustainable building projects (financial resources).

In comparison to the self-assessed empowerment within the social capital dimension, responses show slightly lower resource-related empowerment effects: 75% agree or agree strongly that the capacity to access resources and institutions and the strategies to do so increased. The share of participants that strongly agreed is higher for the general capacity to access (35%, mean 4,0) than for the strategies (30%, mean 3,9). Meanwhile, some of the lacking resources are also addressed through changes within the social capital dimension – new ties and networks support the access to human resources for example.

4.4.5 Empowerment Dimension: Willingness

Moving to the third empowerment dimension, we see that 90% of the participants indicated that the SBA increased their willingness to access resources to further a sustainability transition (90% agree or agree strongly) (mean 4,3). The willingness thus increased stronger than the above-mentioned capacity to access resources (mean 4,0) and the increase in mobilization strategies (mean 3,9).

Beyond the change in willingness, we also asked participants to reflect on the underlying components of their intrinsic motivation, namely impact ("I can make a difference"), competence ("I am good at what I do"), meaning ("I care about what I do") and choice ("I can determine what I do"). We did not explicitly ask about the change, but for participants' general self-perception as we considered SBA-induced changes in these core beliefs to be unrealistic. Comparing the components, it becomes clear that "meaning" scored considerably higher than the rest: All of the participants agreed (75% strongly) to the statement that they care about what they do (mean 4,8). Meaning is followed by "choice" (mean 4,4), impact (mean 4,3) and "competence" (mean 4,2). The relatively high scores on "meaning" show the value-driven nature of the frontrunners, and their

relatively high level of perceived agency (determine and difference). Meanwhile, the combined scales for collective and self-efficacy show, that collective forms (mean 4,3) score higher than individual efficacy levels (mean 4,0) (see Figure 14).

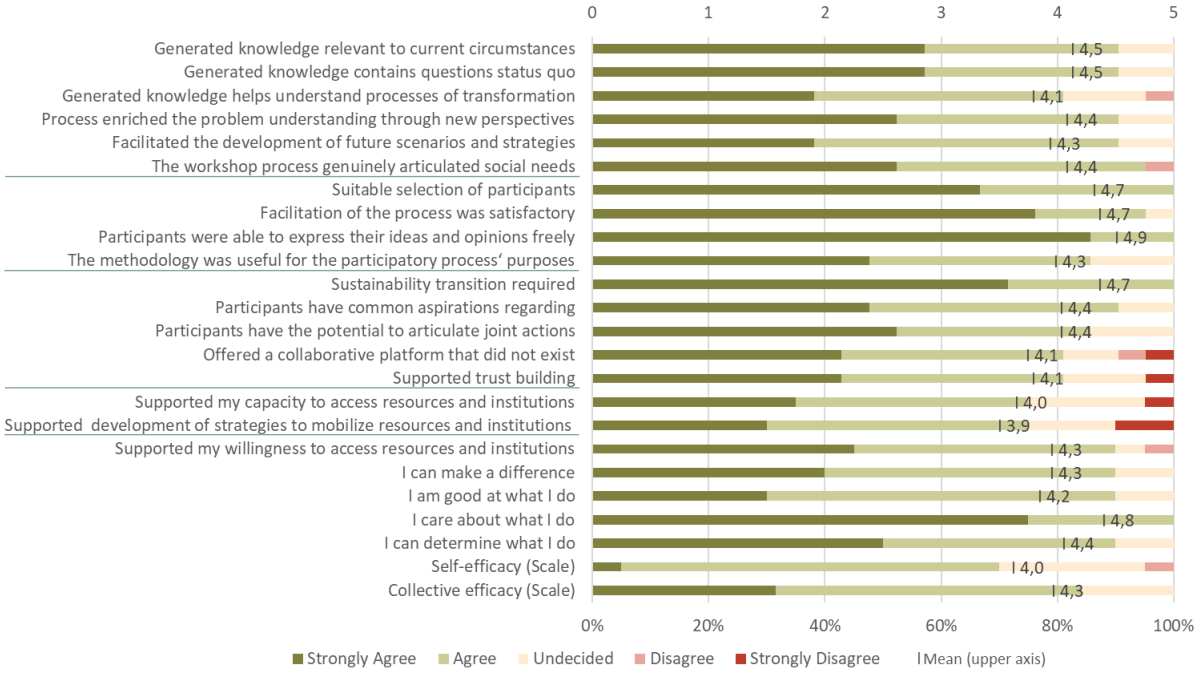

Figure 14: Selected participant survey responses

4.5. Discussion

Having developed a holistic framework to evaluate the (dis)empowering effects of transition interventions, we studied the Sustainable Building Arena in Phnom Penh, as a case study. Our results show that the first SBA offered an "empowering environment", allowed for social learning processes and supported the empowerment of participating frontrunners, as we found empowering effects across the three dimensions. The findings however indicate uneven effects with relatively higher empowerment for social capital and willingness than in the resource dimension.

Thus, while the expansion of trust, cooperation, social ties, and the motivation of frontrunners could be well addressed with the SBA, the access to resources and strategies for their mobilisation were not expanded as much – even though the problem framing indicated that empowerment might be particularly needed here. Though new knowledge resources and access to human resources can be expanded in such a setting, with coalitions, networks, trust and narratives being fostered and the intrinsic motivation hereby increased, TM approaches like the SBA are usually not connected to financial resources. Participants can however pool their resources to expand access or develop strategies for the mobilisation of existing resources elsewhere. Still, while the drafting of visions and strategies might be empowering, insufficient resources for their

implementation can ultimately lead to frustration and can thus have disempowering effects. TM approaches call for "experimentation", but they tend to be silent on the required funding. This might work in the “conventional” European TM cases, where participants can draw on external sources of funding for experimentation through public funds, regional development or innovation programmes, venture capital or more liquid financial markets. These sources tend to be much scarcer in the Global South and thus limit the implementation of transition experiments (van Welie and Romijn, 2018).

Nevertheless, our findings show that the participants’ willingness, which is primarily driven by meaning, to support a sustainability transition has increased for 90% of them. Here, the collective dimensions of transformational agency and the participants’ belief in collective action were highlighted as collective efficacy scored higher than self-efficacy. Accordingly, the noted empowerment effects of the SBA within the social capital dimension are promising: They indicate high degrees of trust building, the perception of shared aspirations and the feeling that joint action for a sustainability transformation is possible. Networks of trust and reciprocity are key to social capital and are seen as a necessity to mobilize collective action and address societal challenges (Schäpke et al., 2017). While the initial responses are promising, Hölscher et al. (2018) remind us that not only the *creation* of networks but especially their *maintenance* and *reproduction* over time is decisive. It is too early to comment on the reproduction, but the institutionalization of a group of Sustainable Building Innovators and a series of discussion rounds that followed the first SBA cycle highlight the participants’ interest in collaboration, continued exchange, and joint action. It is indicative of strong social capital formation and together with the SBA it might play a small role in moving towards the “active and dynamic green building community” that the participants envisioned during the first SBA. The empowerment effects in the social capital dimension also indicate a promising response to Ghosh et al, who call for the decolonisation of transition studies by “embracing the transformative activity of Southern actors, [and] helping in building communities of practises” (Ghosh et al., 2021, p. 108).

Social capital formation, meanwhile, is closely connected to the process design and the participant selection. Scholars have highlighted the importance of safe spaces outside of participants’ regular “functional’ environments” in the Global South (and beyond) for participants to collaborate freely and develop new connections in “empowerment environments” (Loorbach et al., 2015; Pereira et al., 2015). Our results suggest that the SBA offered such an empowering environment where participants were able to share relatively freely and discuss even radical ideas. Simultaneously however, the compressed nature of the SBA showed the limits of independently organised interventions with frontrunners in the Global South, who participate in such exercises in their free time: Interventions in such contexts thus come with the risk of disempowering effects for those

individuals that cannot make the time for the time-consuming participation, or when they are dependent on benevolent approval of supervisors. To accommodate this and minimize disempowering effects, the SBA was shortened to one day and hereby created its own problems: It limited the interaction time and thus the cooperation, the co-creation of knowledge and resources and the formation of social capital.

While Northern European governments might show interest, and offer institutional flexibility and necessary resources for experimental governance approaches, this might not be the case elsewhere. Even here, Hölscher et al. (2019, p. 182) found that it was challenging for policy officers to loosen their grip on the process. A recent study on a TM process in Valencia highlighted institutional differences in Southern European contexts, including a lack of participatory tradition and related implementation challenges (Escario-Chust et al., 2023). In illiberal contexts, however, where the assumption of a benevolent state is far more questionable, the primacy of governments in TM approaches is even more problematic (Lawhon and Murphy, 2012; Rock et al., 2009). Hence, scholars argue that in the authoritarian or illiberal contexts of Southeast Asia, it is forums organised by non-state actors that can "create space for more open discussion" (Lebel et al., 2010, p. 344). This raises the question of how to establish "independent" TM processes that still allow diverse frontrunners to participate and that productively engage with a de-centred state. The SBA succeeded in integrating selected state employees into the process that were identified as frontrunners by the Transition Team without violating the safe space of the Arena, as the survey results indicate.

However, not being linked to an established institution like a municipality challenges long-term engagement: Voluntary-driven processes are prone to end because they draw on volunteered time, arguably "the most pressured resource" (Roorda and Wittmayer, 2014, p. 44). This highlights that transition interventions do not only create resources or increase access to them but also consume resources themselves. Therefore, in cases where governments – usually the "glue of the process" (Roorda and Wittmayer, 2014, p. 44) – do not lead the follow-up, social capital effects tend to fade (Hölscher et al., 2019, p. 183). State-decentred approaches must therefore develop their own, non-governmental glue. The institutionalisation of the Sustainable Building Innovators community and its backing by an established local think tank offers a long-term perspective beyond the funding period of research projects. A strategy that could be derived here, is to initiate TM approaches in such contexts independently and extend the process' openness towards the cooperative institutionalization of the TM process with participating actors and emerging networks. Ultimately, social innovation initiatives need to "find an institutional home" (Pel et al., 2020, p. 9) to become a "continuous enabling process" (van Welie and Romijn, 2018, p. 258). This is particularly salient in the Global South, where project-led donor

interventions and the enhanced role of NGOs and international organizations are critiqued as creating a "society under the rule of short-term projects" (Szántó, 2016, p. 134).

Nevertheless, as the participants largely consider the co-created knowledge of the SBA to be enriching, relevant and critical of the status quo, the social learning processes can be understood as empowering. Instead of witnessing potentially paralysing and thus disempowering effects of the problem understanding, facilitators and participant observers witnessed a can-do attitude of motivated frontrunners that is mirrored in the motivational survey data. Though not formally integrated, the results of the groups were well-compatible. A very small number of exceptions was noted, however, including calls for more/less space for parking or mixed-use/functionally segregated cities. Still, as neither objective definitions of sustainability nor completely overlapping visions and understandings are realistic, the creation of a set of connected and largely coherent narratives and visionary elements and the development of ownership and a system-change perspective is arguably of the highest interest for the mobilization and empowerment of frontrunners (Wieczorek, 2018; Hölscher et al., 2019).

Overall, we can argue that the observed empowerment outcomes indicate political and "power effects": Stronger social ties, trust, co-produced knowledge, shared narratives and elevated intrinsic motivation increase not only *the* level of power that can be exercised by frontrunners but the exercise of *different* kinds of power that relate to the establishment of new resources (innovative power) and new structures (transformative power) (Avelino, 2017). Highlighting these diverse power effects is particularly relevant in our case, as discussions in illiberal contexts primarily highlight "power over" to explain continuity while other power types are ignored (Partzsch, 2017). The empowerment results that were indicated, instead point towards alternatives (power to), and potentially also to win-win situations (power with). The co-developed knowledge and the alternative visions, therefore, support counter-hegemonic discourses and contest the status quo. In terms of power and learning, the developed strategic and tactical knowledge can be understood as "political learning" (Goyal and Howlett, 2020).

In the Cambodian context, where relational aspects of empowerment such as recognition and respect have been underlined (Doneys et al., 2020), power (*omnaich*) can be indicated by wealth, social status (*bunn sak*), and charismatic persuasion (*baramei*) (Jacobsen and Stuart-Fox, 2013). As *bunn sak* is partially determined by personal associations and networks, this can be linked to social capital and the association with highly "ranked" frontrunners (and foreign institutions) can empower others. Equally, actors can accrue bunn through doing good in the sense of sustainability – "through performing morally commendable activities" (Jacobsen and Stuart-Fox, 2013, p. 10). As such, the SBA can support the empowerment of frontrunners "to play the power games with the regime" (Loorbach et al., 2015, pp. 61–62). These games are not played exclusively on

economic pitches but as cross-disciplinary competitions involving socio-political disciplines. With this counter-hegemonic and subversive character, we can position the SBA as a political process, that is part of a "type of democratic governance" beyond deliberative democracy and existing institutions (Jhagroe and Loorbach, 2015). As a political process, the SBA can support the challenging of existing institutions (and societal configurations) by extra-institutional means. This can support “stretch and transform” strategies where empowered actors can challenge and influence the selection environment to undermine incumbent regimes and support the emergence of transformative innovations (Ramos-Mejía et al., 2018; Smith and Raven, 2012). Empowerment approaches have similar subversive roots but became "building blocks of neoliberal governance" (McEwan and Bek, 2006, p. 1021). Still, both TM and empowerment can be subversive in the sense of politically supporting networks of pioneering frontrunners and increasing their capacity to exercise power to question, alter and replace incumbent socio-technical configurations.

Meanwhile, TM approaches in the Global South predominantly address issues of basic infrastructure provision in poor informal settlements (van Welie and Romijn, 2018; Silvestri et al., 2018; Nastar et al., 2018). While urban poverty and informal settlements are indeed fundamental characteristics of many contexts in the Global South, it should not be reduced to these aspects. Noting the importance of emancipatory progress of the urban poor and infrastructural improvements, we argue that “Southern TM” approaches must not be equated with urban poverty or informal settlements. Instead, they should equally consider diverse spatio-institutional characteristics that affect transition processes towards urban sustainability, including informality, alternative lines of accountability, heterodox ontologies, corruption, and the manifold ways in which coloniality is weaved into present systems (Feola, 2019; Arora and Stirling, 2023). This should also involve characteristics of institutional capture or ill-functioning institutions, that are reported for many contexts within the Global South; here, formal institutions do not work as assumed in the interest of the public, but largely in the interest of selected groups, like the neo-patrimonial networks in Cambodia (Hughes and Un, 2011c; Ramos-Mejía et al., 2018). Furthermore, despite the exclusive selection of frontrunners, it should still in essence strengthen democratic spaces through emancipatory design (Silvestri et al., 2018). This should also involve considerations of the group of frontrunners, who are targeted for empowerment: Are they already powerful? And how can the interests of the urban majority be represented in a frontrunner setting? In our case, the urban poor were not participating as such, but NGO staff that work closely with the urban poor were part of the SBA.

Since this study only involved a preliminary evaluation of an ongoing intervention, a more encompassing and continuous evaluation is still needed. This could further dissect the broad resource dimension to distinguish resource types. Another aspect that might be highlighted is that

of place-based empowerment needs. While these were implicitly voiced in the first cycle through the problem framing and visionary elements, it could be explicitly discussed whether particular contexts require specific forms of empowerment.

While the developed narratives are arguably unprecedentedly radical and our results indicate positive empowerment outcomes, this does not imply that a sustainability transition can now easily unfold. The observed empowerment outcomes should not be mistaken for an end result but a mere snapshot of a continuous process of renegotiating empowerment (Roy, 2010). Moreover, the empowered frontrunners are still embedded in a particularly marginalizing setting with unfavourable structures for a sustainability transition. A radical and structural change towards sustainability is a long-term and highly uncertain process, yet we argue that the SBA as a collaborative platform and safe space has been able to stimulate the empowerment of participating frontrunners and their networks and hereby supports the *seeds of destabilization* (Jayaweera et al., 2023). Our multi-dimensional framework allowed us to differentiate the empowerment effects across empowerment dimensions and scrutinize the necessary conditions for an empowering environment.

4.6. Conclusion

We have conducted this research to explore in which ways and to what degree urban transition interventions can contribute to the empowerment of frontrunners in an illiberal context of the Global South. To do so, we have proposed to study TM interventions as facilitated empowerment processes with a multi-dimensional framework to analyse empowerment conditions and (dis)empowering outcomes across the dimensions of willingness, social capital and resources. We studied one particular transition intervention, the Sustainable Building Arena in Phnom Penh, and found that it succeeded in creating an empowering environment and hereby supported empowerment outcomes for frontrunners across dimensions. The empowerment effects were slightly higher in terms of social capital and willingness than for resource mobilization. Transition interventions that seek to influence the speed and directionality of transition processes towards sustainability outside the Global North could thus become even more empowering when involving additional financial resources: As we have shown, resource access was not only more challenging in terms of empowerment outcomes, but was simultaneously highlighted as a key empowerment need by the frontrunners. This could be further explored by transition researchers with development organisations and green or impact funding agencies. Transition interventions could have a higher (empowerment) impact with additional (development) finance and resources, while development funding programmes might be improved by integrating transition approaches

(Marquardt, 2015). In any case, Southern TM designs should explore local financial landscapes to map funding opportunities for transition experiments. At the same time, implementing agencies should be aware that TM not only *creates* but also *consumes* resources – as it takes time and human resources.

The study showed that the de-centring of the state in transition interventions creates new opportunities and challenges: As unfortunate as the lack of a governmental "glue" for an extended engagement process is in the case of a de-centred state, its absence simultaneously opens the door to creatively and collaboratively explore emerging collaborations and hereby create an institutional home for the process. Still, we found that the selective integration of individual, sustainability-oriented state actors is reconcilable with an empowering safe space. This integration stays relevant in illiberal contexts, as sustainability transitions ultimately require wider structural shifts involving legislative changes. Creating a protected and empowering safe space for frontrunners while integrating state actors thus remains a challenge for TM processes in illiberal settings.

Our research furthermore shows that the SBA is psychological and political and supported the capacity of frontrunners to exercise transformative and innovative power: With better access and strategies for resource mobilization, higher motivation and enhanced social capital it supports participants to challenge the status quo (Silvestri et al., 2018; Loorbach et al., 2015). The measured empowerment effects are however only a snapshot of a continuous process and not an end state in itself. Furthermore, the frontrunners are still embedded within marginalizing structures that require fundamental change as part of a sustainability transition.

The authors currently adapt the second SBA cycle to the findings to improve the empowerment outcomes and better support the emergence of an active and dynamic green building community in Phnom Penh. The team, therefore, explores the integration of impact funding organisations that are interested in discussing concrete project ideas that can be derived from the SBA visions and strategies. As conventional TM assumptions of democratic, open and safe conditions are not given in many contexts with critical sustainability challenges, researchers need to refine transition interventions that can address heterogeneous contexts in the Global South, in illiberal settings and beyond, while simultaneously making empowerment and TM subversive again to strengthen their transformative potential.

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Chapter 5: Incubating Transitions

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Empowering environmental entrepreneurs in the Global South? The case of the Sustainable Building Incubator in Phnom Penh

Abstract

Sustainability-driven entrepreneurship or ecopreneurship is increasingly considered to play a crucial role in driving transformations of systems of consumption and production towards sustainability. At the same time, entrepreneurial support organisations like incubators have multiplied, and increasingly also appear in the Global South. However, there is only limited understanding about the ways these programmes in their role as intermediaries actually empower participants to take over active roles in transformation processes. Knowledge is particularly scarce for innovation contexts outside the Global North, where major sustainability challenges and limited funding coincide. This paper therefore studies the empowerment effects of an incubation programme on sustainable building solutions in Phnom Penh, Cambodia. Following a multi-dimensional understanding of empowerment, this study builds on a longitudinal survey research that integrates empowerment in terms of resources, social capital, intrinsic motivation, social learning and process design. The results show overall increased empowerment levels and a correlation of social capital increase and increased willingness. We however also found ambivalent results with negative effects for individual motivational effects such as impact and competence. Incubation programmes need to account for such disempowering tendencies in order to realise their transformative goals.

Keywords: Sustainability transitions; Cambodia; ecopreneurship; business incubation; Global South; empowerment

5.1. Introduction

Cities in the Global South are projected to account for most of the future urban growth, construction activities and associated building energy use (Kang et al., 2018). These urban spaces have increasingly become financialised arenas for capital accumulation processes (Simone, 2020). Land speculation, displacement of urban poor, massive resource consumption, and the inflow of finance capital thus dominate the urban sphere. Local state agencies – often understaffed and institutionally weak – are deeply entangled with these problematic processes and often profit financially (Ramos-Mejía et al., 2018).

Simultaneously, cities are hailed as "seedbeds for sustainability innovations" (Affolderbach and Schulz, 2018a), or loci of creativity and innovation, with a large workforce, infrastructures, and market access as well as a stimulating environment with diverse and unplanned interactions (Shearmur, 2012). The lethargy or inability of public actors to adequately respond to sustainability challenges has led scholars, international organizations, politicians and other voices to call for a stronger role of private actors, firms and especially entrepreneurs to push for transformative change towards urban sustainability through innovation – in the Global South and elsewhere (Cojoianu et al., 2021; Mazutis and Sweet, 2022; UN ESCAP, 2021; PwC and Global Infrastructure Facility, 2020; UNCTAD, 2022; Galkina and Hultman, 2016). Sustainable entrepreneurship initiatives were shown to move from niche business to "a deep-scaling collective movement that can change the direction of environmental politics" (Galkina and Hultman, 2016, p. 59; Holt, 2011; Pinkse and Groot, 2015). Accordingly, environmental entrepreneurs or ecopreneurs are increasingly conceived as change agents "that might greatly contribute to sustainable development" (Ramos-Mejía and Balanzo, 2018, p. 2). To support these, governments and firms have invested in so many entrepreneurial programmes that "entrepreneurial support organizations are seemingly everywhere [now]" (Bergman and McMullen, 2022, p. 702).

The role of entrepreneurial support programmes like (pre)incubation programmes for sustainability transitions has however hardly been reflected in the academic literature: Yu and Gibbs accordingly argue that it is not understood yet "how, and under which socio-spatial conditions, green entrepreneurs can build capacity and power to alter existing game rules or create new reward systems" (2020, p. 2905). Even beyond sustainability-oriented entrepreneurial support organizations (ESO), "there is still much we do not know regarding how ESOs empower, change, and/or challenge individuals" (Bergman and McMullen, 2022, p. 698). Generally, the necessity of contextualised programme designs is acknowledged, while very limited guidelines for incubation processes outside of the West exist – especially so for sustainability-oriented ones (Al-Mubaraki et al., 2013).

In this paper, we therefore study how an incubation programme can support transformational processes through the empowerment of entrepreneurs as change agents drawing on the case of a concrete incubation intervention in Phnom Penh, Cambodia. Appropriately designed sustainability-oriented incubators, especially for contexts in the Global South, arguably have the potential to empower ecopreneurs, build their transformative capacities and allow them to take up an active role in transformative processes of change towards sustainability as innovation intermediaries. We apply a recently developed empowerment in transition governance interventions framework on an incubation programme, the Sustainable Building Incubator in Phnom Penh Cambodia, to assess the empowering effects on the incubatees.

To this end, we introduce the literature on entrepreneurship from the perspectives of sustainability transitions research, the literature on entrepreneurship incubation in the Global South and our empowerment framework in the following (Chapter 5.2). We then discuss our methods and material (Chapter 5.3) and move on to our case study in Chapter 5.4. This is followed by a discussion of the results and a conclusion (Chapter 5.5 & Chapter 5.6).

5.2. Analytical Framework

5.2.1 Ecopreneurship & Urban Sustainability Transitions

While the state has been dominant in transitions studies, Yu and Gibbs (2020) argue that entrepreneurs have initially been neglected actors. Recently, many scholars have however highlighted the role of social, sustainable or green entrepreneurs as key actors and drivers for transitions towards sustainability (Yu and Gibbs, 2020; Ramos-Mejía and Balanzo, 2018; Affolderbach and Krueger, 2017; Burch et al., 2016; Luederitz et al., 2023). Social entrepreneurs are discussed as actors that combine business skills with “a social mission” to “identify under-utilised resources and create new welfare services” or as actors that mobilise “innovation as a means to fulfil unmet social needs” (Gerlach, 2003, p. 39). Those entrepreneurs that target social value primarily within the environmental sphere and seek to “restructure the corporate culture and social relations of their business sector through proactive, ecologically oriented business strategies” can be understood as ecopreneurs (or green or environmental entrepreneurs) (Isaak 1998 in Yu and Gibbs, 2020, p. 2902). Sustainable entrepreneurship can likewise be understood as those activities seeking restructuring of social relations and corporate cultures through sustainability-oriented business strategies. While some distinguish non-profit social entrepreneurship from for-profit ecopreneurship (with environmental objectives), ecopreneurship is here understood as a form of social entrepreneurship that can be for-profit or non-profit but that that seeks to create social values within the environmental dimension.

These ecopreneurs are understood as "catalysts of ecology-related social change", "change agents for sustainability", or "environmental problem solvers" (Bruin, 2016, pp. 10–11). They have been considered as "system builders" that call for wider changes including norms and regulations (O'Neill and Gibbs, 2014, p. 577). Ecopreneurs are also attributed with the creation of social and environmental value besides economic ones (Ramos-Mejía and Balanzo, 2018). Furthermore, green entrepreneurs are considered capable of exercising the power to realise impact in market and sustainability dimensions while successfully challenging dominant and unsustainable production and consumption patterns (Hörisch, 2015). They are thought to be able to influence mind-sets and impose their visions on others as role models and act as "social engineers" through their ecological-oriented business strategies that can "change, reconfigure or provide a new system to impact upon global-local social and environmental problems" (Yu and Gibbs, 2020, p. 2905). Luederitz et al. (2023) have conceptualised a set of eight ways in which sustainable entrepreneurs shape urban sustainability transition, namely through internal or external resource interventions, transactive interventions, organizational interventions and value interventions that affect system elements, properties or processes. Even though green entrepreneurs are associated with such a long list of daunting tasks, it has not been understood yet, under which circumstances green entrepreneurs are actually enabled or empowered to take over these transformative roles. Yu and Gibbs (2020) accordingly ask under which conditions green entrepreneurs gain the power to act as system builders in urban sustainability transitions.

Much of the entrepreneurial literature has focused on entrepreneurs as individuals or "lone heroes", and has thus been critiqued for its methodological individualism, that underplays the role of networks, supporting infrastructures and collective agency (Gibbs and O'Neill, 2012; Affolderbach and Krueger, 2017). Critiquing individualistic and resource-based empowerment approaches, Yu and Gibbs (2020) therefore argue that the emergence of green entrepreneurs and green innovation should not solely be explained by the access to relevant resources, but should equally consider actor networks with collective and embedded capacities (Smith and Raven, 2012). Ecopreneurship thus involves individuals that collaborate within and across organisations: This can be founders of environmentally-oriented organisations, or actors that operate within existing institutions. Furthermore, the concept of ecopreneurship can also be extended to "organisations that behave ecopreneurial and foster ecopreneurs" (Gerlach, 2003, p. 38).

Besides the connectedness and collectiveness of entrepreneurial agency, some also challenge the individualistic perspective from a spatial-relational perspective and highlight the spatial embeddedness of these actors and the resulting place-specific relations (Yu and Gibbs, 2020). This includes the interactions between entrepreneurs, the state and other stakeholders, as well as place-specific sustainability challenges. Cojoianu et al. (2021) for example showed that cities with

a higher number of green start-ups have decreased air pollution levels more than cities with weaker start-up ecosystems. Others highlight that different challenges and socio-economic settings "could necessitate different ecopreneurial approaches in diverse regions" (Bruin, 2016, p. 18). Yu and Gibbs (2020) suggest that ecopreneurs could have a larger influence outside the Global North, ("non-core regions"), since here less regime resistance might be encountered. It is furthermore suggested that in such contexts ecopreneurship could be combined with local economic development where sustainability-oriented innovation can shape the local path creation and hereby increase the competitiveness of the local industry, realizing sought-after development outcomes and getting strategic actors on board (Yu and Gibbs, 2020). Ramos-Mejía and Balanzo (2018) study ecopreneurs in a Colombian context and found that grassroots ecopreneurs need to act as change agents by following a range of boundary, practice, and knowledge circulation strategies, in order to realise their desired impacts.

5.2.2 Supporting ecopreneurship in the Global South

The emerging research on ecopreneurship focuses on a range of themes, including the drivers of engagement in ecological sustainable entrepreneurship (regulation, public concern, expected competitive advantage, top management commitment (Gast et al., 2017; Pastakia, 2002; Koe and Majid, 2014), the strategic actions taken by ecological sustainable enterprises (Oriaifo et al., 2020), or the enabling factors and challenges of ecological sustainable entrepreneurship (Kimjeon and Davidsson, 2022). It is within this last focus area, that first studies recently considered the effects of ESOs such as incubation programmes that seek to enable ecopreneurs (or entrepreneurs in general) to pursue their entrepreneurial endeavours (Bergman and McMullen, 2022; Pattanasak et al., 2022; Haugh, 2020; Hull et al., 2021). Business incubators are understood as organizations that are "established to support the early growth of new businesses with the ultimate goal of supporting young entrepreneurs in attaining financial independence" (Pattanasak et al., 2022, p. 2). To this end, they provide physical and intangible support to participants, such as access to IT infrastructures, office space or business mentoring. In their review of now "ubiquitous" ESOs Bergman and McMullen (2022), consider incubators along with science parks, accelerators, maker spaces and co-working spaces to study their effectiveness. They found "modest support for ESO involvement in fostering or improving individual entrepreneurial intent, self-efficacy, and select competencies"; yet, they conclude, "there is still much we do not know regarding how ESOs empower, change, and/or challenge individuals as they begin, continue, or end their entrepreneurial journey" (Bergman and McMullen, 2022, p. 698). Following another literature review, Pattanasak et al. (2022) identified a range of critical factors for the success of incubators, including financial resources, networking and social capital.

Even less ecopreneurship incubation research has been conducted in the Global South (Al-Mubaraki et al., 2013). This is despite its potentially even larger relevance in Southern contexts: In settings with less formal regulations, ecopreneurship is consequently more rarely initiated as a reaction to environmental regulation, or public expectations, and instead needs to stem from active drivers of ecopreneurship such as expected competitive advantage, or environmental management commitment (Carayannis and Zedtwitz, 2005). Busch and Barkema (2022, p. 855) meanwhile consider incubators in emerging economies to be an "intriguing extreme setting" in terms of uncertainty, as "[n]ascent entrepreneurs are often at early stages of exploring their ideas (i.e., general uncertainty of goals and objectives), and an emerging economy is a particularly volatile setting to do so". Akçomak (2009) likewise argued that many hurdles for successful entrepreneurship are higher in Southern contexts than for their Northern counterparts, including shortages of human capital, and a predominance of ill-functioning institutions. These conditions make successful incubation programmes even more important – especially when environmental concerns are neglected by the state.

In their study on circular-economy incubators in a "developing country" setting, Hull et al. (2021) meanwhile found that stakeholders from the entrepreneurial ecosystem seek minimal government involvement due to distrust of the government. Generally, rent-seeking economies or a history of civil strife (such as in Cambodia) are discussed as unfavourable conditions for entrepreneurs (Naudé, 2010; Stiglitz, 2006). In their analysis of Cambodia's entrepreneurial ecosystem Khieng et al. (2019) state that Cambodia has historically not had an entrepreneurial society, instead risk-averse mind-sets were formed under the primacy of higher education over business engagements. The authors however note a recent shift with popularised business model and entrepreneurship competitions, local role models and mentors, emerging entrepreneurship networks and an increasing number of incubation programmes run by government and private actors: More than 20 graduate and student oriented start-up programmes were organised in 2018 alone (Khieng et al., 2019).

Overall, Haugh (2020) argues that business incubators in "developing economies" are "entrepreneurial enablers" that can lead to individual empowerment, increased agency, higher life chances and poverty alleviation. Agrawal et al. (2021) equally claim that entrepreneurship can empower women in rural India. While empowerment can certainly be an outcome of ecopreneurship, some empowerment processes are also needed to enable actors to pursue entrepreneurial initiatives in the first place.

5.2.3 Incubation as empowerment by innovation intermediation

Within sustainability transitions research so-called intermediaries have gained attention as agents or catalysts that drive system change (Kivimaa et al., 2019), or eco-innovation (Kanda et al., 2018): Understood as actors that create spaces for actors to make connections and establish relationships, they are believed to drive innovation processes "by educating, gathering and distributing financial and human resources, evaluating new technologies/practices, creating partnerships, and influencing regulations and rules" (Martiskainen and Kivimaa, 2018, p. 17). The literature discusses diverse actors as potential intermediaries, including innovation centres, incubators, science parks, universities, cities, or technology transfer offices (Kanda et al., 2018).

In the entrepreneurship literature, intermediaries are discussed as a means to fill "institutional voids" in weak institutional contexts: In such settings ("emerging economies"), entrepreneurial activities are generally understood to be hindered by information asymmetry, higher degrees of uncertainty, limited access to funds and resources, higher monitoring and enforcement costs, lower transparency and hence higher transaction costs. Intermediaries are then proposed as a way to reduce uncertainty and "enable markets to function" (Oriaifo et al., 2020, p. 515). Oriaifo et al. (2020, p. 505) list financial intermediaries (cooperatives, microfinance institutions), firms bridging factor market gaps, and "open-systems intermediaries such as business incubators and accelerators that provide technology to link suppliers and end users" as such intermediaries.

To understand the empowering effects of the incubation programme as an innovation intermediary (Gliedt et al., 2018), we draw on a recently developed multi-dimensional empowerment in transition interventions approach (Jayaweera et al., forthcoming). It considers empowerment effects of transition interventions across three empowerment dimensions, namely increases in social capital, the willingness or intrinsic motivation of individuals to take up active roles in transition processes and the accessibility of resources (see Figure 15).

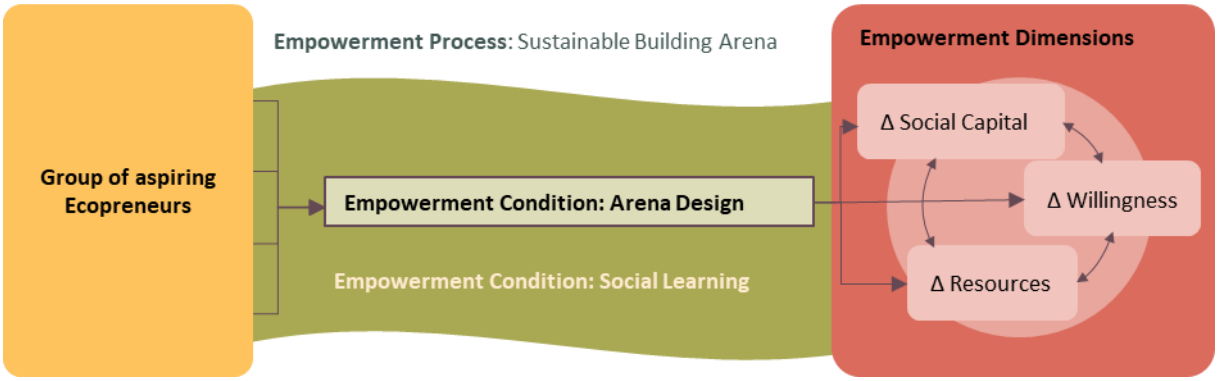

Figure 15: Incubation empowerment framework (adapted from Jayaweera et al., forthcoming).

The resource dimension of empowerment considers the increase of entrepreneurial capacities to mobilise resources for the achievement of their goals (Avelino, 2017; Schreuer, 2016; Noboa et al., 2019). This includes access to resources and institutions themselves but equally the strategies for their mobilisation. Resources, meanwhile, can be financial, but equally cognitive resources, human resources, or raw materials and physical space. The second empowerment dimension covers increases of the willingness or intrinsic motivation of frontrunners to influence envisioned transition processes and take over a more active role in transition processes. This involves increased levels of self-efficacy. Following Thomas and Velthouse (1990), we consider intrinsic motivation to build on self-assessed meaning, impact, choice and competence. These elements are decisive for actors to "gain a sense of power to contribute to sustainability transitions" (Avelino, 2017, p. 513). Thirdly, we consider social capital as a dimension of ecopreneurial empowerment in sustainability transitions: This includes strengthened networks, trustful and reciprocal relationships to drive transformative change. A key part of enhanced social capital in this process is the reflection on and (re-)definition of individual and institutional roles within processes of transformative change towards sustainability (Hölscher et al., 2018; Noboa et al., 2019). While grouped into these broad dimensions, the diverse empowerment effects are equally understood to have cross-dimensional interconnections.

Noting that overall empowerment levels depend on a wide range of factors, we study the empowerment effects of a specific transition intervention like an incubation programme. Such effects, however, can also inadvertently lower empowerment levels and thus be disempowering. The realization of (dis)empowering effects is then understood to depend on the intervention design and the learning effects that are allowed in the created setting (Jayaweera et al., forthcoming). In the context of an incubation programme this can include the learning of skills that are considered relevant for entrepreneurs (Plumly et al., 2008; Pardo-Garcia and Barac, 2020)[7]. Different institutional contexts might call for different skill sets and thus different incubator designs. In less regulated settings with fragile configurations, "system building" skills might for example be more needed than in mature ones.

Applying this framework to a transition intervention like an ecopreneurship incubation programmes, we can explore the role of incubation programmes as intermediaries that seek to empower ecopreneurs to take up active roles in sustainability transitions (Gliedt et al., 2018).

[7] This can for example involve legal skills, technological skills, creativity skills, adaptability skills, team-building and teamworking skills, time management skills, negotiation skills, problem-solving skills, sales and marketing skills, financial management skills, communication skills, cybersecurity skills, empathy.

5.3. Methods and Material

The paper follows a case-study approach to identify and characterise the empowerment effects of an incubation programme in the Global South, namely the Sustainable Building Incubator (SBI) in Phnom Penh. The SBI was implemented from October 2022 to February 2023 as a joint programme of Impact Hub Phnom Penh and a transdisciplinary research project (Build4People).

To assess the empowerment effects of the programme, this study builds on (quantitative) ex-ante and ex-post surveys that were conducted with the participants of the incubation programme[8]. An online questionnaire was sent to the participants in the first week of the programme (November 2022) and one week after the end of the programme (March 2023). An additional ex-post survey for dropped out participants involved extra questions asking for dropouts reasons and did not include questions that were relevant only after completion of the whole programme. No personalised or sensitive data was collected in the research process and participants were informed about the anonymised analysis of the survey results.

Following an outreaching phase, 15 teams applied and 7 teams were selected to participate. One selected team did not start, another team dropped out of the programme halfway, leaving five teams to compete at the end. Out of 15 participants of the programme, the pre-survey questionnaire was answered by 11, the post-survey by 12 participants. Two people answered the drop out questionnaire; one of them also answered the pre-survey. The sample size of the people who took part in the pre- as well as in the post-survey was nine (see Figure 16). In this paper we mainly show and discuss the results of the sample size of the 9 participants, who took part in both surveys. We hence focus on the post survey for the 9 participants and additionally analyse specific pre and post differences.

[8] Some items like open questions were qualitative.

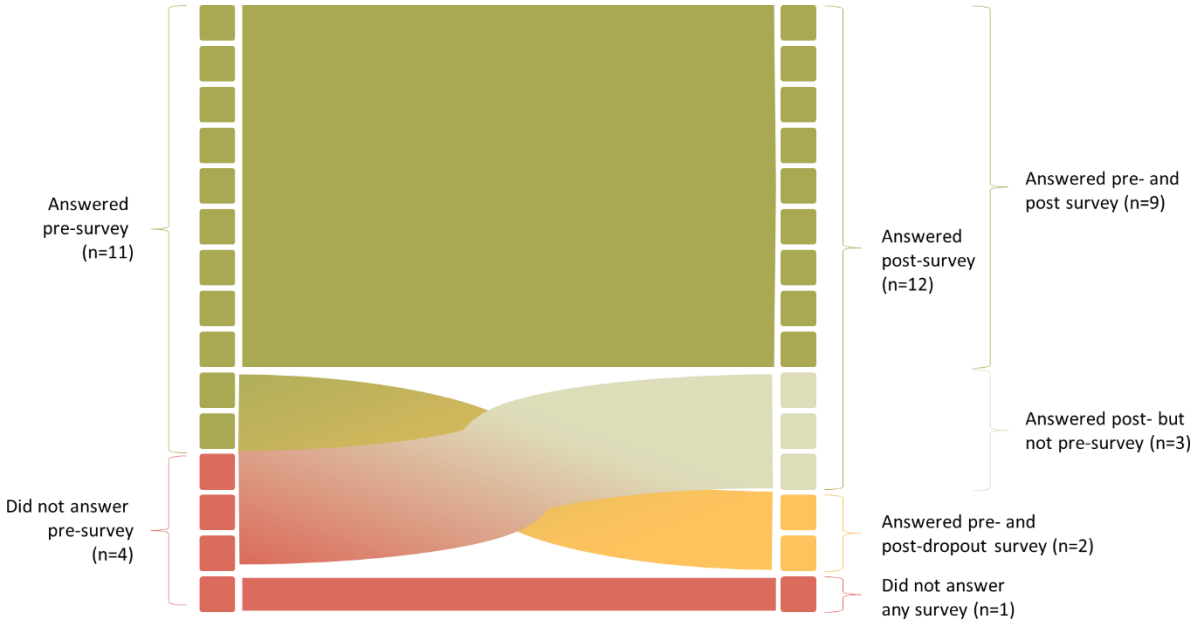

Figure 16: Overview of participants and surveys.

The age mean of the participants was 23 years[9]. Five out of these nine participants were female and four identified as male. All five start-up teams are represented (Aquabuild = 3, Smart Energy & Urban Furniture = 2, SSC and iACT = 1). The current stage of the business was described by five people as idea stage, two people said that their business was already a "prototype", one person said their project is "early operational" and one participant stated that the business is investment ready (see Table 8).

	Idea	Prototype	Early operational	Investment ready
Aqua Build	3			
Smart Energy	1		1	
iACT				1
SSC		1		
Urban Furniture	1	1		
n	5	2	1	1

Table 8: Stage of project idea (N = 9).

Statistical analyses were computed with the Statistical Package for the Social Sciences (IBM SPSS 28). For some analysis in the post-survey we used two scales, namely "Access to resources"[10] which consists of five items (Access to finance, Access to human resources, Access to information, Access to Impact Hub infrastructure, Access to raw materials) and the scale "Social Capital"[11] which consists of three items (expanded ties and networks, changed role, likelihood of more active future role). [12]

[9] *SD* = 5.39, *Min* = 19, *Max* = 36, *MO* = 21, *MD* = 21, *N* = 9.
[10] Internal consistency by reliability analysis: Cronbach´s Alpha = .601.
[11] Internal consistency by reliability analysis: Cronbach´s Alpha = .667.
[12] 'My participation in the incubator has increased the likelihood of me taking over a more active role in sustainable building and urban development projects or initiatives in the future', 'My participation in the

Because of the very small sample size, the test of normal distribution had to be done for all interval scaled items in a second step. The Kolmogorov-Smirnov test and the Shapiro-Wilk test were used to this end. As almost none of the items show a normal distribution (see Appendix 7 and 8), non-parametric tests were used for further statistical analysis. Despite the small sample size, we move beyond descriptive statistics in this paper to explore statistically significant connections between the items to better understand the effects of the incubation programme. We will now introduce the SBI in more detail and then turn to the analysis of our empirical material.

5.4. Results

5.4.1 The Sustainable Building Incubator

The programme was advertised on Social Media, through the networks of Impact Hub and the research project, and by a series of presentations given at local universities in Phnom Penh. Individuals were invited to develop initial ideas in groups regarding building materials, smart building, urban community and innovation design (see Figure 17 for suggested themes). The themes were selected based on prior research within the research project and as important areas for building sustainability. The local building and urban development sector has been one of the most dynamic industries, driving foreign direct investments, GDP-growth but also resource consumption, energy use, land use change with many negative effects for urban communities (Baker et al., 2018; Beckwith, 2020; Flower, 2019). The themes were selected to accommodate these problems and support the development of suitable innovations. The selected teams were chosen based on seven selection criteria: These included the project stage, time commitment, coachability and motivation, impact on urban communities, diversity of skills, founding team, and team size.

incubator has already changed my role in the context of more sustainable building and urban development processes',
'By participating in the incubator, I was able to expand my ties and networks with other innovators who aim to make Phnom Penh's building sector and urban development more sustainable'.

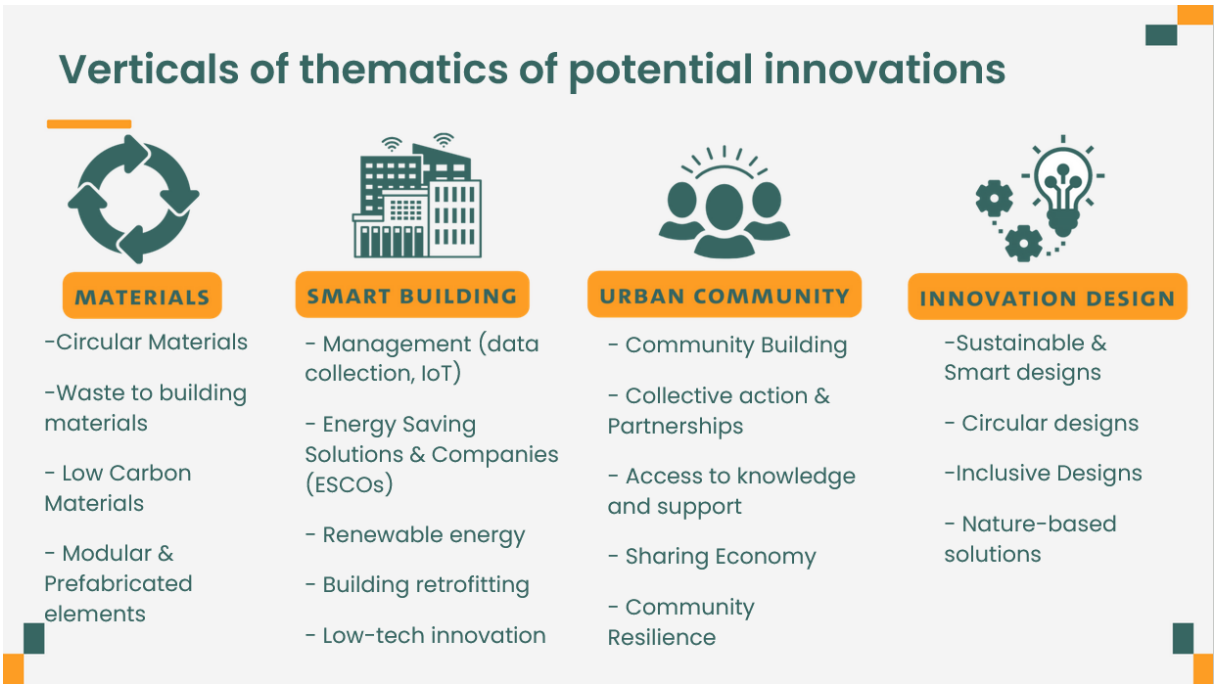

Figure 17: Proposed themes during SBI outreach campaign.

The SBI followed a design thinking approach seeking to support aspiring entrepreneurs transform ideas into tangible prototypes. Guided by business and industry mentors, participants underwent an intensive incubation journey, including one-on-one business and technical mentoring, group masterclasses, a field trip and a video training to help them develop their solution prototypes.

Each team had a lead "industry mentor" that was chosen for them according to their initial start-up idea by the programme coordination team (including the first author of this study). Lead industry mentors included civil engineers, architects and urban planners that were selected from the network of the transdisciplinary research project and were part of the wider sustainable building ecosystem of Phnom Penh. Researchers of the project, including three of the authors, were additionally involved as supportive "floating mentors" that the teams could consult on-demand. Business mentoring was provided by Impact Hub coaches. These were also responsible for most of the Masterclasses of the SBI (see Figure 18).

Figure 18: Overview of weekly masterclasses.

The survey indicated that participants considered the following sessions as the most insightful masterclasses to expand their resource access: "Meet the Industry Experts & Problem Analysis" (7), "Value Proposition & Business Model Canvas" (5), "Partnership, Project Management, and Financial Planning" (5). The most useful ones for expanding resource mobilization strategies include "Customer Persona & Customer Discovery" (6), and again "Value Proposition & Business Model Canvas" (5) and "Partnership, Project Management, and Financial Planning" (5). Generally, the mentoring was perceived as helpful; when participants were asked for improvements in the post-incubation survey, one participant voiced that more mentors with special engineering knowledge would have been useful.

The SBI field trip took the participants to three start-ups that work on related themes: A building material producer (and alumni of a previous incubation programme, My Dream Home), a solar energy start-up (SOGE) and a social enterprise that provides waste water treatment (SuDrain). The aim of the field trip was to create bonds between the participants and increase the belonging to the incubation cohort and to learn from the experience of the entrepreneurs. The video making training supported the teams develop their own promotional video that was shown as part of their pitch: At the end of the programme the participating teams pitched their projects to a jury, which involved two leading architects, as well as a representative each from the Ministry of Environment and the research project. The architectural firm of one judge sponsored the prize of 1.000 USD which was awarded to the winning team (Aquabuild). The criteria for the judges included "Entrepreneurial Leadership and Team", "Understanding of the problem", "Effectiveness of the solution", "Viability and scalability of business model and customer target", and "Social impact".

In the following, we will present the results regarding the effects within the main empowerment dimensions, differences between resource types, skill enhancement and lastly the start-up continuation.

5.4.2 Main empowerment dimensions

The participants that completed both pre- and post-surveys indicate very high agreement levels with empowerment effects across social capital, resource mobilization and motivation in the post-survey (median, modus and mean are high, see Table 9 and Figure 19). The highest values are given for increased motivation (M = 4,6, SD = 0,53) and resource mobilization strategies (M = 4,4, SD = 0,53). Slightly lower increases are noted for the social capital dimension (M = 4,2, SD = 0,53). The lowest values were found for empowerment effects in terms of resource access (calculated on the basis of different resource types) with a mean of 3,9 (SD = 0,48). Meanwhile the survey question directly asking for expanded knowledge about resource location and ownership yielded much higher results with a mean of 4,4 (SD = 0,53).

		Increased motivation	Increased resource mobilization strategies	Increased resource access (scale)	Increased social capital (scale)
N		9	9	9	9
	missing	0	0	0	0
M		4,6	4,4	3,9	4,2
MD		5,0	4,0	4,0	4,3
MO		5	4	3,60	4,00
SD		0,53	0,53	0,48	0,53
Min		4	4	3,00	3,33
Max		5	5	4,60	5,00
Responses: range from 1 = not at all to 5 = totally.					

Table 9: Descriptive statistics of main empowerment dimensions (N = 9).

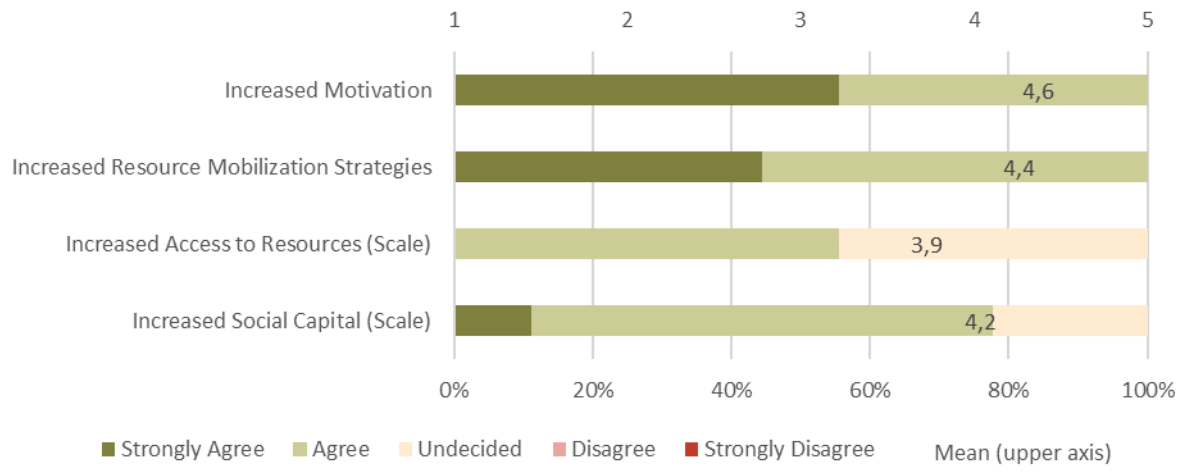

Figure 19: Effects on empowerment dimensions (N = 9).

Regarding the changed role understandings of themselves, participants noted activating effects of the SBI, including "[t]o look at things with [a]different perspective, not as a normal student who see only problem anymore [but] as a human being that could start something to make a change that could respond to [the] problem", or "the incubator program has helped me understand how this can be put into practice […] and share this information with other friends and colleagues". Besides, participants noted increased awareness of sustainability challenges and solutions, noting amongst others "I have developed and become more aware as well as willing to challenge myself more in the sustainability actions", "Changing my mindset to focus on sustainability". Six out of nine participants strongly agreed and two agreed that the SBI programme has increased the likelihood of them taking over a more active in transformative action towards urban sustainability; one participant remained undecided (M = 4,6, SD = 0,73).

Participants also indicated high levels of agreement in terms of motivational increase (M = 4,6, SD = 0,53), when confronted with the statement: "Participating in the incubator has increased my motivation to support change toward sustainable building practices in Phnom Penh". The different components of motivation indicate that the motivation is primarily driven by "meaning" (M = 4,6, SD = 0,73) and "choice" (M = 4,3, SD = 0,71) before "impact" (M = 3,9, SD = 0,78) and "competence" (M = 3,8, SD = 0,67).

Surprisingly, when comparing the pre- and post-surveys, the winning team (Aquabuild) remained constant in terms of competence ("I am good at what I do") (M = 3,7, SD = 0,58), while others decreased, leading to an overall decline of self-assessed competence levels from M = 4,2 (SD = 0,83) to M = 3,8 (SD = 0,67). Overall, the levels decreased for all individual motivational items even though the direct survey item (SBI has increased my motivation…) was answered very positively. The strongest decrease overall is noted for self-assessed impact levels from M = 4,6 (SD = 0,53) to M = 3,9 (SD = 0,78), and from M = 4,8 (SD = 0,41) to M = 4,0 (SD = 0,89) for those participants who

were not in the winning team. The self-assessed competence of these participants decreased from a level of M = 4,5 (SD = 0,84) to M = 3,8 (SD = 0,75) (see Figure 20).

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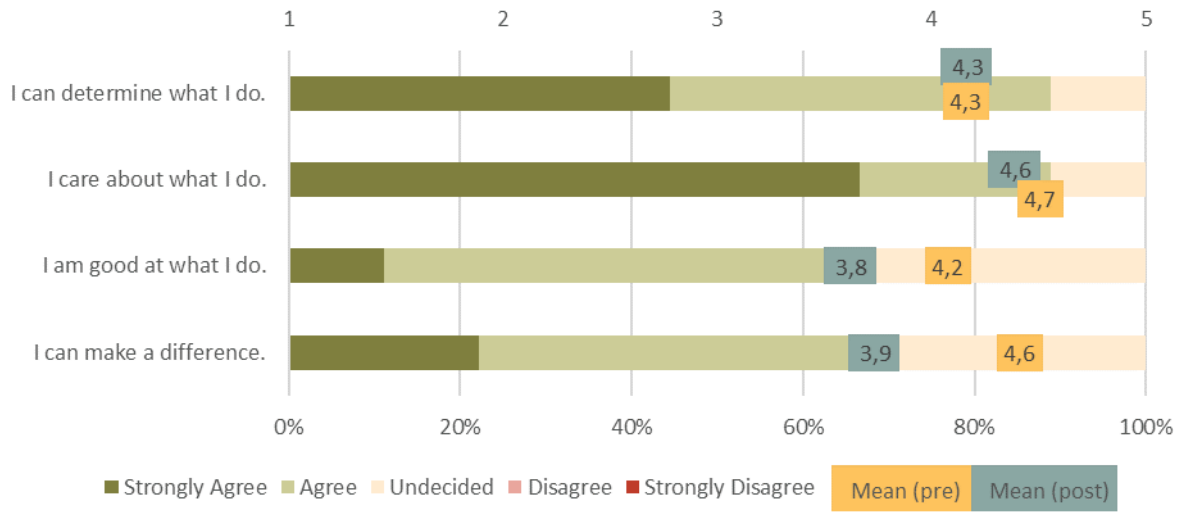

Figure 20: Motivational elements after the SBI and before (mean) (N = 9).

Two participants who dropped out of the programme midway filled out the respective survey, indicating time constraints (both) and personal reasons for dropping out of the programme. One of the dropouts stated that they would definitely continue working on the start-up idea; the other considered this rather unlikely (probability of 2 out of 5).

Correlations between the main empowerment dimensions

To analyse the correlations between the main empowerment dimensions, we calculated the Spearman rank correlation. As shown in Table 10, the "social capital" scale correlates significantly positive with the "increased motivation" (rsp = .702, p = .035) with a medium effect. High values for the increase of social capital thus positively correlate with strong increases in the motivation of participants to support transformative change and the other way around. Equally, a positive significant correlation with a medium effect can be noted between the "access to resources" scale and the "resource mobilization strategies item" (rsp = .699, p = .036). None of the other correlation analysis showed significant results.

		Increased motivation	Increased resource mobilization strategies	Increased resource access	Increased social capital
Increased motivation	correlation coefficient	1,00	,350	,480	,702*
	Sig. (2-tailed)	.	,356	,191	,035
	N	9	9	9	9
Increased resource mobilization strategies	correlation coefficient	,350	1,00	,699*	,307
	Sig. (2-tailed)	,356	.	,036	,422
	N	9	9	9	9
Increased resource access	correlation coefficient	,480	,699*	1,000	,306
	Sig. (2-tailed)	,191	,036	.	,423
	N	9	9	9	9
Increased social capital	correlation coefficient	,702*	,307	,306	1,000
	Sig. (2-tailed)	,035	,422	,423	.
	N	9	9	9	9

Table 10: Correlation of main empowerment dimensions.

Analysis of differences of main empowerment dimensions

The Wilcoxon-test was used for the testing of differences between the levels of motivation, resource mobilisation strategies, resource access and social capital before and after the SBI process. The increase of the motivation to support change toward sustainable building through the incubator (MD = 5) is significantly higher than the increase of access to resources though the incubator (MD = 4) with Wilcoxon-test: z = 2.53, p = .011 (N = 9) (see Appendix 9). The results also show that the increase of the motivation to support change towards sustainable building through the incubator (MD = 5) is significantly higher than that for "Social Capital" (MD = 4.33) with Wilcoxon-test: z = 1.98, p = .047 (N = 9).

We furthermore noted a significant difference between enhanced resource mobilization strategies (MD = 4) and the increase of the motivation to support change toward sustainable building through the incubator (MD = 5) with Wilcoxon-test: z = -2.38, p = .019 (N = 9). Here the strategies for resource mobilization are less distinct than the motivation. None of the other pair comparisons showed any significant differences.

5.4.3 Access to different resource types

Considering the different resource types, the access to finance was ranked lowest by the respondents (only 44% of the participants agreed that the SBI offered access to finance – none

strongly) (M = 3,2, SD = 0,97). Four out of nine participants indicated in the open text field for "What would have helped you to expand your access [to resources] more?" with funding-related answers. Participants indicated additional resource access potentials in terms of "connections with more engineering companies", "finance and branding", "financial and expert support", and "finance options, experts and lab where we can test things". The highest resources access levels were stated for the access to knowledge resources including information, concepts and ideas (M = 4,3, SD = 0,50), as well as the access to the Impact Hub infrastructure and its branding material (M = 4,3, SD = 0,50) (see Appendix 10 and Appendix 11).

When comparing the anticipated access to resources before the SBI and the realised access, it can be seen that the largest difference is in access to finance (M = 3,9, SD = 1,27 pre-survey vs M = 3,2, SD = 0,97 post-survey) and human resources (M = 4,6, SD = 0,53 pre-survey vs. M = 3,9, SD = 0,78 post-survey). Only the realised access to the Impact Hub infrastructure was higher than anticipated (see Figure 21).

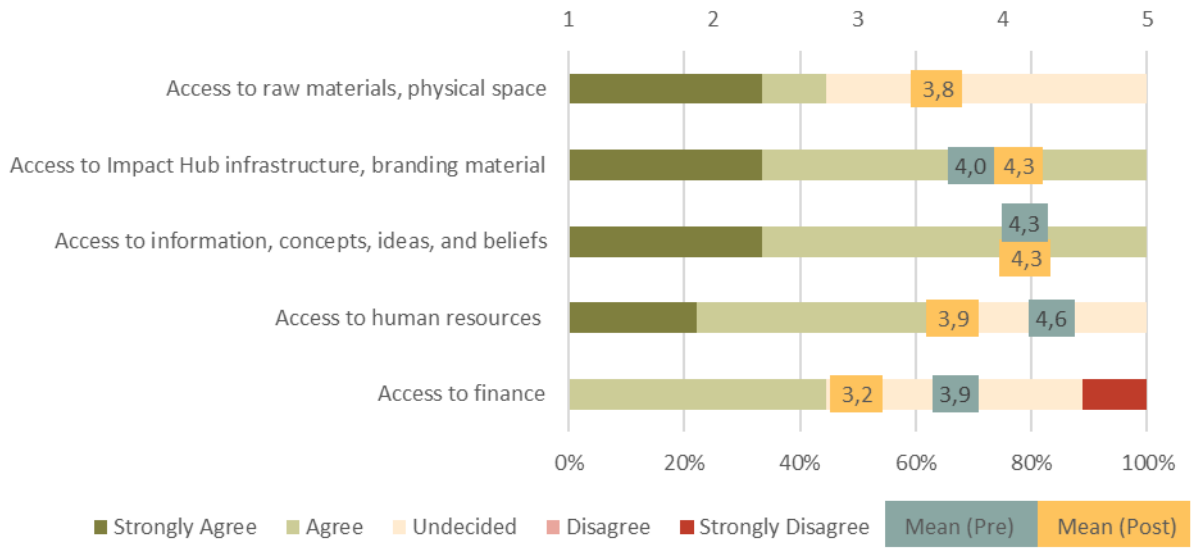

Figure 21: Resource access of SBI (anticipated pre-SBI and realised access) (N = 9).

We used the Wilcoxon-test for the analysis of differences regarding the anticipated resource access and actual access to resources during the SBI. Even though some differences are visible between the pre- and post-surveys in the descriptive data as discussed, there are no significant results indicating differences between pre and post data (see Appendix 12): There was no significant difference found regarding "access to finance"[13], and regarding "access to human

[13] Wilcoxon-test: $z = 1.089$, $p = .276$, $MD_{pre} = 4.00$, $MD_{post} = 3.00$, $N = 9$.

resources"[14]. Likewise, there were no significant differences between pre and post for the "access to information"[15] or the "access to Impact Hub infrastructure"[16].

5.4.4 Skills

Regarding the skill development, participants reported highest levels for soft skills like adaptability (M = 4,8, SD = 0,44), or creativity (M = 4,6, SD = 0,53). In both cases, all participants agreed or strongly agreed that they increased these skills during the SBI. Furthermore, high levels of skill development are noted for communication skills (M = 4,4, SD = 0,73), time management (M = 4,3, SD = 0,87), problem-solving (M = 4,3, SD = 0,87) and team work (M = 4,2, SD = 0,67). Lower levels of increased skills were indicated for cybersecurity, negotiation and legal skills (see Figure 22).

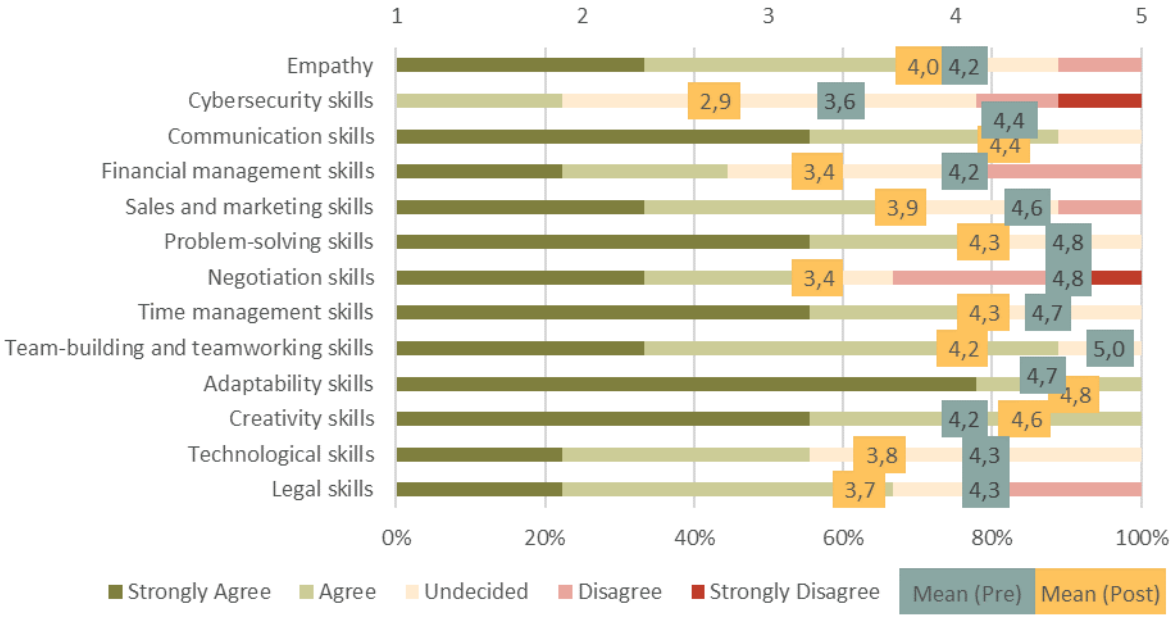

Figure 22: Skill development of SBI (anticipated pre-SBI and realised) (N = 9).

Biggest (negative) differences between skills that were anticipated and actual skill development include negotiation skills (M = 4,8, SD = 0,44 pre vs M = 3,4, SD = 1,51 post), legal skills (M = 4,3, SD = 0,87 pre vs M = 3,7, SD = 1,12 post), and financial management skills (M = 4,2, SD = 0,97 pre vs M = 3,4, SD = 1,13 post). At the same time, creativity skill gains and adaptability gains were stronger than anticipated.

[14] Wilcoxon-test: $z = 1.857$, $p = .063$, $MD_{pre} = 5.00$, $MD_{post} = 4.00$, $N = 9$.
[15] Wilcoxon-test: $z = 0.000$, $p = 1.00$, $MD_{pre} = 4.00$, $MD_{post} = 4.00$, $N = 9$.
[16] Wilcoxon-test: $z = 1.342$, $p = .180$, $MD_{pre} = 4.00$, $MD_{post} = 4.00$, $N = 9$.

5.4.5 Start-Up continuation and the empowerment dimensions

Another post-survey question asked participants to state the likelihood of them continuing their start-up project. The respondents stated in equal shares that they will do so maybe (3 participants), definitely (3 participants), or in between those two (3 participants).

To study the correlation of the project's likelihood of continuation with the main empowerment dimensions, we calculated the Spearman rank correlation coefficient. None of the items however showed any significant results (see Appendix 14). We equally tested the differences between the likelihood of continuation and the empowerment dimensions with the Wilcoxon-test (see Appendix 15). Here, likewise, no significant difference could be identified between "How likely are you to continue your start-up project?" (MD = 4) and (a) increased motivation (MD = 5,0)[17], (b) resource mobilisation strategies (MD = 4,0)[18], (c) resource access (MD = 4,0)[19] and social capital (MD = 4,3)[20].

5.5. Discussion

Having implemented an incubation programme, the Sustainable Building Incubator in Phnom Penh, we applied an empowerment in transitions framework to study its empowerment effects in an "intriguing extreme setting" (Busch and Barkema, 2022). Our findings demonstrate that the SBI increased perceived empowerment levels across motivational, social capital and resource dimensions. We found this to be particularly high for resource mobilization strategies and – when directly asked – for motivation. Besides the strategies for resource mobilization, the knowledge about location and ownership of resources increased. The actual access to different resource types, and the resulting scale value, were however found to be lower – the lowest level of resource access was noted for financial resources. Low access levels to financial resources are understandable, as only one of the five teams was able to directly access funds through the programme.

Empowerment in terms of motivational items is however ambivalent: While the motivation has increased when directly asked (the SBI has increased my motivation to …), all individual motivational components, namely impact, competence, choice and meaning, were lower on average after the SBI than before: While the winning team stated unchanged levels of self-assessed competence, the self-assessed competence decreased from M = 4,2 (SD = 0,83) to M = 3,8 (SD =

[17] (MD = 5) with Wilcoxon-test: *z = 1.406, p = .160 (N = 9).*
[18] (MD = 4) with Wilcoxon-test: *z = 1.265, p = .206 (N = 9).*
[19] (MD = 4) with Wilcoxon-test: *z = 0.237, p = .812 (N = 9).*
[20] (MD = 4.33) with Wilcoxon-test: *z = 0.775, p = .438 (N = 9).*

0,67) overall, and from M = 4,5 (SD = 0,84) to M = 3,8 (SD = 0,75) for those participants who did not win the first prize. The decrease of self-assessed impact is even stronger: We noted a decrease from M = 4,8 (SD = 0,41) to M = 4,0 (SD= 0,89) for this group of participants (6 out of 9). The strong decrease of self-assessed competence and impact levels raises questions about the disempowering effects of competition-driven incubation programmes like the SBI for the teams that do not win (Avelino, 2017). Motivating entrepreneurs to excel in competitive incubation programmes can be conducive for transformative change, but the ultimate goal is not to motivate them for the short period of the incubation or competition, but to empower and motivate them to take over active roles in long-term processes of transformative change towards sustainability. Intermediaries should be aware of this and seek to mitigate potentially disempowering effects on entrepreneurs that participate without winning prizes or funding. This is particularly important in southern contexts with less formal regulation, where ecopreneurship rests on "active drivers", including the commitment of ecopreneurs (Carayannis and Zedtwitz, 2005).

Still, the self-reported motivation of the participants increased, and showed a significant positive correlation to social capital: Participants who already changed their own role understanding or expect a more active role in the future and who have expanded their ties and networks during the SBI are hence more likely to be more motivated to support transformative change in the sector. This highlights the interconnected nature of the empowerment dimensions. In addition, higher levels of resource mobilization strategies correlate significantly with realised access to resources (rsp = .699, p = .036). Meanwhile, one resource that the incubation draws on, is the participants' time: Time has been stated as the reason for which the dropped out participants discontinued their incubation. Intermediaries must therefore carefully consider these limitations when seeking to maximise empowerment.

Moreover, we observed significant skill development among participants, particularly in communication, adaptability, and team working skills. This skill development can support participants not only as ecopreneurs but also in other transformative roles. Likewise, the activating effect of the SBI that is indicated by new role understandings of participants as more action- and solution-oriented individuals highlights that the empowering effects are not limited to the continuation of a particular ecopreneurship project. Overall, the SBI thus managed to support innovation processes as an intermediary through its creation of space and opportunities for individuals to expand their skills and motivation, form social capital and mobilise resources (Martiskainen and Kivimaa, 2018).

Individual short-term incubators like the SBI however struggle to live up to the ambitious goals for such intermediaries in the Global South that are noted in the literature, including the reduction of uncertainty and the enablement of functioning markets (Oriaifo et al., 2020). Therefore, while

the implementation of such programmes flourishes, they alone cannot fill the "institutional voids"; instead they need to be complemented by more structural changes and a more conducive ecosystem to initiate transformative change (Ly and Kungwansupaphan, 2021; Galkina and Hultman, 2016). It also remains to be seen whether the perceived empowerment levels translate into lasting effects that lead to actions and active roles beyond the incubation programme.

Still, ecopreneurship incubation programmes like the SBI are a very attractive means as they can align different interests (Naudé, 2010) while being perceived as supportive to political agendas of ruling powers in terms of (local) economic development, job creation, innovation, that suit for example the "win-win" rhetoric of the Cambodian Prime Minister (Ngoun, 2022; Ou, 2020; Ly and Kungwansupaphan, 2021). Yet, social entrepreneurship or ecopreneurship can drive progressive social and environmental goals under this veneer of entrepreneurship and economic growth narratives in otherwise capitalist and hostile environments in the sense of an entrepreneurial Trojan horse in transitions (Pel, 2016). As some would argue, this could support the move away from profit maximisation and towards the realization of better, fair and compassionate market economies and more sustainable production-consumption systems (Dey and Marti, 2019; Driver, 2012; Yunus, 2008).

At the same time, one can critique social entrepreneurship as a capitalist Trojan horse that expands capitalist relations and invades community sectors with business ideals under the guise of social value creation. This supposedly normalises the primacy of market-solutions and capitalist virtues, diverts attention from structural changes, and erodes democratic decision making processes, as political goals become the subject to business techniques and private sector activities (Dey and Marti, 2019). While early ecopreneurship is rightly criticized as naïve for considering social entrepreneurship as a panacea to societal challenges (Galkina and Hultman, 2016), some of its critiques are similar so: It romanticizes an initial state of politics and political goals that is solely subject to democratic processes that are entirely outside of business considerations and which now come under threat of entrepreneurialisation. Instead, at least for settings with a dominance of ill-functioning institutions, like Cambodia, one can argue that when many state institutions are captured by vested interests, democratic legitimacy is low and many societal challenges are left unaddressed by ruling elites, ecopreneurial or social entrepreneurial innovation for these challenges are very welcome.

Ecopreneurs and social entrepreneurs are important actors, who are able to create social, environmental and economic values, yet ecopreneurship intermediation needs careful and vigilant observation as it must not lead to a depoliticisation or responsibilization of individuals where captured state institutions focus on profitable rentier opportunities (Ramos-Mejía and Balanzo, 2018). In this regard, the proposal developed by the winning team (Aquabuild) to

produce building materials (tiles) from water hyacinth, an intrusive plant that endangers local ecosystems does not signify a state rollback. Meanwhile, the SCC team's concept for a currently defunct community centre in an urban poor neighbourhood addresses social issues that have been left unresolved by the state. Another case however contains elements of a potential state rollback: Team Arcniture developed an advertisement-based model for advanced urban furniture, a public good that is currently provided by the state, however in a low-quality and limited supply. Still, also here, the proposal involved the cooperation with state agencies and not their replacement. Nevertheless, these initiatives should be joined by ongoing calls for political solutions, democratic processes and government accountability to counter potential rollbacks of publicly funded services that might occur in the context of social entrepreneurship rollout. Scholars also noted the danger of disempowering effects of the entrepreneurialisation of transitions through the creation of precarious self-employed social or ecopreneurs (Avelino et al., 2020). Instead, ecopreneurship should lead to empowered change agents and changed power balances in socio-technical systems. Translocal empowerment effects are of relevance here, as linkages through translocal networks – as through the transdisciplinary research project and the translocal Impact Hub infrastructure – can offer access to resources and institutions, up-scale, and normalise social innovations and increase the willingness of ecopreneurs to seek transformative change (Avelino et al., 2020).

Despite the overall positive empowerment effects, it must be noted that the entrepreneurs are still embedded in an unfavourable ecosystem with high hurdles, uncertainty and a relatively stable socio-technical regime (Khieng et al., 2019; Jayaweera et al., 2023). Further studies could apply the framework but thicken the empirical material through in-depth qualitative data, for example to deepen the understanding of the ambiguous motivational effects. Considering the constant renegotiation of empowerment (Roy, 2010), it would also be insightful to grasp the mid- and long-term effects of the incubation programme through subsequent assessments.

5.6. Conclusion

This study has sought to explore how entrepreneurial support organizations can empower aspiring ecopreneurs in the institutional context of the Global South to take up active roles in sustainability transitions. While empowerment is primarily discussed as the outcome of entrepreneurial activity, we sought to study how an incubation programme can act as an intermediary in an "intriguing extreme setting" like Phnom Penh, and empower participating ecopreneurs to take up a more active role in sustainability transitions in the first place. Applying a multi-dimensional empowerment-in-transitions understanding, we studied the effects of the Sustainable Building Incubator in Phnom Penh as a case study. Our results have shown that

perceived empowerment levels in terms of willingness, resource access and social capital have increased as a result of the programme intervention. The results for the motivational elements were however ambiguous, as decreasing levels of self-assessed competence and impact indicated disempowering effects for those participants that did not win the first prize. Incubation programmes need to account for such disempowering tendencies in order to realise their transformative goals.

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PART III: Synthesis

Chapter 6: Conclusion

This final part firstly presents the key findings of the thesis and answers the guiding research questions raised in Chapter 1.2. It secondly discusses conceptual implications and implications for transition practitioners (Chapter 6.2) and finally suggests avenues for further research (Chapter 6.3)

6.1. Key findings

6.1.1 (In)stability Configurations of socio-technical Regimes

This thesis set out to develop more nuanced understandings of incumbent socio-technical constellations in diverse contexts beyond the Global North and to derive targeted transition interventions on this basis. Previous research has found regimes in the Global South to be more heterogeneous, yet regimes regardless of context contain some characteristics of unevenness and heterogeneity. The results of the thesis are thus not only relevant for Southern contexts. To develop a more nuanced understanding of socio-technical regimes, the thesis considers them as unevenly (in)stable and proposes a more differentiated regime analysis through their (in)stability configurations in Chapter 2. These uneven configurations do not only characterise given socio-technical regimes, but equally their potential transition dynamics. The framework was conceptualized and then tested in the context of Phnom Penh's building system to answer the first research question: How can the dynamics of socio-technical regime change be explained by analysing constellations of (in)stability?

The developed framework highlights the intrinsically linked nature of stability and change, of stabilizing and destabilizing factors in existing regimes (see Figure 23). We have defined (in)stability configurations of regimes as "time, place and context-specific constellations of stabilizing and destabilizing factors that are intertwined and affect the reproduction of regime elements and their (in)compatibilities". Here, destabilizing factors weaken or threaten the reproduction of regime elements and their compatibility, while stabilizing factors support these. The factors are understood to have their own latent directionality in the sense that they can (de)stabilise regime elements towards specific trajectories of change, with some being more likely or sustainable than others. While these seeds of destabilization can offer cracks towards trajectories, they are not deterministic. Instead, the actual realization of transition processes depends on a range of other pressures and contingencies. The framework differentiates sources of (in)stability from socio-cultural, economic, or political-institutional sources that can be regime-internal, or connected to landscape or niche dynamics. Furthermore, (de)stabilizing factors can be associated with different geographical scales.

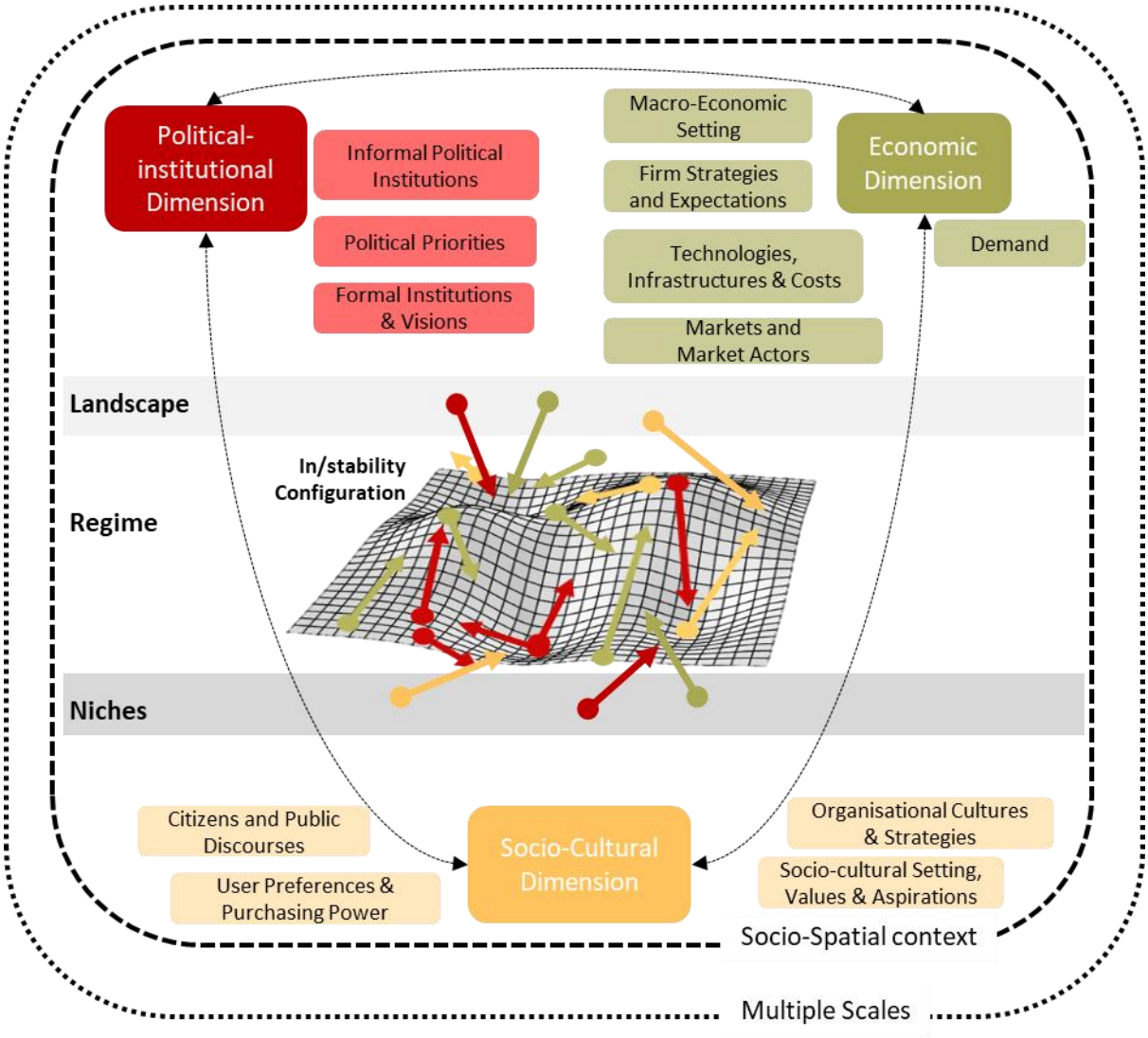

Figure 23: (In)stability configuration framework (Source: Jayaweera et al 2023: 4)

Applying the framework to Phnom Penh's building system, our findings indicate a heterogeneous (in)stability configuration with a number of ingrained seeds of destabilization. The identified configuration is characterised by diverse and ambiguous (de)stabilizing dynamics with a concentration of destabilizing effects within socio-cultural and economic dimensions. The strongest stabilizing effects can in contrast be associated with political-institutional factors.

Our findings show that Southern regimes are not (in)stable as such, but that particular dimensions can be more or less stable than others. Our case suggests that regimes in illiberal contexts in the Global South might be stabilized political-institutionally, while they are less stable economically and socio-culturally: Destabilizing momentum included emerging belief systems and groups of globally-oriented, sustainability-interested urban youth, extended financial planning horizons of households, discursive effects of building collapses (socio-cultural), the emergence of sustainability-oriented market actors, experimental projects, small-scale demand, and destabilizing market effects of oversupply (economic dimension), as well as ongoing institutional

work by niche actors and emerging formal green building institutions (political-institutional). The findings thus partially support the claim of Turnheim and Geels (2012) that transition processes are mediated by socio-political factors, however the primary drivers are not necessarily economic but potentially socio-cultural.

Within the political-institutional dimension our study meanwhile indicates relatively weak and less efficient state institutions with low regulatory enforcement levels. The dominance of ill-functioning institutions supports studies of Hansen et al. (2018) and Wieczorek (2018) in this regard. In strong contrast to Hansen et al. (2018), this is however associated with stabilizing effects and regime resistance. These findings resonate with Roy's (2009) "informality from above" and the findings of Noboa and Upham (2018) who argued that regimes in illiberal contexts can be stabilised by aspects such as state capture. The patrimonial setting blurs regime boundaries and national power centres and associates actors with different positions, allowing better connected incumbents to negotiate preferable government relations, profit more from market intransparency, and influence policy processes more in their interest. While overall clearly stabilising, low regulatory (enforcement) levels come with their own destabilizing potential, as this opens spaces for innovators to experiment in ways that might be limited by regulations in other contexts.

Meanwhile, we found that besides institutional fragmentation on the ministerial level, sustainability-oriented frontrunners and innovators are themselves fragmented despite their spatial proximity. This corresponds to previous findings postulating that conditions of fragmentation can actually impede niche development (Hansen et al., 2018; Herslund et al., 2018). Relying heavily on external sources of knowledge, capital, technology, materials and regulation, relatively little regime stability is generated by local investments in technologies, sunk costs or other economic commitments in Phnom Penh. Consequently, much destabilizing momentum emanated from the global level, including sustainability discourses, the initial demand of TNCs that supports local niche-formation, and the support of international development organisations. Still, local elites and incumbents were so far able to mediate the global-local linkages, external dependencies and selection pressures and shape these in their interest. The demand for certified office or industrial space by these firms and organisations, illustrates how instabilities and transition dynamics can differ in heterogeneous subsegments such as Grade A office space or residential markets. In contrast to office and industrial spaces, no residential projects have been certified yet. Besides the global influence and the splintered (de)stabilizing dynamics, the demand from TNCs furthermore highlights inter-system dynamics: It shows how actors of other global regimes (such as mobility in the case of Daimler) can influence other systems such as the building system in Phnom Penh and support local niche formation.

Finally, our findings support the claim that economic commitments might be less decisive in Asian contexts (Berkhout et al., 2009), yet we can argue that this does not necessarily imply *less* commitments overall, but *different* commitments that stabilize incumbent configurations: In Phnom Penh's building regime it is much less those commitments to particular technologies or material infrastructures that must be overcome, but primarily the socio-political commitments to patrons, clients or wider networks. This is also not necessarily true for "Asia" as such but for those systems and contexts in which less capital-intense and specialized (production) infrastructures are part of local value creation processes. Overall, the findings allow us to partially support the "state of flux" claim that Hansen et al. (2018) have attested regimes in the Global South; we identified an unequal fluidity with dynamic socio-cultural and to a lesser degree economic factors, and more obdurate political structures.

The identified (in)stability configuration and the ingrained seeds of destabilization suggest a range of entry points for potentially impactful transition interventions. This includes the support of socio-cultural and economic sources of instability by awareness raising, focussing on change-inclined and sustainability-interested youth, showcasing the economic feasibility of sustainable practices, the support of sustainability-oriented innovators and the integration of such approaches in ways that address the complexities of the (in)stability configuration. The fragmented innovators and frontrunners could be targeted by the creation of safe spaces that protect them from incumbents with reinforcive power to co-create alternative visions and knowledge, build networks, social capital, discursive coalitions and offer a conducive setting for self-empowerment. Such fora could be provided through contextualised forms of Transition Management that address the (de)stabilizing factors as discussed in Chapter 3 and Chapter 4, or environmental incubation programmes for aspiring young entrepreneurs as studied in Chapter 5.

The (in)stability configuration concept meanwhile proved to be an insightful tool to move beyond homogenising regime understandings, to study the intertwinement of stability and change within dominant configurations and to identify entry points for transition strategies.

6.1.2 Contextualising Transition Management

Based on the previous system analysis, the characterization of the (in)stability configuration, the identification of seeds of destabilization, and an additional literature review, we developed a transition governance concept, the Sustainable Building Arena, in Chapter 3. Developing the SBA, we identified a number of considerations that are useful for answering the second research question: How can strategies of transition governance be adapted to contexts of the Global South?

Firstly, we call for the development of contextualised interventions on the basis of a nuanced system analysis that leads to a differentiated understanding of its (de)stabilizing dynamics. Contextualised transition strategies can then address the identified (in)stability configuration and leverage individual seeds of destabilization by attempting to weaken stabilizing elements, strengthen destabilizing elements, or push destabilizing elements with ambiguous directionalities towards sustainability.

Secondly, based on the political-institutional sources of (in)stability, the intervention's relation to state agencies needs to be defined. In our case, strong stabilizing dynamics through political-institutional factors such as the neo-patrimonial networks, the dominance of ill-functioning institutions, and the wider rent-seeking dynamics of state-affiliated actors call for an approach that de-centres the state. Here, the assumption of the "benevolent state" is even less convincing than in other contexts. Instead of anchoring the transition intervention at a state institution – as is usually the case in Northern urban transition interventions – our case thus called for a more independently-run process. Even though the de-centring rests on the argument that this can create a safe space for change agents to co-create freely and develop more radical alternatives (visions, strategies, narratives) that are not captured by vested interests, this process should not be read as antagonistic to the state, as some form of cooperation or buy-in of the state is still needed in contexts like Cambodia. The positioning of transition interventions to state actors therefore becomes a much more deliberate and careful choice.

Thirdly, the stabilizing effects through personal and political commitments more generally require a more deliberate and selective integration of sustainability frontrunners and change agents – including those from state institutions: To navigate the complex power relations and "rhizomic" interpersonal relations in Cambodia, a diverse, yet uncaptured Transition Team that is motivated to support the process is crucial. Following a state-decentred approach the selection of Transition Team members becomes a much more deliberate choice, as it does not build on state representatives by default. Initiating agencies must thus carefully chose a diverse team of trusted, motivated, well-connected and sustainability-minded actors for their Transition Team. Having established the team, a jointly implemented power-based actor mapping can be useful to identify a stimulating group of participants that can exercise innovative and transformative power (Avelino, 2017). Equally, the collaborative specification of process details with the Transition Team – such as the shortening of the workshop time to increase inclusivity and reduce disempowering effects in our case– was found to be a valuable means of contextualizing the transition intervention. In terms of actor selection we also highlighted the role of "connectors" and "informants" as important actors to overcome social commitments in an illiberal and opaque setting like Phnom Penh. Other contexts might call for the inclusion of different change agents.

Adding to the overall increased actor-sensitivity, fourthly, the process needs to define how the actor integration evolves over time: Moving beyond static group compositions, we have argued for the temporally variegated inclusion of actors, i.e. to not only consider which actors to include (how) in the process, but to furthermore consider how the actor involvement changes over time. In the case of the SBA, where a minimum of two workshop cycles was planned, this involved a decreasing level of shielding, and the partial opening of the Arena towards diverse actors that are more associated with reinforcive power and regime practices.

Lastly, when strong destabilizing effects from within the socio-cultural dimension become apparent in the initial analysis, the actors that drive these trends should be included in the process. In our case, changing values and demands were noted, as younger groups reportedly do not fully accept the political settlement of growth, wealth, and "political stability" in exchange for democratic participation, accountability of the state, transparency, justice and environmental ecological sensitivity. In such instances it appears promising to focus on youth NGOs, youth-driven impact organisations, aspiring young social entrepreneurs or ecopreneurs as seeds of destabilization and target interventions to these groups.

Overall, the findings show that Transition Management processes, like the SBA, that are attentive to the particular (in)stability configuration, can support the development of actionable knowledge, the empowerment of marginalized actors and support collective action for transformative change in the built environment sectors in contexts outside the Western liberal norm of transition studies.

6.1.3 Empowerment in Transition Interventions

The empowerment of sustainability frontrunners and change agents is a common albeit vaguely defined or narrowly understood target of many transition interventions. A multi-dimensional empowerment framework was therefore introduced in Chapter 4 to grasp empowerment and potentially disempowering effects of transition interventions more holistically. It was subsequently applied to two interventions, the Sustainable Building Arena process and the Sustainable Building Incubator that are being implemented in the context of the Build4People Project. The analytical framework and the resulting findings allow to answer the third research question: How can transition interventions in the Global South support the empowerment of sustainability frontrunners?

To capture the diversity of empowerment effects, the empowerment-in-transitions framework was developed on the basis of empowerment literature in development studies, transitions research and psychology (see Figure 24). It integrates empowerment effects – and their ever-

present shadow side of disempowering effects – across three dimensions that are contingent on two empowerment conditions: The dimensions involve empowerment in terms of increased levels of social capital, access to resources and willingness to take over more active roles in transition processes. The framework considers empowerment in the context of transition interventions to be dependent on the process design of the intervention and the social learning effects that it initiates. Actors are not understood to be "given" empowerment benevolently, instead they empower themselves in more or less empowering settings that might be created by such interventions. The framework is open to extensions and adaptations to address local particularities.

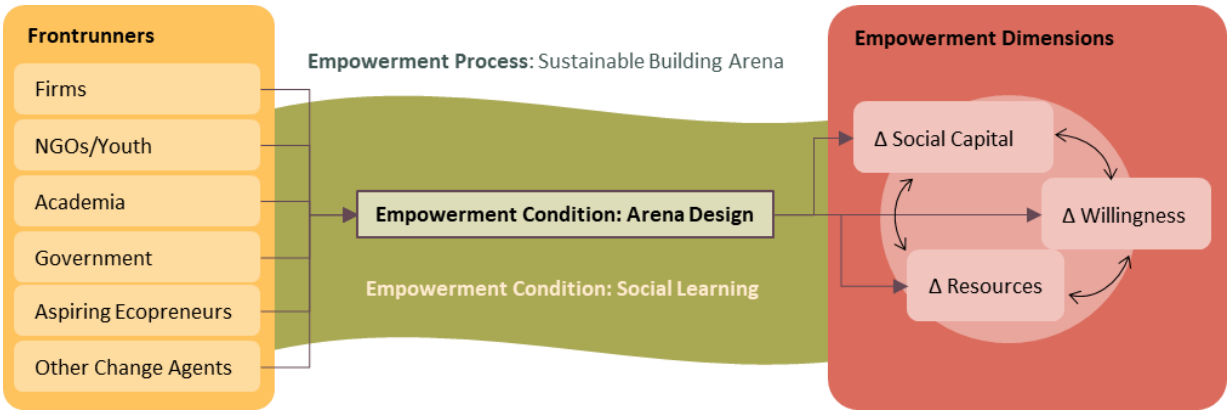

Figure 24: Empowerment in transition interventions (Adapted from Jayaweera et al., forthcoming)

Applying the framework firstly to the previously conceptualized Sustainable Building Arena, the findings indicate that the process did create an "empowering environment" that allowed for social learning and supported the empowerment of participants across the three dimensions. The effects were however found to be uneven, with relatively higher increases of empowerment levels in terms of social capital and willingness than in terms of resources.

In the case of the Sustainable Building Incubator (Chapter 5), our results have shown increasing perceived empowerment levels in terms of willingness, resource access and social capital as a result of the programme intervention. We found this to be particularly high for resource mobilization strategies and – when directly asked – for motivation. The motivational empowerment results were ultimately however ambiguous, as some individual motivational elements such as levels of self-assessed competence and impact decreased for those participants that did not win the first prize.

Whereas knowledge about resources and strategies for their mobilization increased in the case of the incubator, actual changes in access levels to different resource types were moderate. Low access levels to financial resources are unsurprising, as only one of the five teams was able to directly access funds through the programme. While the problem framing phase of the Sustainable

Building Arena suggested significant resource-related empowerment needs, the empowerment outcomes in this regard were limited: Though new knowledge resources were co-created and access to human resources was expanded, the SBA was not connected to any financial resources that could support the implementation of developed ideas. The findings thus shed light on potentially disempowering effects of independently-run interventions, as the inability to draw on financial resources to realize co-created visions, strategies and experiments can ultimately lead to frustration and discouragement. The common anchoring of TM processes at municipalities or state institutions and the existence of a range of regional development and funding programmes, venture capital and more liquid financial markets allow participants in contexts of the Global North easier access to financial means to put co-created plans into action. The scarcity of such funds for the SBA hinders the translation of outcomes into transition experiments and underscores the broader issue of resource scarcity for transition experiments in Southern contexts, as noted by van Welie et al. (2018). Nevertheless, the findings show that the willingness of SBA participants to support a sustainability transition has increased for 90% of them.

In the case of the SBI, the motivational effects were rather ambivalent: Here, the motivation levels increased when directly asked ("the SBI has increased my motivation to…"), but all individual motivational components, namely impact, competence, choice and meaning, were lower on average after the SBI than before. The strong decrease of self-assessed competence and impact levels of those participants who did not win the first prize underscores the potentially disempowering effects of competition-driven incubation programmes like the SBI (Avelino, 2017). Still, the self-reported motivation of the participants increased, and showed a significant positive correlation to social capital: Participants who already changed their own role understanding, who expect a more active role in the future and who have expanded their ties and networks during the SBI are hence more likely to be more motivated to support transformative change in the sector. Likewise, activating effects of the SBI that are indicated by new role understandings of participants highlight the width of the empowering effects: Many participants noted a shift from a problem focus to a focus on solutions and their own role in the solution development process. Additionally, the observed skill gains, especially in communication, adaptability, and team work can support the incubatees as ecopreneurs *and* in other transformative roles.

In terms of social capital, the noted empowerment effects of the SBA are promising: The findings indicate high degrees of trust building, the perception of shared aspirations and the feeling that joint action for a sustainability transformation is possible. The initial responses are encouraging, however, it is not only the initial *creation* of networks but especially their *maintenance* and *reproduction* that is decisive. Still, the institutionalisation of the Sustainable Building Innovators

community and its backing by an established local think tank offers a long-term perspective beyond the funding period of research projects. A series of discussion rounds that followed the first SBA cycle highlighted the participants' interest in collaboration, continued exchange, and joint action.

The results suggest that the process design of the Arena allowed for an empowering environment where participants were able to share relatively freely and discuss radical ideas. The compressed nature of the SBA however indicated the limits of independently organised interventions with frontrunners in the Global South who participate in their free time. Shortening interactive sessions could reduce disempowering effects, as more frontrunners were able to join, yet this also limits the cooperative setting, the co-creation of knowledge, resources and the formation of social capital. Time restraints also played a considerable role in the case of the SBI as these were stated as the reason for which the dropped out participants discontinued their involvement. Both intervention processes clearly showed that they do not only create (access to) resources but equally consume resources, and thus support the earlier findings of Hölscher et al. (2018; 2019) that the implementation of empowerment processes are very demanding in practice.

Simultaneously de-centring the state in the SBA process while selectively inviting state-affiliated individuals offered a way of navigating the need for a safe and protected space and yet creating productive relations to the state. This integration remains relevant even in illiberal contexts like Cambodia, as sustainability transitions ultimately require wider structural shifts that also involve legislative changes. De-centring, yet connecting state actors to transition interventions poses a challenging task for transition practitioners. After all, as discussed by Larbi et al. (2021a), it is rather unusual for authoritarian leaders or repressive dictatorships to act in the public interest. The study furthermore showed that a de-centred state can create both challenges and new opportunities for transition interventions: Continuing, extending and deepening engagement processes is challenging for a Transition Team without the "process glue" that the anchoring of the process at state institutions creates. Its absence however allows for the exploration of emerging partnerships and collaborations to create an institutional home for the transition intervention process. Akin to workers in Marxist theory, the process is free in a double sense: Free of chains that capture the process, but equally free of the *means of institutionalisation*, the Transition Team needs to find actor constellations that can provide an institutional home. In contrast to the worker, the Transition Team can however be part of the creation of such constellations.

Overall, both the Sustainable Building Arena and the Sustainable Building Incubator were generally able to support the empowerment of sustainability frontrunners and aspiring ecopreneurs in a Southern, illiberal context, by creating relatively safe spaces and opportunities

for sustainability-minded change agents to form social capital, mobilize resources and expand their motivation and skills. Such interventions are however far from straightforward processes. They come with trade-offs, disempowering effects and unequal benefits. Having "opened up" two transition interventions in Chapters 4 and 5, the findings largely confirm the results in European cities of Hölscher et al. (2019, p. 182), who noted the "ambiguous nature of empowerment". The proposed empowerment-in-transitions framework can however be used as a reflexive tool to guide intervention processes and mitigate disempowering effects while increasing the transformative potential.

6.2. Implications

6.2.1 Conceptual Implications

This thesis studied the building and urban development sector of Phnom Penh and hereby shifted the focus on a socio-technical system that has been underrepresented in transition studies temporally, spatially and sectorally: It attempted to open up transition research to the diversity of incumbencies beyond Northern contexts and cases where sustainability transition processes have already accelerated or are actively supported.

The proposed analysis of (in)stability configurations opens the door for scholars to assess diverse systems and study the intertwinement of stability and change in heterogeneous settings before sustainability transitions take off, while taking the unevenness and incompleteness of regimes seriously. This can lead to more nuanced understandings of incumbencies and potentially more impactful transition interventions. The concept invites scholars to apply the framework in diverse contexts to characterize (in)stability configurations, study ingrained seeds of destabilization and identify the cracks and trajectories that they suggest. This analysis of (in)stability configurations can then be the baseline for the development of tailored transition strategies, or fertiliser for the identified seeds of destabilization.

The diversity of settings in which the framework can be applied includes those in the Global South, or those characterised by authoritarianism (Un, 2019), illiberalism (McCarthy and Un, 2017b), political capitalism (Bafoil, 2014), neo-patrimonialism (Kimchoeun et al., 2007; Craig and Kimchoeun, 2011), developmental states (Swilling et al., 2016), those that have gone through conflicts (Öjendal and Lilja, 2009) or a transition from socialist systems (Springer, 2009b). The analysis of (de)stabilizing factors and resulting configurations across heterogeneous contexts could then lead to different typologies of (in)stability configurations. Other cases in rather illiberal or neo-patrimonial settings might show similarly strong political-institutional stabilization and

rather fluid and destabilising social-cultural dimensions. These might be well-addressed with similar transition interventions to the ones developed in the thesis. In terms of fragmentation and heterogeneity, co-creative platforms and safe spaces could be promising avenues for isolated niche actors in other settings as well; regarding market fragmentation, it could be of interest to focus on those segments – or those parts of "splintered systems" (van Welie et al., 2018) – that support niche activity – like the TNC-induced demand for green certified office and industrial space in Phnom Penh – and explore how these niche activities can be supported to expand to other segments or parts of the socio-technical system.

Meanwhile further de-centring towards and within Southern systems is needed, as many transition processes that are required to realise sustainability globally are embedded in contexts unlike the classical liberal-democratic transition contexts. The thesis not only suggests a "Southern turn", but furthermore suggests for Southern transitions research to move beyond themes of poverty and basic infrastructure provision. While noting urban poverty and inadequate access to basic infrastructures and housing as crucial challenges – that surely need to be part of inclusive and just transition processes – the thesis proposed not to reduce the Global South to these aspects in transitions research. Instead, diverse spatio-institutional characteristics should be assessed that affect transition processes towards urban sustainability, spanning from informality and alternative lines of accountability, to heterodox ontologies, corruption, or the manifold ways in which coloniality is weaved into present systems (Feola, 2019; Arora and Stirling, 2023). This can also involve aspects of institutional capture or ill-functioning institutions, where formal institutions do not work as assumed in the interest of the wider public, but largely in the interest of selected groups, like the neo-patrimonial networks in Cambodia (Hughes and Un, 2011c; Ramos-Mejía et al., 2018). Meanwhile such research should always be open for alternative imaginations, concepts of justice and heuristics (Sovacool and Hess, 2017). Creating knowledge in the "periphery" (Tirado-Herrero and Fuller, 2021) – while also being more sensitive to existing knowledge in the "periphery" – equally offers relevant insights for other contexts and can move sustainability transitions research forward as a whole (Loorbach et al., 2017). By challenging conventional transition assumptions such as liberal democratic and participatory traditions, or the rule of law from different perspectives, researchers can "unpack their own situated – provincial – origins" (Leitner and Sheppard, 2016, p. 231). Thus, "seeing from the South" can lead to re-seeing, re-evaluating, unlearning and provincializing of the North by highlighting the parochial character of its knowledge claims (Sheppard et al., 2013). While some recent transition conferences like IST 2020 or NEST 2022 had dedicated "Global South" tracks, panels or sessions, the remaining conference implicitly assumed "normal" transition settings in the North. As a more radical step, the creation of a particular conference track for transitions in Western European or Northern contexts could be considered.

The results challenge simplified understandings of Northern innovation diffusion and Southern systems as mere innovation recipients. Contexts like Phnom Penh are diverse spaces of innovation, even though capital-intensive high-tech innovation and expertise are primarily imported, resulting in destabilizing momentum from the global level. Coalitions of local innovators and global actors are hence relevant in settings in which local and national elites stabilize the status quo in their interest. We found that low regulatory levels in Phnom Penh can however increase openness for experimentation and innovation, especially for diverse social and low-tech innovation that can lead to alternative and more sustainable pathways, potentially pointing indeed "to a broader, more socially- embedded model of innovation" (Köhler et al., 2019, p. 15).

How to support such activities to forge these pathways remains a crucial challenge. We have proposed and studied two approaches, firstly a Transition Arena process, to carve out a protected co-creative and empowering space for diverse but fragmented frontrunners and change agents outside of state control to develop visions and strategies, to forge coalitions and networks; and secondly an incubation programme, to create an empowering space for aspiring ecopreneurs to learn, co-develop solutions, create networks and become even more motivated. Researchers need to continuously refine transition interventions that can address heterogeneous contexts in the Global South, in illiberal settings and beyond. The proposed transition interventions should then however not be read as manifestations of cockpit-ism, i.e. a mode in which transition researchers mechanically manage or steer transitions through their interventions. Researchers are instead in a more humble role as policy entrepreneurs, boundary makers, and facilitators that can create spaces for the co-production of knowledge, the creation of coalitions and the empowerment of frontrunners and change agents. They should reflectively implement the targeted interventions and closely monitor its effects. This can involve the multi-dimensional (dis)empowerment effects across social capital, willingness and resource access, as well as the empowerment conditions of social learning and intervention design. Interventions with other foci should be reflected on equally closely, for example in terms of their discursive effects. Often quite an afterthought of interventions, the reflexivity and evaluation should be ongoing, critical and can be used to improve interventions and move the field forward as a whole.

When entrepreneurial incubation intermediation activities like the Sustainable Building Incubator are implemented, they should be closely and critically followed: They are an attractive means that can align different interests of incumbents and niche actors alike and seek "regime capture", yet the way this capturing plays out needs to be carefully observed. Here, it remains crucial for researchers to understand transition interventions as political processes that are not technical or neutral but that support the challenging of existing institutions and societal configurations by extra-institutional means. This can support "stretch and transform" strategies

where empowered actors can challenge and influence the selection environment to undermine incumbent regimes and support the emergence of transformative innovations (Ramos-Mejía et al., 2018; Smith and Raven, 2012).

6.2.2 Implications for transition practitioners

As argued before, the findings of the thesis highlight the potential for transition practitioners to develop transition interventions on the basis of a system analysis that considers regime (in)stabilities. Likened to the utilisation of specially developed fertilizer for the seeds of destabilization, the seeds need to be identified and the surrounding soil and ecosystem need to be studied in order to support the transformative potential. This can then lead to a wide range of processual adaptations in practice.

More generally, the thesis calls on transition practitioners to make much more deliberate choices regarding the position of the interventions vis-à-vis the state – instead of anchoring them by default at state institutions. In contexts that are characterised by illiberal tendencies, ill-functioning institutions and rent-seeking tendencies, this can imply a de-centring of the state, i.e. refraining from anchoring interventions at municipalities or other state institutions. It could however imply choosing a particular state agency to cooperate with and hereby widen pockets of well-functioning institutions. Akin to the way wetlands are reclaimed within the city of Phnom Penh, actors can try to expand and reclaim the "islands of effectiveness in a sea of rent-seeking and patronage" (Kelsall and Heng, 2014, p. 1).

The thesis has shown that even in illiberal contexts with de-centred intervention designs, interventions need to be somehow productively related to the (illiberal) state, as sustainability transitions ultimately require wider structural shifts involving legislative changes. This raises the question of how to establish "independent" TM processes that still allow diverse frontrunners to participate and productively engage with a de-centred state. The findings indicate that the selective integration of individual, sustainability-oriented state actors is reconcilable with an empowering safe space. This should however not come to the detriment of these individuals. Instead, mechanisms are needed to support this particular group of change agents that are – as change-driven individuals – caught between institutions that generally seek to reproduce dominant configurations and their own progressive visions. Integrating them into multi-scalar networks, as discussed by Avelino et al. (2020), could be a promising avenue. More generally however, reflecting on the relation between transition interventions, the state and the underlying assumption of well-functioning institutions and a common-good attitude is also useful for other cases – especially when considering the state as a social relation that is a "reflection of capitalist power relations, which depends on the reproduction of capitalist accumulation" (Feola, 2019,

p. 7). Other studies have shown how manifestations of regime resistance in the form of government lobbying have succeeded in influencing policy development in their interest in the United Kingdom and other Northern contexts (Lockwood et al., 2019; Seyfang and Gilbert-Squires, 2019; Smink et al., 2015). A more deliberate positioning of transition processes with regards to state actors is thus of general interest.

The study showed that the de-centring of the state in transition interventions creates new opportunities and challenges: Lacking the default relationship with the state and the associated commitment or "process glue", committed relationships and continuity need to be established more deliberately by transition practitioners. De-centring can open the door to the creative and collaborative exploration of emerging collaborations and the processual creation of an institutional home for transition interventions. Not having a continuing foundation or perspectives however also renders such processes more precarious. Independently-driven processes are also more prone to wither and see their social capital effects fading as they draw on volunteered time, arguably "the most pressured resource" (Roorda and Wittmayer, 2014, p. 44). Practitioners need to be attentive to this "resource consumption", the overall time restraints of participants and be even more responsive to the ideas of the Transition Team and the participants. It is even more important for the team to highlight the transformative and beneficial outcomes to the participants in order to keep engagement levels high.

More generally, transition practitioners need to consider the motivational dimension of their interventions: As the results of the incubation programme showed, competition-driven programmes can ultimately disempower participants who do not win. Thus, while motivating aspiring entrepreneurs in the short-term to excel in competitive incubation programmes might seem beneficial, the ultimate goal is to empower and motivate them for the long-term to take over active roles in long-term processes of transformative change. Intermediaries should be aware of this and mitigate potentially disempowering effects when implementing competitive programmes. This is particularly important for contexts where ecopreneurship rests on "active drivers" such as the commitment of individuals (Carayannis and Zedtwitz, 2005). Potentially disempowering effects need to be mitigated for other reasons, too: The limited availability of external funding for the implementation of co-created project ideas was noted in Phnom Penh, and is likely to be a concern in many Southern contexts (Chapter 4). The pre-intervention analysis could therefore benefit from a screening of the funding landscape. Exploring this landscape and mapping funding opportunities for transition experiments could hence be integrated into the Transition Management designs in cases where the state is de-centred or does not provide financial support. Limited financial funds for the implementation of transition experiments in Southern contexts could also be addressed by cooperative transition projects with international

development agencies or impact investment firms. More generally, adjusted funding schemes for transdisciplinary North-South research projects that allow for a larger share of the funds to flow to the Southern partners and to implementation finance would be beneficial. This could lead to more innovative implementation, more transformative outcomes, and would address the power imbalance in such projects. After all, a key premise of a more decolonial transition practice focusses on "embracing the transformative activity of Southern actors, [and] helping in building communities of practises" (Ghosh et al., 2021, p. 108). Instead of bringing Northern transition blueprints that might increase external dependencies, it is thus key for transition practitioners to support local innovation processes, and create empowering spaces for local change agents to create networks and co-create visions and strategies for how cities in the Global South can be planned, built, and operated in more sustainable, just and inclusive ways. This thesis represents a humble attempt for approaching such interventions and the underlying analysis of socio-technical systems beyond the Global North.

6.3. Limitations & Further Research

As a nested case study with an overarching socio-technical system and two transition interventions, the thesis allowed for a rich analysis, theory-informing results and some carefully generalizable findings but comes with its limitations. To improve the developed frameworks to study (in)stabilities, develop contextualised transition interventions (SBA), and assess the (dis)empowering effects of interventions, further studies are needed.

On a general level, transitions are highly uncertain, complex, contested and long-term. Any attempts to influence transition dynamics therefore need to be assessed beyond the immediate effects. More longitudinal research is therefore needed to qualify the rather short-term effects presented here. Such studies could also move beyond a focus on self-reported effects (Chapter 5), and develop even richer empirical foundations through more qualitative data through in-depth interviews with change agents (Chapter 4 and Chapter 5). This could also be useful to expand the understanding of the interconnectedness of (dis)empowerment effects and dimensions and clarify the ambiguity of some (dis)empowerment findings. The implementation of more long-term studies is particularly salient for the analysis of the contextualised Transition Management intervention, the SBA, in Chapter 3, as the study is limited to the first cycle of the process. This is however important beyond the fact that the SBA was studied during the intervention, as only long-term studies can show how the initial empowerment effects translate into more active roles in transition processes in the mid- and long-term, and how this relates to the continuous (re)negotiation of empowerment (Roy, 2010). Another translation of interest is that of perceived

empowerment, as stated in surveys, to enacted empowerment through the actual uptake of more active roles.

Despite some (at least short-term) empowering effects and the development of unprecedentedly radical visions for Phnom Penh, the results do not imply that a sustainability transition could now easily unfold. The initial analysis indicated a relatively stable building and urban development system in Phnom Penh in which transition processes would always be long-term, uncertain and contested. Short-term interventions and experiments alone do not suffice, but need learning, replication, and embeddedness in wider structural changes.

Applying the (in)stability configuration framework to Phnom Penh's building regime provided a rich understanding of the regime characteristics, yet, being a single (embedded) case study it would be promising to further test and expand the framework in other contexts. Promising avenues for further research are applications of the framework in diverse contexts to explain contextual or place-specific differences in the (de)stabilization of regimes (Coenen et al., 2012). To this end, the study of socio-technical systems and the (in)stability configuration of regimes in contexts with diverse institutional conditions could be productively connected to the critical varieties of capitalism (VoC) approach (Loewen, 2022). This could lead to the development of typologies of (in)stability configurations that might be addressed with similar transition strategies. In this regard further research could also test and further expand the contextualisation principles that were developed in Chapter 3.

Another promising aspect that connects the insights from the Chapters 2 to 5 of this thesis might be the exploration of place-based empowerment needs. While these were implicitly voiced in the first cycle of the SBA through problem framing and visionary elements, such context-specific needs could be explicitly explored in regimes and their (in)stability configurations, then addressed in contextualised transition interventions and finally evaluated in terms of (dis)empowerment effects.

Figure 25: The (un)sustainable city of the present (Photo Credit: Dr. Serey Sok)

During our introductory ride through Phnom Penh along Norodom Boulevard and National Road 2, we witnessed the materialization of Cambodia's rapid urban and wider political-economic development of the last decades in the urban built environment. While this brought us towards aspirational residential pockets such as the Eco-Romance and Eco-Melody projects at the beginning of the scientific journey of this thesis, the same ride would not have been possible on the day these last pages were written:

Early July 2023 did not only see the four days with the highest global temperature on record according to the University of Maine (Birkel, 2023), but also record rainfall and heavy flooding in the city of Phnom Penh – flooding exacerbated by the infilling of wetlands for building projects like "Eco-Romance" or "Eco- Melody" (Zelin, 2023; Beckwith, 2020). The concomitance of these record heat and precipitation events and their effects on urban dwellers – especially the most vulnerable – stresses the urgency of the climate emergency and the pressing need for transformative change towards sustainability – in cities of the Global South and beyond. Meanwhile, Cambodia's general election on 23 July 2023 reminds us of another concern: Having closed one of the last critical news outlets and having disqualified the only major opposition party for the election, the CPP of Prime Minister Hun Sen – who has been in power for 38 years – contests again without tangible opposition (Al Jazeera, 2023; Kurlantzick, 2023). Transformative change, we are hereby reminded, is thus needed beyond liberal democracies. Similar to navigating flooded Phnom Penh, steering towards sustainability amidst uncertain futures thus necessitates adapted strategies based on a good understanding of uneven local terrains and their inherent (in)stabilities.

PART IV: Appendix

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List of Publications

Submitted

Jayaweera, R., Pansa, R., Rohracher, H., Waibel, M. (submitted). Empowering environmental entrepreneurs in the Global South? The case of the Sustainable Building Incubator in Phnom Penh. In: Sustainable Development

Jayaweera, R., Becker, A., Rohracher, H., Nop, S., Waibel, M. (accepted pending minor revisions) Urban Transition Interventions in the Global South: Creating empowering environments in disempowering contexts? In: Energy Research and Social Sciences.

2023

Jayaweera, R., Rohracher, H., Becker, A., Waibel, M., 2023. Houses of cards and concrete: (In)stability configurations and seeds of destabilisation of Phnom Penh's building regime. Geoforum 141, 103744. https://doi.org/10.1016/j.geoforum.2023.103744.

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Authors' Contributions

Chapter 2: Jayaweera, R., Rohracher, H., Becker, A., Waibel, M. (2023). Houses of cards and concrete: (In)stability configurations and seeds of destabilisation of Phnom Penh's building regime. Geoforum, 141 (2023) 103744. ISSN 0016-7185, https://doi.org/10.1016/j.geoforum.2023.103744.

RJ: Conceptualization, Methodology, Visualization, Investigation, Data curation, Formal Analysis, Writing – Original draft; HR: Supervision, Writing – Review & Editing; AB: Formal Analysis, Writing – Review & Editing; MW: Supervision, Writing – Review & Editing

Chapter 3: Jayaweera, R., Nop, S., Karagianni, C., Waibel, M., Schwede, D. (2022). Sustainable building arenas: Constructing a governance framework for a sustainability transition in Cambodia's urban built environment. IOP Conference Series: Earth and Environmental Science 1078 (1), 12084. https://doi.org/10.1088/1755-1315/1078/1/012084.

RJ: Conceptualization, Methodology, Visualization, Investigation, Writing – Original draft, SN: Writing – Review & Editing, CK: Writing – Review & Editing, MW: Supervision, Writing – Review & Editing, DS: Writing – Review & Editing

Chapter 4: Jayaweera, R., Becker, A., Rohracher, H., Nop, S., Waibel, M. (accepted pending minor revisions). Urban Transition Interventions in the Global South: Creating empowering environments in disempowering contexts? In: Energy Research and Social Sciences.

RJ: Conceptualization, Methodology, Visualization, Investigation, Data curation, Formal Analysis, Writing – Original draft, AB: Formal Analysis, Writing – Review & Editing, HR: Supervision, Writing – Review & Editing, SN: Writing – Review & Editing, MW: Supervision, Writing – Review & Editing

Chapter 5: Jayaweera, R., Pansa, R., Rohracher, H., Waibel, M. (submitted). Empowering environmental entrepreneurs in the Global South? The case of the Sustainable Building Incubator in Phnom Penh. In: Sustainable Development.

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Appendix 1: Interview Guide

Introduction

[Share info on: *Project background, interview aim, anonymity, abbreviation, recording, transcript*]

- What is your professional background?
- How and when did you first get involved in green building/urban development?
- What is your understanding of sustainable building generally, and specifically regarding Phnom Penh?

Phnom Penh Regime and Transition Pathways

- Have issues of sustainable buildings or urban development gained in relevance in the recent past in PP in your opinion?
    - If yes: How, when, and why did this become a topic?
- How are sustainable (or green) buildings generally understood and debated in Phnom Penh?
    - e.g. policy driven, grassroots, climate change mitigation, planning, resilience, marketing, etc.
- Were there any key events or turning points in respect to green/sustainable building [urban development]?
- Who have been the key actors in the field of sustainable building [or UD] in Phnom Penh?
    - What kind of actors or actor networks have been driving issues of sustainable/green buildings [or UD]?
    - Which actors were rather resisting these issues?
    - Actors with ambiguous roles?
- What have been important driving or resisting factors or main challenges?
- How do aspects of informality [*weak state, patrimonialism, kleptocracy, authoritarianism*] influence the pathway towards green/sustainable buildings [or UD]?
- What kind of processes or events would you consider to be achievements in Phnom Penh?
- Did you observe any learning processes or feedback loops in the process?
- Where do actors source their models, information, policies or innovations?
- What were missed opportunities or failed projects?
    - Why were they missed/did they fail?
- How would you describe current trends?

Specific projects, programs or policies (*if interviewee are involved in any*)
a) Cambodia Green Building Council,

b) Certifications & Guidelines for Green Building in Cambodia,

c) Individual certified projects or pursuing international certification

d) …

- What were the origins?
- What were the main objectives?
- What is your role?
- Who were the key actors/stakeholders in the project?
- What are the specificities/characteristics?
- Were there any role models and sources of inspiration? Any technological, organisational, policies, economic, social, ecological innovations?
- Success/non-success factors?
- Existing transfer/learning initiatives from case study?
- What development/future perspectives are there? Next steps?
- Would you do anything differently if you had to do it again?

Outlook

- What change is needed to allow for a successful mainstreaming of green/sustainable buildings [& UD] in Phnom Penh?
- What would you consider promising levers for change?
- What is your outlook for future developments?

Appendix 2: Coding Scheme

- **Stability/Change**
  - Socio-Cultural Dimension
    - Socio-Cultural Setting, Values & Aspirations
    - Citizens & Public Discourses
    - User Preferences & Purchasing Power
    - Organisational Cultures & Strategies
  - Political-Institutional Dimension
    - Political Priorities
    - Formal Institutions & Visions
    - Informal Political Institutions
  - Economic Dimension
    - Macro-Economic Setting
    - Firms' Strategies & Expectations
    - Technologies, Infrastructures & Costs
    - Demand
    - Markets & Market Actors
  - Temporality (urgency/too early/priorities/sequencing)
  - Events/Shocks
  - Path Dependencies
  - Institutionalization Processes
  - Pathways
    - Government-led
      - By Incentives
        - Affordable housing finance with GB requirements
      - By State Regulation
        - Building Code
          - Building Code cum Green Building Code
          - Building Code in combination with a rating scheme
          - Extra/separate Green Building Code
      - By own Projects
    - Private sector-led
      - Green Finance-led Pathway
      - Business case Pathway
      - TNC-led
    - High Standard/elite-oriented/trickle down environmentalism
    - Safety-led Pathways
    - Techno-Pathways
    - Minimal Standards/Mass Market oriented
    - „Lifestyle“ Pathway (cool, trendy)
    - New Khmer Architecture inspired Pathway
    - Multi-stakeholder Platform led Pathway
- **Scale/Multi-scalarity**
  - Individual
  - Neighbourhood
  - Urban
  - Provincial
  - National
  - Global
- **MLP - Levels**
  - Landscape
  - Niche-Regime
  - Regime
  - Niche
- **Actors/Organizations**
  - State
  - Central State/National level
    - Inter-ministerial Bodies
    - National Council for Sustainable Development (NCSD)

- Ministry of Economy & Finance (MEF)
- Ministry of Environment (MoE)
- Ministry of Land Management, Urban Planning and Construction (MLMUPC)
- Ministry of Planning (MoP)
- Provincial State/Phnom Penh City Administration (PPCA)
- Local State (Khan, District, Sangkhat)
- Spatially referenced actors
  - Japan/JICA
  - China
  - Singapore
  - Vietnam
  - Thailand
  - Malaysia
  - Korea
- Intermediaries
  - Construction Association
  - EUROCHAM
  - Certification Bodies /(Green) Building Councils
- CPP
- Hun Sen/Prime Minister
- Civil Society/NGOs
- Donors/Development Agencies
- Investors
- Firms
  - Contractor
  - Property Industry/Developers
  - Engineers/Consultants
  - Real Estate Brokers
  - Architects & Planners
  - Transnational Corporations (TNCs)
  - Niche Firms
- Academia & Research Institutions
- Youth
- Temporary Institutions
- Change Agents
- Frontrunners
- Incumbents
- Households/Users

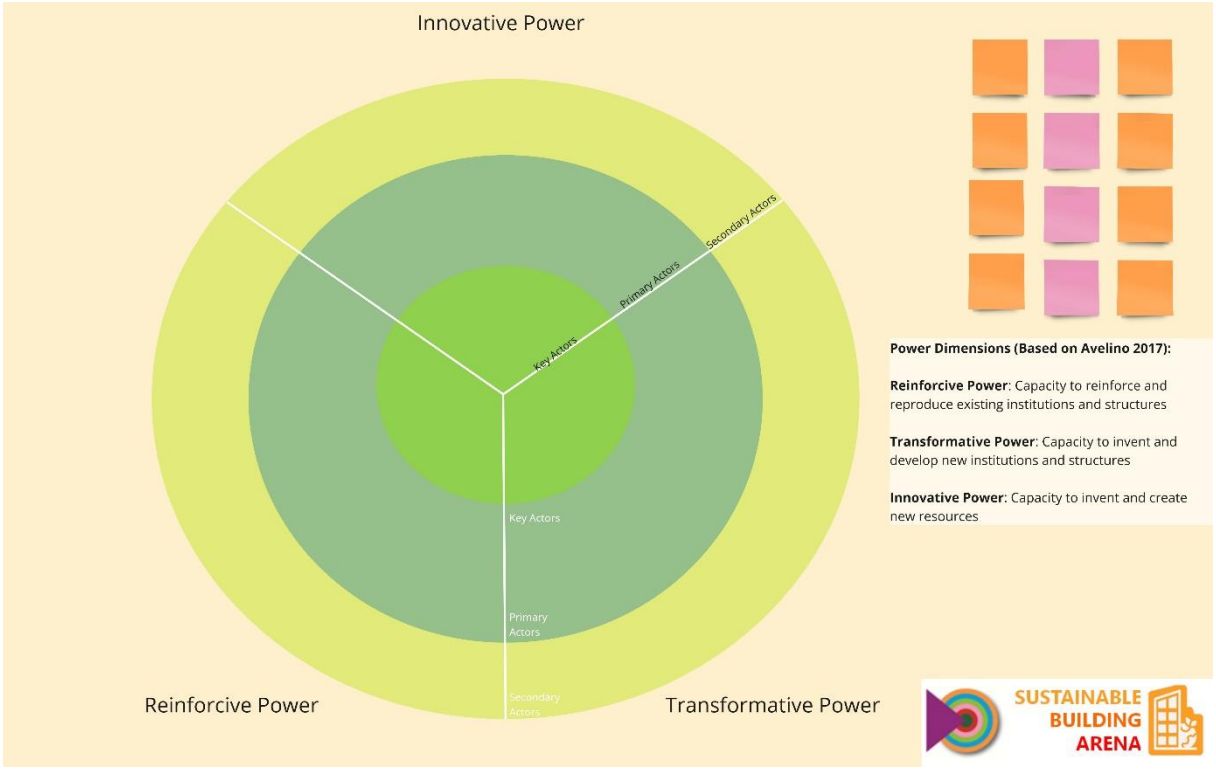
Governance

- Trust
- Multi-level Governance
- Administrative Organisation
- Transparency
  - Information (Hoarding)
- Inter-actor Conflicts over Authority
- Nepotism/Cleptocracy
- Corruption
- Informality
- Discourses

Power

- Transformative Power (niche-regime)
- Innovative Power (niche)
- Reinforcive Power (regime)

Appendix 3: Actor Mapping Canvas



Appendix 4-6: Visual Summary of Workshop Results

Appendix 4: Integrated Results of the First SBA Cycle: Challenge Framing (Drawing by Pen Uddam)

Appendix 5: Integrated Results of the First SBA Cycle: Vision Development (Drawing by Pen Uddam)

Appendix 6: Integrated Results of the First SBA Cycle: Transition Strategies (Drawing by Pen Uddam)

Appendix 7-15: Statistical Tables

Appendix 7: Test of standard distribution (pre-survey)

Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
How motivated are you to take part in this program?	0,414	9	0,000	0,617	9	0,000
the following section asks questions about your opinion on the resources offered in the incubator program: Access to finance	0,313	9	0,011	0,795	9	0,018
I already know where to find the previously mentioned resources to develop sustainable building and urban development solutions (finance, human resources, information, ideas, infrastructure, etc.).	0,317	9	0,010	0,873	9	0,132
I already know where to find the previously mentioned resources to develop sustainable building and urban development solutions (finance, human resources, information, ideas, infrastructure, etc.).	0,317	9	0,010	0,873	9	0,132
I already know where to find the previously mentioned resources to develop sustainable building and urban development solutions (finance, human resources, information, ideas, infrastructure, etc.).	0,317	9	0,010	0,873	9	0,132
I already know where to find the previously mentioned resources to develop sustainable building and urban development solutions (finance, human resources, information, ideas, infrastructure, etc.) .	0,317	9	0,010	0,873	9	0,132
I already know who owns or creates the previously mentioned resources to develop sustainable building and urban development solutions (finance, human resources, information, ideas, infrastructure, etc.).	0,389	9	0,000	0,693	9	0,001
I am interested in increasing my access to these resources & institutions through the incubation program.	0,471	9	0,000	0,536	9	0,000
Besides knowing about the previously mentioned resources and institutions, I know already with which	0,278	9	0,044	0,833	9	0,049
I am interested in developing strategies to (further) mobilize resources and institutions for sustainable	0,471	9	0,000	0,536	9	0,000
Legal skills	0,335	9	0,004	0,748	9	0,005
Technological skills	0,335	9	0,004	0,748	9	0,005
Creativity Skills	0,297	9	0,021	0,813	9	0,028
Adaptability Skills	0,459	9	0,000	0,564	9	0,000
Team-building and teamworking skills		9			9	
Time management skills	0,459	9	0,000	0,564	9	0,000
Negotiation Skills	0,471	9	0,000	0,536	9	0,000

Problem-Solving Skills	0,471	9	0,000	0,536	9	0,000
Sales and Marketing Skills	0,396	9	0,000	0,684	9	0,001
Financial management skills	0,344	9	0,003	0,711	9	0,002
Communication skills	0,333	9	0,005	0,763	9	0,008
Cybersecurity skills	0,402	9	0,000	0,658	9	0,000
Empathy	0,269	9	0,059	0,808	9	0,025
I have already been part of programmes or initiatives that supported the sustainable building and urban development processes.	0,275	9	0,048	0,780	9	0,012
I already have an active role with a lot of responsibility in supporting the sustainable building and urban development processes in Phnom Penh.	0,259	9	0,083	0,844	9	0,065
I am connected to other innovators who aim to make Phnom Penh's building and urban development sector more sustainable.	0,303	9	0,017	0,728	9	0,003
I am interested in taking over a more active role with responsibilities to support more sustainable building and urban development processes in Phnom Penh.	0,297	9	0,021	0,813	9	0,028
I want to build new ties and networks with other innovators who aim to make Phnom Penh's building sector and urban development more sustainable.	0,356	9	0,002	0,655	9	0,000
I can make a difference.	0,356	9	0,002	0,655	9	0,000
I am good at what I do.	0,269	9	0,059	0,808	9	0,025
I care about what I do.	0,414	9	0,000	0,617	9	0,000
I can determine what I do.	0,272	9	0,054	0,805	9	0,024
I can adapt and recover.	0,356	9	0,002	0,655	9	0,000
I can relay on my own abilities in difficult situations.	0,269	9	0,059	0,808	9	0,025
I can usually solve even challenging and complex tasks well.	0,351	9	0,002	0,781	9	0,012
I am able to solve most problems on my own.	0,278	9	0,044	0,853	9	0,081
I have confidence that together with others, we can achieve a lot, if we try hard.	0,519	9	0,000	0,390	9	0,000
I believe that together with others we can make effective contributions when we face new opportunities.	0,471	9	0,000	0,536	9	0,000
I have confidence that together with others we have the capability to solve problems.	0,471	9	0,000	0,536	9	0,000
I am optimistic that together with others we can trust in our joint power.	0,414	9	0,000	0,617	9	0,000
I think that people can jointly prevent the negative consequences of difficult situations.	0,414	9	0,000	0,617	9	0,000
I think that people around me can talk to and get help from each other when they feel stressed.	0,223	9	,200*	0,838	9	0,055
I think that people around me can help each other to obtain information or resources when dealing with stressful events.	0,333	9	0,005	0,763	9	0,008

I think that people in general can follow the support and guidance of others when facing a difficult situation.	0,275	9	0,048	0,780	9	0,012
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

Appendix 8: Test for standard distribution (post-survey)

Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Participating in the incubator has increased my motivation to support change toward sustainable building	0,356	9	0,002	0,655	9	0,000
Access to finance	0,298	9	0,020	0,752	9	0,006
Access to human resources (incl. Industry and entrepreneurship experts, co-founders, personnel, supporters, and clients)	0,223	9	,200*	0,838	9	0,055
Access to information, concepts, ideas, and beliefs	0,414	9	0,000	0,617	9	0,000
Access to Impact Hub infrastructure, branding material	0,414	9	0,000	0,617	9	0,000
Access to raw materials, physical space	0,344	9	0,003	0,711	9	0,002
Having participated in the incubator, I have expanded my knowledge about strategies with which I can access the previously mentioned resources and institutions, in order to implement sustainable building and urban development practices.	0,356	9	0,002	0,655	9	0,000
I am still interested in developing strategies to (further) mobilize resources and institutions for sustainable building practices through the incubation program.	0,356	9	0,002	0,655	9	0,000
Legal Skills	0,284	9	0,035	0,863	9	0,102
Technological skills	0,269	9	0,059	0,808	9	0,025
Creativity skills	0,356	9	0,002	0,655	9	0,000
Adaptability skills	0,471	9	0,000	0,536	9	0,000
Team-building and teamworking skills	0,297	9	0,021	0,813	9	0,028
Time management skills	0,335	9	0,004	0,748	9	0,005
Negotiation skills	0,199	9	,200*	0,886	9	0,180

Problem-solving skills	0,335	9	0,004	0,748	9	0,005
Sales and marketing skills	0,209	9	,200*	0,889	9	0,194
Financial management skills	0,208	9	,200*	0,899	9	0,248
Communication skills	0,333	9	0,005	0,763	9	0,008
Cybersecurity skills	0,325	9	0,007	0,846	9	0,068
Empathy	0,278	9	0,044	0,853	9	0,081
My participation in the incubator has increased the likelihood of me taking over a more active role in sustainable building and urban development projects or initiatives in the future.	0,396	9	0,000	0,684	9	0,001
My participation in the incubator has already changed my role in the context of more sustainable building and urban development processes.	0,278	9	0,044	0,833	9	0,049
By participating in the incubator, I was able to expand my ties and networks with other innovators who aim to make Phnom Penh's building sector and urban development more sustainable.	0,351	9	0,002	0,781	9	0,012
I can make a difference.	0,223	9	,200*	0,838	9	0,055
I am good at what I do.	0,297	9	0,021	0,813	9	0,028
I care about what I do.	0,396	9	0,000	0,684	9	0,001
I can determine what I do.	0,272	9	0,054	0,805	9	0,024
I can adapt and recover.	0,414	9	0,000	0,617	9	0,000
I can rely on my own abilities in difficult situations.	0,223	9	,200*	0,838	9	0,055
I can usually solve even challenging and complex tasks well.	0,272	9	0,054	0,805	9	0,024
I am able to solve most problems on my own.	0,297	9	0,021	0,813	9	0,028
I have confidence that together with others, we can achieve a lot, if we try hard.	0,471	9	0,000	0,536	9	0,000
I believe that together with others we can make effective contributions when we face new opportunities.	0,471	9	0,000	0,536	9	0,000
I have confidence that together with others we have the capability to solve problems.	0,414	9	0,000	0,617	9	0,000
I am optimistic that together with others we can trust in our joint power.	0,356	9	0,002	0,655	9	0,000
I think that people can jointly prevent the negative	0,356	9	0,002	0,655	9	0,000

consequences of difficult situations.						
I think that people around me can talk to and get help from each other when they feel stressed.	0,356	9	0,002	0,655	9	0,000
I think that people around me can help each other to obtain information or resources when dealing with stressful events.	0,333	9	0,005	0,763	9	0,008
I think that people in general can follow the support and guidance of others when facing a difficult situation.	0,414	9	0,000	0,617	9	0,000
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

Appendix 9: Analysis of differences of the main empowerment dimensions

Test Statisticsa						
	Resource mobilization strategies – motivation	Resource access - motivation	Social capital - motivation	Resource access – mobilization strategies	Social capital – Resource mobilization strategies	Social capital – Resource access
Z	-,577b	-2,533b	-1,983b	-2,384b	-1,066b	-1,246c
Asymp. Sig. (2-tailed)	,564	,011	,047	,017	,286	,213
a. Wilcoxon-Test						
b. Based on positive ranks.						
c. Based on negative ranks.						

Appendix 10: Descriptive statistics of resource access (pre-survey)

		the following section asks questions about your opinion on the resources offered in the incubator program: Access to finance	Access to people, including industry & entrepreneurship experts, co-founders & partners, etc.	Access to new information, concepts, ideas related to Sustainable Buildings	Access to Impact Hub facilities, network, material, and branding.
N	Valid	9	9	9	9
	Missing	0	0	0	0
Mean		3,89	4,56	4,33	4,00
Median		4,00	5,00	4,00	4,00
Std. Deviation		1,269	,527	,707	,707
Minimum		1	4	3	3
Maximum		5	5	5	5

Responses: range from 1 = not at all to 5 = totally.

Appendix 11: Descriptive statistics of resource access (post-survey)

		Through the incubation program, I was given... Access to finance	Access to human resources (incl. Industry and entrepreneurship experts, co-founders, personnel, supporters, and clients)	Access to information, concepts, ideas, and beliefs	Access to Impact Hub infrastructure, branding material	Access to raw materials, physical space
N	Valid	9	9	9	9	9
	Missing	0	0	0	0	0
Mean		3,22	3,89	4,33	4,33	3,78
Median		3,00	4,00	4,00	4,00	3,00
Std. Deviation		,972	,782	,500	,500	,972
Minimum		1	3	4	4	3
Maximum		4	5	5	5	5

Responses: range from 1 = not at all to 5 = totally.

Appendix 12: Wilcox Test for resource access to resources (pre-survey & post-survey)

Ranks				
		N	Mean Rank	Sum of Ranks
Through the incubation program, I was given... Access to finance - the following section asks questions about your opinion on the	Negative Ranks	4a	2,88	11,50
	Positive Ranks	1b	3,50	3,50
	Ties	4c		
	Total	9		

resources offered in the incubator program: Access to finance				
Access to human resources (incl. Industry and entrepreneurship experts, co-founders, personnel, supporters, and clients) - Access to people, including industry & entrepreneurship experts, co-founders & partners, etc.	Negative Ranks	4d	2,50	10,00
	Positive Ranks	0e	,00	,00
	Ties	5f		
	Total	9		
Access to information, concepts, ideas, and beliefs - Access to new information, concepts, ideas related to Sustainable Buildings	Negative Ranks	3g	2,50	7,50
	Positive Ranks	2h	3,75	7,50
	Ties	4i		
	Total	9		
Access to Impact Hub infrastructure, branding material - Access to Impact Hub facilities, network, material, and branding.	Negative Ranks	1j	3,00	3,00
	Positive Ranks	4k	3,00	12,00
	Ties	4l		
	Total	9		
a. Through the incubation program, I was given... Access to finance < the following section asks questions about your opinion on the resources offered in the incubator program: Access to finance				
b. Through the incubation program, I was given... Access to finance > the following section asks questions about your opinion on the resources offered in the incubator program: Access to finance				
c. Through the incubation program, I was given... Access to finance = the following section asks questions about your opinion on the resources offered in the incubator program: Access to finance				
d. Access to human resources (incl. Industry and entrepreneurship experts, co-founders, personnel, supporters, and clients) < Access to people, including industry & entrepreneurship experts, co-founders & partners, etc.				
e. Access to human resources (incl. Industry and entrepreneurship experts, co-founders, personnel, supporters, and clients) > Access to people, including industry & entrepreneurship experts, co-founders & partners, etc.				
f. Access to human resources (incl. Industry and entrepreneurship experts, co-founders, personnel, supporters, and clients) = Access to people, including industry & entrepreneurship experts, co-founders & partners, etc.				
g. Access to information, concepts, ideas, and beliefs < Access to new information, concepts, ideas related to Sustainable Buildings				
h. Access to information, concepts, ideas, and beliefs > Access to new information, concepts, ideas related to Sustainable Buildings				
i. Access to information, concepts, ideas, and beliefs = Access to new information, concepts, ideas related to Sustainable Buildings				
j. Access to Impact Hub infrastructure, branding material < Access to Impact Hub facilities, network, material, and branding.				
k. Access to Impact Hub infrastructure, branding material > Access to Impact Hub facilities, network, material, and branding.				
l. Access to Impact Hub infrastructure, branding material = Access to Impact Hub facilities, network, material, and branding.				

	Through the incubation program, I was given... Access to finance - the following section asks questions about your opinion on the resources offered in the incubator program: Access to finance	Access to human resources (incl. Industry and entrepreneurship experts, co-founders, personnel, supporters, and clients) - Access to people, including industry & entrepreneurship experts, co-founders & partners, etc.	Access to information, concepts, ideas, and beliefs - Access to new information, concepts, ideas related to Sustainable Buildings	Access to Impact Hub infrastructure, branding material - Access to Impact Hub facilities, network, material, and branding.
Z	-1,089b	-1,857b	,000c	-1,342d
Asymp. Sig. (2-tailed)	,276	,063	1,000	,180
a. Wilcoxon Signed Ranks Test				
b. Based on positive ranks.				
c. The sum of negative ranks equals the sum of positive ranks.				
d. Based on negative ranks.				

Appendix 13: Descriptive statistics of likelihood of project continuation

How likely are you to continue your startup project?		
N		9
	missings	0
M		4,00
MD		4,00
Modus		3a
SD		,866
Min		3
Max		5
Responses: range from 1 = not at all to 5 = totally.		

How likely are you to continue your startup project?				
	N	%	valid %	cumulated %
maybe	3	33,3	33,3	33,3
4	3	33,3	33,3	66,7
definitely	3	33,3	33,3	100,0
total	9	100,0	100,0	

Responses: range from 1 = not at all to 5 = totally.

Appendix 14: Correlation matrix of likelihood of continuation and main empowerment dimensions (n = 9)

		How likely are you to continue your start-up project?
Increased Motivation	correlation coefficient	-,274
	Sig. (2-tailed)	,476
	N	9
Resource Mobilization Strategies	correlation coefficient	,000
	Sig. (2-tailed)	1,000
	N	9
Resource Access (Scale)	correlation coefficient	-,664
	Sig. (2-tailed)	,051
	N	9
Social Capital (scale)	correlation coefficient	,080
	Sig. (2-tailed)	,838
	N	9
How likely are you to continue your start-up project?	correlation coefficient	1,000
	Sig. (2-tailed)	.
	N	9

* The correlation is on the .05 level significant (two-tailed).

Appendix 15: Wilcox test for start-up continuation and main empowerment dimensions

Ranks				
		N	Mean Rank	Sum of Ranks
Participating in the incubator has increased my motivation to support change toward sustainable building - How likely are you to continue your startup project?	Negative Ranks	2a	3,00	6,00
	Positive Ranks	5b	4,40	22,00
	Ties	2c		
	Total	9		
Having participated in the incubator, I have expanded my knowledge about strategies with which I can access the previously mentioned resources and institutions, in order to implement sustainable building and urban development practices. - How likely are you to continue your startup project?	Negative Ranks	2d	3,50	7,00
	Positive Ranks	5e	4,20	21,00
	Ties	2f		
	Total	9		
Through the incubation program, I was given access. - How likely are you to continue your startup project?	Negative Ranks	4g	6,13	24,50
	Positive Ranks	5h	4,10	20,50
	Ties	0i		
	Total	9		
newties_relationships_roles_scale_post - How likely are you to continue your startup project?	Negative Ranks	4j	3,13	12,50
	Positive Ranks	4k	5,88	23,50
	Ties	1l		
	Total	9		
a. Participating in the incubator has increased my motivation to support change toward sustainable building < How likely are you to continue your startup project?				
b. Participating in the incubator has increased my motivation to support change toward sustainable building > How likely are you to continue your startup project?				
c. Participating in the incubator has increased my motivation to support change toward sustainable building = How likely are you to continue your startup project?				
d. Having participated in the incubator, I have expanded my knowledge about strategies with which I can access the previously mentioned resources and institutions, in order to implement sustainable building and urban development practices. < How likely are you to continue your startup project?				
e. Having participated in the incubator, I have expanded my knowledge about strategies with which I can access the previously mentioned resources and institutions, in order to implement sustainable building and urban development practices. > How likely are you to continue your startup project?				
f. Having participated in the incubator, I have expanded my knowledge about strategies with which I can access the previously mentioned resources and institutions, in order to implement sustainable building and urban development practices. = How likely are you to continue your startup project?				
g. Through the incubation program, I was given access. < How likely are you to continue your startup project?				
h. Through the incubation program, I was given access. > How likely are you to continue your startup project?				
i. Through the incubation program, I was given access. = How likely are you to continue your startup project?				
j. newties_relationships_roles_scale_post < How likely are you to continue your startup project?				
k. newties_relationships_roles_scale_post > How likely are you to continue your startup project?				
l. newties_relationships_roles_scale_post = How likely are you to continue your startup project?				

Test Statisticsa

	Participating in the incubator has increased my motivation to support change toward sustainable building - How likely are you to continue your startup project?	Having participated in the incubator, I have expanded my knowledge about strategies with which I can access the previously mentioned resources and institutions, in order to implement sustainable building and urban development practices. - How likely are you to continue your startup project?	Through the incubation program, I was given access. - How likely are you to continue your startup project?	newties_relationships_roles_scale_post - How likely are you to continue your startup project?
Z	-1,406b	-1,265b	-,237c	-,775b
Asymp. Sig. (2-tailed)	,160	,206	,812	,438

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.
c. Based on positive ranks.