DOI : 10.35662/unine-these-3095

UNIVERSITÉ DE NEUCHÂTEL
FACULTÉ DES LETTRES ET DES SCIENCES HUMAINES

THÈSE DE DOCTORAT

Soutenue le 27 mars 2024

BASIC SERVICES UNDER RAPID URBANIZATION : UNPACKING THE INTERACTIONS OF SANITATION WITH URBAN INEQUALITY.

Andri Heidler

Groupe de recherche en économie territoriale (GRET)
Institut de sociologie

Sous la direction du Professeur Olivier CREVOISIER
Professeur ordinaire, Université de Neuchâtel

et

Sous la co-direction du Docteur Christoph LÜTHI
Chef du département "Sanitation, Water and Solid Waste for Development" (Sandec)
à l'Institut Fédéral Suisse des Sciences et Technologies de l'Eau (Eawag)

Jury de thèse

Sophie SCHRAMM,
Technische Universität Dortmund, ordentliche Professorin
Fakultät Raumplanung

René VERON,
Université de Lausanne, Professeur ordinaire
Institut de géographie et durabilité

Olivier CREVOISIER,
Université de Neuchâtel, Professeur ordinaire
Institut de sociologie

unine
Université de Neuchâtel

Faculté des Lettres et Sciences Humaines
Espace Tilo-Frey 1
CH - 2000 Neuchâtel
Tél. +41 32 718 1700
secretariat.lettres@unine.ch

IMPRIMATUR

La Faculté des lettres et sciences humaines de l'Université de Neuchâtel, sur les rapports de M. Olivier Crevoisier, directeur de thèse, professeur, Université de Neuchâtel ; M. René Veron, professeur, Université de Lausanne ; Mme Sophie Schramm, professeure, Technische Universität Dortmund autorise l'impression de la thèse présentée par M. Andri Heidler en laissant à l'auteur la responsabilité des opinions énoncées.

p.o.

Neuchâtel, le 27 mars 2024

Le doyen
Loris Petris

Funding disclosure

This research has been conducted at the University of Neuchâtel in collaboration with the Swiss Federal Institute of Aquatic Science and Technology (Eawag), partially funded through the Swiss Network for International Studies (SNIS) through the U-STASIS research project: https://snis.ch/projects/urban-sanitation-technologies-as-international-power-structures-u-stasis/

Dedication

Wo kämen wir hin, wenn alle sagten,

wo kämen wir hin, und keiner ginge,

um zu sehen, wohin wir kämen,

wenn wir gingen.

Kurt Marti

Acknowledgements

I would like to express my gratitude to my supervisor, Olivier Crevoisier, for his trust throughout the research process and the U-STASIS research project. I would also like to thank Christoph Lüthi for his trust and support. Your expertise in the sanitation sector and your experience in the global political discourse on this have enabled me to build up a sound knowledge of sanitation and to understand what people have been racking their brains about in the past. I am grateful that you have always responded pragmatically to my often critical analyses.

I also would like to express my gratitude to the scientific collaborations and exchanges I have enjoyed as part of U-STASIS. Sharmin, Abul, Mahbub: Not only do I owe you a very successful collaboration, but through you I was also able to get to know Dhaka, the Sundarbans and Bangladesh. Although you clearly pointed out that I had overloaded the joint time with very high ambitions, you went all in to make it a success. This meant hustling to reach people and spending long days in the car. Thank you for your fabulous support in any aspect. Muhil, Samitha, Josiane, Ria, Simon: Our collaboration was very particular. We worked together from different places, different continents and different time zones, not once one of us met another one in person. As if that was not enough, the work that we embarked upon together, no one had done before. The way you supported me on this exploratory path by doing the needed tedious work but even more so by thinking along and thinking ahead was very rewarding! Methuselah, Tim, Godlove: Although the joint work is not included as a chapter in the dissertation, your contributions and time together in Dar es-Salaam have enabled me to find a comparative perspective on the challenges of sanitation. I am sincerely grateful for your abilities as engineers and planners to honestly address my critical contributions and discuss them. Without such deliberations, I might still be up in the air somewhere. John: I am honoured to have worked with you. I owe a main part of my intellectual motivation and drive to your ideas. Understanding power and powerlessness, participation and collective action in both research and everyday life has become a core part of my work. This began with my encounter with the power cube as part of my master's thesis. Being able to work with you as part of my dissertation has been rewarding and inspiring. I am sincerely impressed by your ability to engage with what we have learned in case studies and your humble approach. Thank you!

Louise, Kayla, Jojo, and Gina: While I always said that VaLoo was my “Plan B” in case the PhD funding would not work out, there was many, many moments where VaLoo was “Plan A”, because of you. Thank you!

My dissertation would not have been possible without friends that have both distracted me from all these thoughts that have followed me over the past years but also supported me in sorting them. Thank you Birds Brigade!

To my parents. My gratitude to you goes beyond this dissertation, and there is no space to even summarize what you mean to me and how you have supported me in making this dissertation a reality. I am deeply impressed by your curiosity and your conviction that by understanding the world and each other and acting on what we learn, we can strive for a more just, more equal, more compassionate future.

To my wife. Thank you for bearing with me no matter what.

Summary

This dissertation addresses the interaction of basic service arrangements with urban inequality. In the face of rapid and unplanned urbanization, one of the main challenges for public actors is to ensure that the expansion of basic services keeps pace to achieve a minimum level of services across the entire urban population to reduce inequality. However, as most basic services are delivered through extensive infrastructure networks, they tend to be capital and planning intensive and therefore lag significantly behind urban growth, especially where urbanization is informal. Against this backdrop, the unbundling of network infrastructures and decentralized basic service provision are seen as a game changer through increasing flexibility and decreasing investment volumes. As a result, the same basic service can increasingly be provided by different technological solutions, operating models, and actors. The conditions under which citizens gain access to basic services, particularly eligibility and cost, can vary greatly. In short, the processes for delivering the same basic service are becoming more fragmented, which makes the issue of inequality central. This thesis takes the example of sanitation to address how different arrangements of basic service provisioning interact with urban inequality from a territorial perspective. The thesis is based on three research articles, which form a chapter each.

Chapter 4, studies Multilateral Development Banks' (MDBs) investment behaviour for water supply and sanitation. The chapter introduces a novel dataset comprising all water and sanitation investments between 1960 and 2020. Drawing on 3639 water and sanitation projects, the chapter assesses territorial trends, technology choices, distribution of financial burdens, and reforms to institutional arrangements to understand how MDB's investment behaviour varies across space and time and how it responds to the global policy discourse and urbanization.

Chapter 5 scrutinizes the development of the water and sanitation sector in Dhaka, Bangladesh, between 1990 and 2020. The chapter introduces the policy pathways framework (PPF) as a novel analytical concept to unpack the multiscalar negotiations involved in the deliberation over sanitation policies and investments. The chapter shows how donors link the ongoing introduction of citywide inclusive sanitation (CWIS) to the organization of sanitation through an economy, how the utility uses CWIS as an opportunity to avoid costly responsibilities in non-sewered sanitation, and how service co-production through community-based solutions is neglected.

Chapter 6 introduces the territorial political economy framework (TPE) and the sanitation bargains typology to analyse the variety of sanitation systems that exist in cities. The TPE distinguishes three dimensions—security, production, and finance—to explore sanitation systems' generic distribution of structural power and their local-global interaction. The typology of sanitation bargains identifies five ideal types, namely the household, municipality, utility, cityworks, and enterprise, bargains. The TPE framework and the bargains typology are timely propositions for making research in IPE more territorially sensitive.

For actors promoting CWIS the dissertation shows that the flexibility in technology must be extended to organization and financing. To this end, the systematic collection and synthesizing of existing financial and organizational arrangements for non-sewered sanitation is more promising than the current focus on promoting an abstract vision of a sanitation economy based on private investments and household demand, where safe sanitation is provided as a result of a functioning market.

Keywords

International political economy; territorial political economy; power cube framework; structural power; sanitation bargains; policy pathways framework; sanitation; CWIS; SDG6; multilateral development banks

Résumé

Cette thèse traite de l'interaction entre les services de base et les inégalités urbaines. Face à une urbanisation rapide et non planifiée, le principal objectif des acteurs publics est de garantir que l'expansion des services de base se poursuive au même taux, afin d'atteindre un niveau minimum de services pour l'ensemble de la population urbaine et de réduire l'inégalité. Cependant, comme la plupart des services de base sont fournis par le moyen de grands réseaux d'infrastructures, ils ont tendance à être à forte intensité de capital et de planification et sont donc à la traîne de la croissance urbaine, en particulier là où l'urbanisation est informelle. Dans ce contexte, le dégroupage des infrastructures de réseau et la fourniture décentralisée des services de base sont considérés comme un changement de donne, car ils augmentent la flexibilité et réduisent les volumes d'investissement. Par conséquent, le même service de base peut de plus en plus être fourni par des solutions technologiques, des modèles d'exploitation et des acteurs différents. Les conditions dans lesquelles les citoyens ont accès aux services de base, en particulier l'éligibilité et le coût, peuvent varier considérablement. En bref, les processus impliqués dans la fourniture d'un même service de base sont de plus en plus fragmentés, ce qui rend la question de l'inégalité centrale. Cette thèse prend l'exemple de l'assainissement pour étudier comment les différentes modalités de fourniture des services de base interagissent avec les inégalités urbaines dans une perspective territoriale. La thèse est basée sur trois articles de recherche, chacun formant un chapitre. Le chapitre 4 examine le comportement d'investissement des banques multilatérales de développement (BMD) dans l'approvisionnement en eau et l'assainissement. Le chapitre présente un nouvel ensemble de données comprenant tous les investissements dans l'eau et l'assainissement entre 1960 et 2020. S'appuyant sur 3 639 projets d'eau et d'assainissement, le chapitre évalue les tendances territoriales, les choix technologiques, la répartition des charges financières et les réformes des dispositifs institutionnels pour comprendre comment le comportement d'investissement des BMD varie dans l'espace et dans le temps, et comment il réagit au discours politique mondial et à l'urbanisation. Le chapitre 5 examine le développement du secteur de l'eau et de l'assainissement à Dhaka, au Bangladesh, entre 1990 et 2020. Il présente le Policy Pathways Framework (PPF) comme un nouveau concept analytique permettant d'analyser les négociations multiscalaires impliquées dans les délibérations sur les politiques et les investissements en matière d'assainissement. Le chapitre explique comment les financeurs associent l'introduction en cours de l'assainissement inclusif à l'échelle de la ville (CWIS) à l'organisation de l'assainissement à travers une économie, comment les entreprises de services publics utilisent le CWIS comme une opportunité d'éviter des responsabilités coûteuses dans l'assainissement sans égouts, et comment la coproduction de services à travers des solutions basées sur la communauté est négligée. Le chapitre 6 présente le cadre de l'économie politique territoriale (EPT) et la typologie des marchés de l'assainissement pour analyser la variété des systèmes d'assainissement existant dans les villes. La TPE distingue trois dimensions - la sécurité, la production et le financement - pour explorer la distribution générique du pouvoir structurel des systèmes d'assainissement et leur interaction locale-globale. La typologie du marché de l'assainissement identifie cinq types idéaux, à savoir les marchés des ménages, des municipalités, des services publics, des travaux urbains et des entreprises. Le cadre TPE et la typologie des marchés sont des propositions opportunes pour rendre la recherche sur l'EPP plus sensible à la dimension territoriale. Pour les acteurs promouvant les CWIS, la thèse montre que la flexibilité de la technologie doit être étendue à l'organisation et au financement. A cette fin, la collecte systématique et la synthèse des dispositions financières et organisationnelles existantes pour l'assainissement sans égout sont plus prometteuses que l'accent mis actuellement sur la promotion d'une vision abstraite d'une économie de l'assainissement basée sur l'investissement privé et la demande des ménages, où l'assainissement sûr est fourni comme le résultat d'un marché qui fonctionne.

Mots clés

Économie politique internationale; économie politique territoriale; power cube framework; pouvoir structurel; sanitation bargains; cadre des voies politiques; assainissement; CWIS; SDG6; banques multilatérales de développement

CONTENT TABLE

FUNDING DISCLOSURE **3**

DEDICATION **4**

ACKNOWLEDGEMENTS **5**

SUMMARY **6**

KEYWORDS **7**

CONTENT TABLE **10**

1 INTRODUCTION **11**

1.1 URBANIZATION, INEQUALITY AND BASIC SERVICES 12
1.2 THE ISSUE OF SANITATION 14
1.3 THE THEORETICAL CHALLENGE AND RESEARCH QUESTION 18

2 LITERATURE REVIEW **19**

2.1 INTERNATIONAL POLITICAL ECONOMY 19
2.2 SUSAN STRANGE'S APPROACH TO IPE AND ITS RELEVANCE TO THE STUDY OF SANITATION 21
2.3 THE POWER CUBE FRAMEWORK 26

3 METHODOLOGY OF THE DISSERTATION **28**

3.1 ANALYZING STABILITY AND CHANGE IN SANITATION FROM A TERRITORIAL PERSPECTIVE 28
3.2 COMPLEMENTARITY OF THE CHAPTERS 30
3.3 SHAPING AN ENGAGED APPROACH TO KNOWLEDGE CREATION & APPLICATION 32

4 MDB INVESTMENT BEHAVIOUR IN WATER AND SANITATION **40**

4.1 INTRODUCTION 41
4.2 METHODS 43
4.3 RESULTS AND DISCUSSION 44
4.4 CONCLUSIONS 53

5 BARGAINING OVER SANITATION SECTOR REFORMS **54**

5.1 INTRODUCTION 55
5.2 CONCEPTUAL FRAMEWORK AND METHODOLOGY 58
5.3 FINDINGS 61
5.4 DISCUSSION 67
5.5 CONCLUSION 69

6 THE TERRITORIAL POLITICAL ECONOMY OF URBAN SANITATION **71**

6.1 INTRODUCTION 72

6.2 URBAN POLITICAL ECOLOGY AND INTERNATIONAL POLITICAL ECONOMY: UNDERSTANDING SANITATION AS TERRITORIAL STRUCTURING OF PUBLIC ISSUES 73
6.3 THE TERRITORIAL POLITICAL ECONOMY FRAMEWORK 75
6.4 DATA AND METHODS FOR A TYPOLOGY OF SANITATION BARGAINS 77
6.5 A TYPOLOGY OF SANITATION BARGAINS 78
6.6 DISCUSSION & CONCLUSION 84

7 CONCLUSION 87

7.1 KEY INSIGHTS: MDBS, CHANGE, AND STABILITY 87
7.2 POSITIONALITY AND LIMITATIONS OF THE THESIS 90
7.3 IMPLICATIONS FOR THEORY AND ACTION 91
7.4 IMPLICATIONS FOR ACTION 93

8 ANNEXES 94

8.1 ANNEX 1: MDB DATA 94
8.2 ANNEX 2: MDB VARIABLES OVERVIEW 96
8.3 ANNEX 3: INTERVIEW CODING 100
8.4 ANNEX 4: INTERVIEWS DHAKA 100
8.5 ANNEX 5: OVERVIEW DOCUMENT ANALYSIS DHAKA 100

9 BIBLIOGRAPHY 101

LIST OF FIGURES

FIGURE 1: ANALYTICAL DIMENSIONS OF THE POWER CUBE FRAMEWORK. 27
FIGURE 2: METHODOLOGY OF THE DISSERTATION 29
FIGURE 3: OVERVIEW OF THE U-STASIS RESEARCH PROJECT 34
FIGURE 4: CHANGES IN TERRITORIAL FOCUS OF MDB INVESTMENT PROJECTS OVER TIME. 45
FIGURE 5: CHANGING PRIORITIES BETWEEN WATER SUPPLY AND SANITATION OVER TIME. 47
FIGURE 6: SANITATION TECHNOLOGIES OVER TIME IN THE WORLD BANK PROJECTS. 48
FIGURE 7: TOTAL INVESTMENTS DISAGGREGATED BETWEEN SPONSORS 49
FIGURE 8: INSTITUTIONAL REFORMS FOR SEWERED AND NON-SEWERED SANITATION. 50
FIGURE 9: IDEAL TYPE SANITATION BARGAINS IN REFERENCE TO KEY DIMENSIONS. 85

LIST OF TABLES

TABLE 1: A TYPOLOGY OF BARGAINS FOR THE PROVISION OF SAFE SANITATION 78
TABLE 2: VARIABLES FOR QUALITATIVE CONTENT ANALYSIS OF MDB PROJECTS. 96
TABLE 3: OVERVIEW DEDUCTIVE CODING SCHEME FOR ANALYZING KII AND POLICY DOCUMENTS. 100
TABLE 4: OVERVIEW OF INTERVIEWS CONDUCTED IN DHAKA. 100
TABLE 5: LIST OF ANALYZED DOCUMENTS FOR DHAKA. 100

1 Introduction

1.1 Urbanization, inequality and basic services

The interest of my dissertation lies in understanding how the organization of access to safe sanitation as a distinct process of urbanization interacts with urban inequality.

As the world continues to urbanize, sustainable and equitable development increasingly depends on the governance of urban growth, especially in low- and lower-middle-income countries where cities grow most rapidly. Yet, unplanned and inadequately managed urban expansion increased the number of people living in informal settlements and slums, where approximately one billion people reside today (UN 2019). The image of slums and informal settlements against the backdrop of skyscrapers is a very visible expression and spatial manifestation of urban inequality. Broadly speaking, inequality refers to the multidimensional and unequal distribution of conditions, resources, and capabilities in a population or geographical area. Inequality is expressed in the unevenly distributed circumstances in which individuals find themselves, such as income; housing quality; life expectancy; level of physical security; access to basic services such as water, sanitation, electricity, and transport; the quality of the environment, including air and water pollution and other environmental hazards; and access to amenities (Nijman and Wei 2020). As the skyscrapers indicate and as Hamnett (2019: 245) points out, inequality should not be confused with expressions of poverty, deprivation, and powerlessness. Instead, these are only one side of inequality. The other side comprises the rich, the powerful, and the healthy. Cities are where qualified workers find the best-paid jobs and where high-quality services, such as schools and hospitals, are available. Thus, both poverty and wealth are integral to inequality. Inequality is also different from segregation. Whereas inequality and segregation have explicit territorial materializations, segregation refers to the extent to which individuals of different population groups occupy or experience different social contexts or environments (Florida and Mellander 2020).

Addressing urban inequality involves two territorial aspects. On the one hand, it encompasses measuring the unequal territorial distribution of living conditions, resources, and capabilities of city dwellers, and on the other hand, it demands understanding the ways in which the territorial reinforces sociopolitical and socionatural relations and processes that produce inequality outcomes (Hamnett 2019). Cities generate or reinforce specific forms of inequality through processes of urbanization. Scholars of critical urbanism such as Davis (2013) or Massey (2013), inspired by the work of David Harvey (1973), stress that the urban in urban inequality is used to express how urban inequality is not just a variant of inequality found elsewhere. This dynamic is visible in the structure of urban economies that meander between formal and informal, the ways housing is organized, and in the infrastructures that enable cities to function. The forms that urbanization takes are shaped by spatial planning through land use policies and zoning or their absence; by public and private investments in buildings and infrastructure for electricity, transport, water supply, and sanitation or their absence; and by the conditions, such as citizenship, income level, and employment status, under which urban residents gain access to resources and services. Government policies for planning and managing urban growth decide whether the benefits, opportunities, costs, and risks of urbanization are shared equitably among city dwellers living in different parts and conditions in the city. Analysing how public policy interacts with urbanization is thus imperative to understand urban inequality, including its spatial distribution.

City governments have relatively limited control over some forms of inequality, such as income disparities that are often produced elsewhere because they have limited power to redistribute wealth, but cities do have more extensive possibilities to address non-income inequalities (Tonkiss 2020). For example, providing basic urban services such as transport, water, sanitation, waste, and electricity are territorial processes that interact directly with inequality and in which public actors at the city level play a prominent role. Insufficient and unequal basic service provision results in at least four negative outcomes for those not serviced. These are adverse physical health, increased temporal and monetary costs, decreased safety, and compromised mental health and dignity (Pierce 2017). Because of their importance in fulfilling essential human needs, basic services are generally a core responsibility of public actors. Thus, although income inequality helps shape all these forms of disparity, they are not reducible to it (Tonkiss 2020).

In the face of rapid and unplanned urbanization, one of the main challenges for public actors is to ensure that the expansion of basic services keeps pace to achieve a minimum level of services across the entire urban population and thereby reduce inequality. However, as most basic services are delivered through extensive infrastructure networks, they tend to be capital and planning-intensive and, therefore, lag significantly behind urban growth, especially where urbanization is informal. Against this background, a general trend towards unbundling networked services has developed over the last 30 years, and decentralization has become a preferred service delivery strategy by both public and private actors (Graham and Marvin 2022, 2001). The main promises of decentralized basic service provision and the associated technological innovations are twofold. First, decentralization enables the ecologically efficient provision of basic services in the areas of energy, water, and wastewater. Second, decentralization and modular technologies promise more flexibility through decreasing investment volumes and shortening planning horizons and can, therefore, provide more responsiveness in the face of rapid urbanization (Hoffmann et al. 2020). The decentralized provision of basic services, therefore, is assumed to yield the potential to rapidly extend basic services to all urban residents and thus reduce urban inequality (Evans 2013).

Decentralization and unbundling of network infrastructures remove the monopoly of a single service provider and the theoretically homogenizing nature of network infrastructure. This is because a network infrastructure is generally operated by a single actor. Depending on the materiality of the basic service, multiple providers compete on the same network (e.g. electricity), while with other services, such as water and sanitation, this is not the case. Yet, with unbundling, the competition between service providers is opened up, even for basic services that are less competitive in a network infrastructure. As a result, the same basic service can increasingly be provided by different technological solutions and operating models, and even different actors. This means that the conditions under which citizens in the same city gain access to basic services, particularly eligibility and cost, can vary greatly. In short, the processes for delivering the same basic service are becoming more diverse or ‘splintered’, which makes the issue of inequality more central (Graham and Marvin 2001; van Welie 2019). That said, this thesis takes the example of sanitation to scrutinize its interaction with urban inequality in two regards. On one hand, it scrutinizes how different forms of basic service provisioning affect inequality outcomes and on the other hand its analyses the multiscalar negotiations involved in the deliberation over basic service provisioning interact with processes that shape urban inequality.

1.2 The issue of sanitation

Sanitation is the 'infrastructures and services for the safe management of human excreta from the toilet to containment and storage and treatment on-site or conveyance, treatment and eventual safe and end use or disposal' (UNICEF and WHO 2020). Sanitation is a key basic service that has a major bearing on the functioning of cities by affecting the presence and distribution of the burden of disease and the level of environmental quality (Andersson, Dickin, and Rosemarin 2016). Sanitation is a case of a basic service in which progress has been particularly slow compared to access to water, electricity, communication technologies, and financial services, despite high ambitions (UNICEF and WHO 2020). In 2020, over 50% of the world's population still lacked access to safely managed sanitation. In urban areas, improved sanitation is available to 40% of the population in low-income economies and 67% in lower middle-income economies, respectively, thereby contributing to urban inequality (JMP 2019).

The lack of progress stands in contrast to the significance of sanitation in the global policy discourse over the past 40 years. Since the United Nations International Drinking Water and Sanitation Decade from 1980 to 1990, a series of attempts have been made at the global policy level to advance access to safe sanitation for all. The Decade aimed to encourage UN member states to invest in the improvement of water and sanitation infrastructures to achieve services for all by 1990. Despite the progress made, simultaneous rapid urbanization resulted in an increase in the absolute number of people without access. Although the goals were not reached, the decade led to an increased recognition of water and sanitation as integral to economic development policies (Najlis and Edwards 1991) and low-cost sanitation options became recognized as valid alternative technologies to sewerage systems that can deliver equivalent public health and environmental protection outcomes. However, low-cost sanitation options did not play a major role in the planning and implementation of sanitation infrastructure investment projects (Kalbermatten 1991). At the level of global policy, acknowledgement of sanitation increased steadily as a core public issue for sustainable development. Under the Millennium Development Goals (MDG) that defined what the donor community sought to reach by 2015, goal 7.3 aimed to halve the proportion of the population without access to drinking water and basic sanitation. As part of the United Nation's International Year of Sanitation in 2008, the Sustainable Sanitation Alliance (SuSanA) was formed to promote and support the development of sustainable sanitation approaches. The International Year of Sanitation moved a systems perspective on sanitation and the idea of sanitation as a service to centre stage. Attention to sanitation on the global development agenda was further accentuated in 2010 by the recognition of the human right to water and sanitation. To help fulfil this human right, the UN General Assembly adopted a special target on sanitation and wastewater management as part of Sustainable Development Goal (SDG) 6. In particular, SDG 6.2 aims to provide 'access to safe sanitation for all' by 2030.

Parallel to the growing importance of sanitation for the global development agenda, the infrastructures and technologies for providing sanitation have undergone scrutiny. Primarily, the superiority of conventional sanitation, consisting of vast sewerage networks and centralized wastewater treatment plants, was increasingly contested. It became ever clearer that as long as sewered sanitation was seen as the only solution, progress would be far too slow and would hinder rapid expansion of access to safe sanitation. Sewers and centralized treatment plants were increasingly considered unsuitable for expanding sanitation to many of the so-far-unserved and often informal urban settlements because they require large quantities of water, involve high investment and operating costs, and demand long planning horizons (Reymond, Renggli, and Lüthi 2016). Recently, the sustainability of

sewered sanitation systems has been questioned more fundamentally by leading wastewater research institutions. A key concern is the linear and inefficient management of the resources contained in wastewater as well as the high operation and maintenance cost of the system (Hoffmann et al. 2020). In response to the increasing recognition of the limitations of sewered sanitation and in line with the more general trend of splintering urbanization, a variety of technologies and planning approaches for non-sewered sanitation have been developed over the last 30 years. Technological development has focused on managing human excreta independently of sewers and on using water as sparingly as possible. Two complementary approaches have emerged. On the one hand, the on-site treatment of household wastewater and human excreta at the level of the house or the neighbourhood, such as the decentralized wastewater treatment systems (DEWATS) approach (Ulrich, Reuter, and Gutterer 2009). On the other hand, the off-site treatment organizes the management of human excreta along a service chain. In the latter, which remains the dominant form of non-sewered sanitation, technological innovation has focused on improving the sanitation service chain in the five steps of containment, emptying, transport, treatment, and disposal or reuse (Tilley et al. 2008).

Parallel to technological development, new governance models for urban sanitation have emerged. For sewered sanitation and basic service provisioning more generally, state-led development has been increasingly questioned. Network infrastructures and public administrative units were unbundled and made autonomous from governments with the aims of depoliticizing and increasing accountability and efficiency through financing and organizing basic services including water supply and sanitation through market mechanisms. In this process, citizens became increasingly understood as customers who demanded a service. This organizational transformation was amongst others induced by neoliberal ideas about basic service provisioning, such as the new public management principles that identified governments as inefficient service providers and sought to promote agility, ambition, efficiency, and effectiveness through private sector engagement. In sewered sanitation, this process was most extremely visible in a series of failed attempts to privatize entire water and sanitation sectors and more subtly in the increasing importance of public–private partnerships in designing, constructing, and operating water and sanitation infrastructures (Finger and Allouche 2002; Bakker 2013; Marques 2016). For non-sewered sanitation, household or community-centred and demand-led planning approaches and organizational models have been developed (Schertenleib et al. 2021).

After being treated as two distinct and, in some debates, opposing or incompatible concepts of sanitation, sewered and non-sewered sanitation have gradually converged. The clearest expression of sewered and non-sewered sanitation as complementary systems is the concept of citywide inclusive sanitation (CWIS). CWIS advocates a flexible technological approach that focuses on the integration of sewered and non-sewered sanitation solutions, depending on what is best suited to achieving safe sanitation in any particular context (Gambrill, Gilsdorf, and Kotwal 2020).

The ‘inclusive’ in CWIS not only refers to the inclusion of various technological solutions but also expresses the normative aim of equity in urban development and access to sanitation for all.

The CWIS principles are spelled out in the *Manila Principles on CWIS* and include equity; environmental and public health; a mix of technologies; comprehensive planning, monitoring, and accountability; and a mix of business models[1] (Narayan and Lüthi 2020). CWIS explicitly aims to unite the efforts and lessons learned on urban sanitation to tackle the impasse that many low- and middle-income cities face in improving their sanitation systems. Thus, the core technologies and approaches that the CWIS concept applies are not particularly new: non-sewered sanitation technologies and the service delivery framework (Schrecongost et al. 2020). At the core of integrating different technological solutions is the value chain concept. To achieve optimal organization of sanitation along the value chain, CWIS seeks a transition from the top-down and supply-driven approach of conventional sanitation to more demand-driven and bottom-up approaches that focus on the delivery of services to households by entrepreneurs in a sanitation economy (Mallory et al. 2020; Carrard, Jayathilake, and Willetts 2021; Sinharoy, Pittluck, and Clasen 2019). Since the adoption of the SDGs, CWIS has become the dominant paradigm for achieving safe urban sanitation for all by 2030 (Narayan 2022). Its explicit focus on combining sewered and non-sewered sanitation at the city scale while advocating the importance of innovative service delivery businesses makes it a potentially transformative approach in the sanitation sector, with the capability to reduce the negative effects of splintering (Lüthi, Willetts, and Hoffmann 2020). This is particularly visible in the broad support that has united behind the CWIS principles and calls to action from multilateral development banks (Gambrill, Gilsdorf, and Kotwal 2020; ADB 2021a), research institutions (Narayan and Lüthi 2020), global philanthropies (Schrecongost et al. 2020), international nongovernmental organizations (INGOs), multinational corporations, and Big Four consultants (Coates and Knezovich 2020; Couder and Kibutu 2020; Rosenboom et al. 2016).

In sum, the developments over the past four decades have continued and intensified both the promotion of sanitation as integral to sustainable development in the global development agenda and the assertion that appropriate technologies and governance models must be developed and adapted to the territorial circumstances in which they are implemented to keep pace with rapid urbanization. Throughout these developments, multilateral development banks (MDB) have emerged as central actors for providing the funding required for the investment in sanitation infrastructures in particular in low- and middle-income economies. They have provided over 15 billion USD to water and sanitation investments between 2010 and 2020 and are, next to governments' own investments the most important source of funding sanitation infrastructures (OECD 2022; Estache 2010). They have also strengthened their role as important knowledge hubs, playing a leading role in the global policy discourse on basic service provisioning (Engen and Prizzon 2018; Humphrey and Michaelowa 2013; Humphrey 2022). The important role of MDBs in finance and knowledge management combined with the central role of sanitation in the global governance discourse makes them key players for the governance of urban sanitation. This is important as sanitation is at first sight seen and often also approached as a predominantly local affair.

[1] Definition of the Manila Principles for CWIS: Equity: Everyone in an urban area – including communities marginalized by gender, social and economic reasons – benefit from equitable, affordable, and safe sanitation services. Environment and Public Health: Human waste is safely managed along the entire sanitation service chain, starting from containment to reuse and disposal. Mix of Technologies: A variety of sewered and non-sewered sanitation solutions coexist in the same city, depending on contextual appropriateness and resource recovery potential. Comprehensive Planning: Planning is inclusive and holistic with participation from all stakeholders including users and political actors – with short- and long-term vision and incremental perspective and is synergistic with other development goals. Monitoring and Accountability: Authorities operate with a clear, inclusive mandate, performance targets, monitoring requirements, human and financial resources, and accountability. Mix of Business Models: Sanitation services are deployed through a range of business models, funding sources, and financial mechanisms to reach all members equitably.

1.2.1 Social science research on urban sanitation

The diverse arrangements for the governance of urban sanitation systems and the logics along which they function have not gone unnoticed in social science research. From a social science perspective, two fields of inquiry form each a coherent discourse on urban sanitation systems. These are sustainability transition studies and urban political ecology (UPE) and each of them is briefly synthesized in the following paragraphs.

Scholars from innovation studies and sustainability transition research focus on the sociotechnical aspects of sanitation, aiming to understand why many innovations in sanitation do not scale successfully. This research so far has mainly analysed the activities through which actors pursue innovations in non-sewered sanitation and explores the challenges they face, including resource mobilization between the city and the global scale, from a neo-institutionalist perspective (van Welie et al. 2018; van Welie and Romijn 2018; van Welie, Truffer, and Yap 2019; Cherunya, Ahlborg, and Truffer 2020). Recent theoretical debates point to a critical research gap in the field and call to incorporate the increasing importance of international structures (Fuenfschilling and Binz 2018) and to put socio-technical regimes in their contested social relations, providing the sort of understanding of power and structure that is absent in much of conventional socio-technical regime conceptualizations (Haas 2019; Brand 2012). Yet to date, innovation studies and sustainability transition research do not ask whose power a regime's rules reflect most, nor question the sources of power within regimes.

In contrast, studies of sanitation in the tradition of urban political ecology (UPE) focus on uncovering distributional contention in urbanization processes and studying the power relations that create unequal access to resources in cities. UPE posits that the interdependence of environmental and social processes become most apparent in the urban, where the transformation of nature is concentrated in its physical form and in its social and ecological consequences. Therefore, the city is conceived as a 'second nature' shaped by socioecological and politicoecological relations and processes that cannot be neatly separated (Swyngedouw and Heynen 2003). Conceptually, studies of UPE are grounded in critical social theory, a postpositive understanding of nature, and an interdisciplinary mix of neo-Marxist ideas in urban geography, anthropology, and environmental justice (Cousins et al. 2019). Consequently, UPE is best understood as an interdisciplinary theoretical platform comprising a diverse set of approaches for interrogating the power- and interest-laden, interrelated social and ecological processes that occur within cities (Heynen, Kaika, and Swyngedouw 2006; Loftus, March, and Nash 2016).

UPE studies of sanitation have described various urban ecologies that have developed around particular sanitation systems in different places and at different times (Gandy 2004, 2006a, 1998). Other scholars addressing sanitation from a UPE perspective have highlighted and problematized the intersectionality of social identities and belief systems that are embedded in various sanitation infrastructures, which thus can be seen as tools of governance and sources of power regardless of their functionality (Truelove and O'Reilly 2020; Kotsila and Saravanan 2017; Nakyagaba et al. 2021; McFarlane and Silver 2017; Morales, Harris, and Öberg 2014). Furthermore, UPE studies of sanitation have underlined the need for a differentiated understanding of security as justice, dignity, and recognition, as environmental risks are unevenly distributed across urban space but can only be solved collectively because access to safe sanitation at the individual level does not imply the absence of risks from unsafe sanitation (Rusca, Alda-Vidal, and Kooy 2017; McFarlane 2019; McFarlane and Silver 2017). Finally, studies have also addressed how MDBs use their lever on finance to shape the development paths of sanitation systems at the city level (Sanchez 2019) and how speculative investment in infrastructures for basic services impacts tenure security in slums (Desai and Loftus 2013).

In sum, studies from UPE into urban sanitation underscore its political, public, and power-laden dimensions as a negotiation between citizens from different urban settlements, governments, and local and global private players. Such negotiations are mediated by diverse private and public interests that need to be addressed if the interaction of sanitation provisioning with urban inequality is to be understood in more detail. Yet, most UPE research into sanitation uses case studies that foreground the local, and the links to global processes are predominantly considered through a bottom-up approach. Such studies start from the concrete materialization of the global in particular territories of the cities studied, either through the presence of global actors such as the World Bank, multinational companies, global philanthropies, and international nongovernmental organizations or global ideals such as modernity, new public management, and integrated water resources management (Molle 2008). Thus, although UPE studies on urban sanitation integrate scalar dimensions from the local to the global, they are guided by what emerges from a particular case.

In sum, while both innovation studies and UPE research indicate the importance of addressing the global processes that shape basic service provisioning in cities as a multiscalar process, they lack the conceptual tools and theoretical foundation for doing so.

1.3 The theoretical challenge and research question

From the above discussion of the provision of sanitation in rapidly urbanizing cities, two theoretically relevant issues emerge:

First, a theoretical framework to analyse the distributive outcomes of the different technological, social, political and economic arrangements that enable access to safe sanitation is missing. With the emergence of CWIS, there is an urgent need to understand how different combinations of sanitation infrastructure (sewered vs. non-sewered) and service delivery arrangements (demand-driven vs. supply-led) lead to different distributions of costs, benefits, risks, and opportunities across space and time as well as between the different actors involved in and affected by sanitation.

Second, an analytical concept to scrutinize the multiscalar negotiation processes that shape sanitation outcomes between local and global actors is lacking. The bargaining over access to safe sanitation in the city has become a multiscalar process as negotiations over the design, financing, and implementation of sanitation infrastructures and service arrangements take place at different levels and between local and global actors. The investment in sanitation infrastructures at the city level relies on resources from the international level, in particular MDB finance, and political processes at multiple scales play important roles. However, there is limited understanding and lacking conceptualization of how deliberations by global actors influence negotiations concerning urban sanitation governance and even less addressed and theorized is the reciprocal impact, where local developments influence the global sphere.

To scrutinize the two theoretical issues, I address the following research two question in my dissertation:

> *How are investments into different sanitation infrastructures and service arrangements negotiated between local and global levels amongst an increasingly diverse range of actors and how do the resulting sanitation infrastructures and service arrangements interact with urban inequality?*

To answer the research questions, a more systematic examination of global actors and policy processes and that establish a link between local urban development and urban governance is required. Research in the field of International Political Economy (IPE) draws on a diversity of theories to analyse the complex relationships between issues of international politics, economics and global power dynamics. IPE is therefore a valuable starting point to shed light on how different forms of sanitation compete at the global level. Yet, as IPE is limited to analysing the global scale and as IPE forefronts structural conceptualizations of power, I further build upon the power cube framework (PCF) to understand how the multiscalar negotiations unfold between local and global and to understand the complex interdependencies between actors and how their vested interests have hindered access to safe sanitation in many cities for decades.

2 Literature Review

2.1 International Political Economy

International Political Economy (IPE) as a field of research emerged in the 1970s and 1980s from the recognition that processes of and in globalization can no longer be analysed by single disciplines because of the acceleration and deepening of the link between political and economic processes (Cohen 2008). As a reaction, IPE aims to break down disciplinary boundaries between politics, economics, and international relation, and increasingly diverse disciplines, including but not limited to Sociology, Geography, and Anthropology to produce an explanatory framework for understanding processes of globalization (Balmaan and Dillman 2019). Few fields of study are so lively and challenging given its wider range of orthodox and heterodox perspectives, and methodologies to grasp issues of development and conflict from an international perspective (Vivares 2020).

Structuring research in IPE is a daunting tasks as different schools of thought and styles of inquiry have developed inside IPE and each textbook makes different distinctions between them. The earliest structuration of the field differentiated between an U.S American school and a British school (Cohen 2008). More recently, the differentiation between orthodox, meaning positivist and quantitative, and a heterodox, meaning, critical and qualitative, approaches to IPE has become established (Berry 2020; Babic and Sharma 2023; Cafruny 2016). Orthodox IPE theories include realist and (neo)liberal accounts, while heterodox approaches include, structuralist and constructivist accounts (Balmaan and Dillman 2019). I follow the distinction between orthodox and heterodox approaches and first briefly introduce the orthodox field before I provide more detail on heterodox IPE on which this thesis builds upon.

2.1.1 Theories and research approaches of orthodox IPE

Orthodox IPE is rooted in critical rationalism, which holds that scientific knowledge is objective in the sense that it goes beyond to what humans individually ‘know’ and thus exists outside the human sphere, and also that truth is objective in the sense that it exists independently of social mediation or individual perception (Jäger, Horn, and Becker 2016). Its main field of inquiry is the relationship between states and between states and international organizations with regards to trade, finance, and development through addressing the international political and economic interaction to understand the behaviour of states and to identify causal relations between political and economic processes at the international level. Examples of typical orthodox IPE inquiries are the relationship between the forms of government, trade agreements and the level of foreign direct investments (Büthe and Milner 2008) or the relationship between liberalization of trade, membership in international organization ant the state of the natural environment (Spilker, Koubi, and Bernauer 2017). In considering the above relationships, orthodox

IPE makes the *ceteris paribus* assumption, which roughly means "all other conditions remaining equal," and subsequently adopts methodological individualism for the study of rational actors' behaviour as its central approach (Cafruny 2016). Therefore, orthodox IPE is less interested in the processes that shape the structures of current globalization but rather how they condition relationships between and behaviours of actors. Critics term orthodox IPE as a problem solving theory, because it takes social, political, and economic structures and basic socio-economic conditions as neutral and immutable categories and tries to *solve problems* in those given circumstances. In doing so, orthodox approaches to IPE neglect the wider implications which the structures of globalizations convey and the histories that have shaped them.

In contrast to orthodox IPE the research aspiration of my dissertation starts from the understanding that the structures under which sanitation systems are implemented are dynamic, power laden, and subject to change and that they stand in a dialectical relationship to each other. Therefore, I devote the reminder of this literature review to discuss heterodox approaches to IPE which share this central concern and provides the perspectives, theoretical approaches and analytical concepts on which I build to address my research question.

2.1.2 Theories and research approaches of heterodox IPE

Heterodox IPE is rooted in critical social science and critical realism, which holds that scientific knowledge is not objective because it implies the explicit choice of ontological position, and that 'truth' is complex and open ended in the sense that it is context and time specific (Jäger, Horn, and Becker 2016). Its theories and conceptual frameworks draw inspiration from three key thinkers, amongst others, who offer overlapping and complementary theories about how structural power shapes contemporary forms of globalization. The historical materialistic perspective in the tradition of Karl Marx is one foundational theory for heterodox IPE. This tradition holds that under current globalization capitalist modes of production prevail. Therefore it is necessary to understand global capitalism as a historically specific mode of production with place and time specific effects for economic and political processes from the local to the international level (Jäger 2020). The perspective on power as a cultural and political process, in the tradition of Antonio Gramsci, is a further foundational theory for heterodox IPE. In this tradition, hegemony at the international level, is an order within a social structure, an economic structure, and a political structure; and it cannot be simply one of these things but all three together. Thus, actors aim to establish hegemony through the universalization of ideational concepts that stabilize their preferences and interests (Talani 2016; Cox 1983). The perspective on structural power in the tradition of Susan Strange is a third foundational approach for heterodox IPE. In this tradition, the focus lies on the analysis of the *rules of globalization* engraved in four dimensions of structural power, namely security, production, finance, and knowledge. Furthermore, studying processes of globalization always concerns the distributional outcomes that are produced. In the words of Susan Strange, this makes '*cui bono?'* the key concern of IPE (Cohen 2008; Strange 1988).

As a result of its shared theoretical starting point, heterodox IPE considers a variety of actors beyond the nation state, such as multinational corporations, international organizations, and non-governmental organizations as relevant subjects of analysis and considers a broad range of global processes and discourses as issues of analysis, e.g. inequality, climate change, sustainable development etc. The principal objective of heterodox IPE lies in *problematizing* both, the observed processes or the (scientific) concepts that sustain them, as they are potentially transitory and subject to change (Cox 1981; Cafruny 2016). This means that heterodox IPE does not just aim at a better understanding of the world but also aspires to be emancipatory by contributing to social struggles and transformations which lead to a more solidaristic society (Jäger, Horn, and Becker 2016).

Based on the foundational aspects laid out above, a variety of different approaches to the international political and economic processes of globalization have emerged, which are critically influenced by the theoretical advances in (critical) social science more generally. Examples of this are Foucauldian, feminist, and post-colonial approaches to heterodox IPE. Explicitly rejecting "theoretical navel-gazing" inside the field, Berry (2020: 38) concludes that heterodox IPE is hold together by the ontological and epistemological standpoint that: "Structure matters, and agency matters. The ideational matters, and the material matters. Past practice shapes, but does not completely determine, the present. Individuals and institutions have some autonomy vis-à-vis their environment, but not complete autonomy. We can conduct research methodically, without being a slave to methodology".

The ideas of heterodox IPE shape my approach to doing research in four different aspects. Ontologically, following heterodox IPE I give priority contextualized social and historical explanations to causal ones by approaching social reality not as something that is given, but something that has been made/constructed. Epistemologically heterodox IPE demands me to reconstruct the processes under scrutiny as port of a particular social, historical and ideological context. Thereby I reject methodological individualism in favour of reconstructive approaches based on different philosophical starting points, mainly critical realism and historical materialism. Empirically, this implies that I open up the analysis of international political and economic processes under current globalization to include a variety of actors and issues. Finally, I subscribe to the aspiration of explicit normativity in heterodox IPE. This means that I am aware that any theory is always for someone and for some purpose (Cox 1981). Thus, I aim to be explicitly normative through the parallel processes of *problematization* and *emancipation* (Jäger, Horn, and Becker 2016). Problematization involves analysing existing economic and political structures by challenging prevailing norms, power relations, ideologies, and conventional knowledge and uncovering hidden assumptions. In doing so, problematization illuminates the underlying power dynamics and interests that shape global economic relations in order to explore the root causes of global inequalities, environmental degradation, and social injustices. Emancipation is the goal of liberating individuals and societies from oppressive systems by identifying pathways to greater social and environmental justice and equity, advocating for transformative change, and developing tools to challenge exploitative practices and promote social well-being.

2.2 Susan Strange's approach to IPE and its relevance to the study of sanitation

Heterodox IPE shares the key interest in structural power and how it is shaped. Susan Strange has made a decisive contribution to conceptualizing and systematically analysing structural power in heterodox IPE.

Key to Susan Strange inspired approaches in heterodox IPE is the analysis of the bargain between 'states' (i.e. the public) and 'markets' (i.e. the private) in the deliberation over public issues. A bargain, then, first encompasses the degree to which an issue is perceived as a public or private responsibility. Giving the example of sanitation, supply-led provision through the government embodies the dominance of 'states' over 'markets' while the demand-driven provision of sanitation services represents the opposite. Going further, a bargain is characterized by the social, political and economic arrangements that emerge to address the issue. Such arrangements can be scrutinized through analysing four dimensions in which structural power manifests itself (Cohen 2008; May 1996; Berry 2020). These dimensions are production, finance, security, and knowledge, which function as the underlying foundations of the international political economy (Strange 1988). Structural power confers the power to decide how things shall be done to shape the frameworks within which states relate to each other, relate to their citizens, and other actors. The relational power of each party in a relationship is more, or less, if one party is also partially

determining the surrounding structure of the relationship. Thus, a bargain then represents a relatively stable balance of structural power between actors involved in addressing a certain public issue (Balmaan and Dillman 2019). Finally, each bargain results in a particular distribution of the cost and benefits and risks and opportunities that are associated with how the public issue is addressed and thereby can describe how it interacts with inequality (Strange 1988). In sum, the dimensions of structural power encompass the central aspects that are constitutive for most public issues and policies and are therefore particularly well suited to develop a theoretical framework to analyse the distributive outcomes of different bargains that enable access to safe sanitation. In the following, I discuss the current state of heterodox IPE along the four dimensions of structural power. For each dimension I first outline its definition and provide an overview of current debates. Thereafter I describe their meaning for the provision of access to safe sanitation.

2.2.1 Security Dimension

In the security dimension, structural power lies with those who can provide or deny physical security through the protection against violence and war (Strange 1988). Thus, the deliberation over what constitutes a hazard and at what threshold it becomes a risk to the functioning of society so that it must be eliminated or reduced by the authorities is central in the security dimension. While hazards occur naturally, risks are socially constructed by humans (Davoudi 2014). The higher the perceived risk, the higher the willingness to pay to be protected (Strange 1988).

Orthodox IPE predominantly limits the security to the absence of violence and war, making the state the main provider of security. Studies in heterodox IPE contrast realist's narrow accounts of security and have studied organized crime (Hastings 2015; Ruiz Lopez 2016), terrorism (Mohan and Mawdsley 2007), and cyber security (Burkart and McCourt 2017). Beyond the investigation of a diversity of direct physical threats to security, heterodox IPE has also developed a nuanced understanding of security that offers explanatory power for dominance beyond war and violence through advancing a human-centred approach to security which rejects the state as the focus of analysis in the security structure and posits that citizens, which might be protected, should be at the centre of analysis (Kerr 2008; Silina 2016).

Expanding the conceptualization from hard security to human security highlights that threats to public health, such as unsafe sanitation is a risk to the security of societies through the threats imposed by environmental pollution and waterborne diseases (Mara et al. 2010). According to the World Health Organization, health security includes the protection against, control of and response to public health threats (WHO 2007). Similarly, the availability of adequate quantities of water of acceptable quality has a security dimension, amongst others, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability (UN Water 2013). Recognizing that public health is a security concern, that sanitation systems are the most important medical achievement of the past 200 years, and that the lack of wastewater treatment threatens health security, the orthodox IPE understanding of security that predominantly relates security to the absence of direct physical violence and war must be expanded to include the protection against individual and public health threats.

2.2.2 Production Dimension

In the production dimension, structural power lies with those who can determine what is produced and by whom and who can consume this production (Strange 1988). Structural power is thus based on the influence and control over processes of production.

Studies in heterodox IPE address the production structure by critically examining the role of foreign direct investment on the development of nations (Büthe and Milner 2008; Haftel 2010; Vukov 2020) and cities (Huang and Wei 2011) and the agreements through which they are regulated (Shadlen 2005; Wade 2003; Young 2016), indicating that they have dramatically increased the power of investors and transnational corporations (TNCs) over states (Balmaan and Dillman 2019). For TNCs in particular, studies have examined the governance in (see: Gereffi, Humphrey, and Sturgeon 2005) as well as of (see: Borras Jr et al. 2019; de Jonge 2011; Cutler and Lark 2022) their activities. For the changing role of governments in organizing production, studies have scrutinized the resurgence of protectionism and industrial policies as a means to regain some control (Nem Singh 2023; Bechtel, Bernauer, and Meyer 2012) as well as global uneven development as a result of a global capitalist economy (Fitzsimons and Starosta 2018; Taylor 2007).

With regards to access to basic service infrastructures, such as access to safe sanitation, studies in heterodox IPE that address the production structure yield important insights in two regards. First, that the dependence of societies from the Global South on the Global North for capital-intensive investments such as sanitation is to a large degree a result of the net appropriation of resources and labour from the Global South to the Global North, extracted amongst others through induced price differentials in international trade (Leander 2001). This extraction exceeds international aid as well as the estimated financial need to end poverty by magnitudes (Hickel et al. 2022; Dorninger et al. 2021). Second, the triumph of private production and service chains as the dominant form for organising production and consumption under current globalization. The three concepts of global commodity chains (GCC), global value chains (GVC) and global production networks (GPN) have been advanced to generate insights into the geographies of global production and related uneven development (Scholvin 2020). These approaches start from the observation that due to the increasing fragmentation of production across the globe, transnational chains and networks have become the world economy's backbone and central nervous system (Scholvin 2020). While the GCC and GVC approaches (Gereffi, Humphrey, and Sturgeon 2005) focus on actors directly involved in the production process, the GPN approach widens the focus to non-productive actors such as civil society, states and research institutions (Yeung and Coe 2015; Henderson et al. 2002). Both GVC and GPN approaches have been applied in more problematizing and problem-solving approaches. For example, GVC ideas and terminologies have become dominant in formulating economic upgrading policies (Ravenhill 2014) and GPN ideas have been applied to problematize how global standards such as fairtrade are re-enforcing dominant power relations (Brugger 2017).

Regarding the sanitation system, the production structure comprises the technology choices, operational business models, maintenance arrangements, and the relative importance and rewards that they give to the owner of land, labor, capital and technology. In territorial terms, sanitation systems predominantly depend on place-based, custom-built and continuous technologies such as septic tanks, sewers and treatment plants. They are, in general, land and capital intensive. Few parts in the sanitation system, predominantly pumping and advanced treatment stages, are solved by technologies produced and traded in global markets. The key difference in regards to the production structure for access to safe sanitation is the differentiation between sewered and non-sewered

infrastructures, as they are critically liked to the range of options for operational business models as well as to the capital intensity of the sanitation system.

2.2.3 Finance Dimension

In the finance dimension, structural power lies with those who are able to create credit and determine the conditions for access to or refusal of credit. Furthermore, the finance structure concerns all the factors that determine the terms in which currencies are exchanged. While capital and money can be accumulated, credit is created and thus demands the legitimacy of the creating actor to do so (Strange 1988).

Contemporary studies in heterodox IPE address the international monetary and finance structure by focusing on currencies & exchange rates (Cohen 2018; Kirshner 2008), global tax governance (Christensen and Hearson 2019), money laundering (Andreas 2004), development finance (Humphrey 2022), and the broader theme of financialization (Mader, Mertens, and Van der Zwan 2020). In the following, I limit the overview to development finance and financialization as they are relevant to sanitation.

The development of the international monetary systems for development finance is commonly synthesized in three phases. First, the Bretton Woods System, was characterized by the establishment of the international monetary fund (IMF) and the World Bank after the second world war for the reconstruction of Europe. Development was financed under a Keynesian economic idea, mainly through money creation for public investment to rebuild and strengthen war torn economies. Second, the Washington Consensus, was a coherent set of IMF, World Bank, and WTO policies starting in the 1980ies which promoted economic liberal reforms for liberalization and privatization to reduce the role of the state. Such structural adjustment programs were promoted & enforced in borrowing economies through using development finance as leverage (Babb 2013). Third, the Wall Street Consensus refers to the organization development finance around partnerships with global private finance, predominantly after 2015. The aim of this reorganization is to escort excess global (North) capital into development through enlisting the state into risk-proofing development assets and through accelerating the structural transformation of local financial systems towards market-based finance (Gabor 2021).

The broad term financialization describes an adjacent process from the 1980ies onwards in which the relevance of finance for everyday transactions and thus the importance of the finance structure vis a vis the other structure has dramatically increased (Van Treeck 2009; Epstein 2005). The study of financialization is an emerging research field which has attracted interest of researchers beyond heterodox IPE (Mader, Mertens, and Van der Zwan 2020). With regards to the issue of access to safe sanitation, work on financialized urban development and financialization of the bottom of the pyramid, through impact investing and social entrepreneurship for welfare are of relevance.

Work on financialized urban development in the global South has described how particular cities emerge as sites and objects of investment through strengthening their resilience to a diverse range of risk to remain attractive for global capital. Examples of recent studies include Dhaka (Sharma 2021), Jakarta (Colven 2022), and Brazil (Cruxên 2022). Work on the financialization of low-income households highlights how low-income household participate in the financialization of the economy and society by increasingly relying on a variety financial instruments to carry their material and cultural reproduction, including accessing basic services (Gonzalez 2020). Work on the financialization of social welfare scrutinizes how philanthropic activities make use of financial means to transform traditional ways of grant-making into a profit-oriented investment process. Donation- or grant-based transfer of funds, become investments targeted at a problem. Thus, financialized approaches to welfare aim to both

solve the problem and create profit for the capital that in many cases is part of the root causes of the addressed problem (Stolz and Lai 2020; Berndt and Wirth 2018).

With regard to sanitation, the finance dimension illustrates that investments in sanitation infrastructure are rarely borne solely by the current revenues of municipalities, cities or even national governments. The focus is therefore on the various financing models as well as on the actors that provide credit that enable borrowing for specific sanitation systems. On the other side, the finance dimension is also concerned with how covering the cost of providing access to safe sanitation is affected by the financial arrangements that enabled to set up the system at first. The different streams through which upfront investments can be covered are generally referred to as the 3Ts: (general) taxes, (cost-covering) tariffs, and transfers such as grants or donations.

2.2.4 Knowledge Dimension

In the knowledge dimension, structural power lies with those who have the authority to determine what is considered legitimate knowledge and who can create, disseminate, and use this knowledge (Strange 1988). Knowledge in this sense is understood as an umbrella term for many different things, including information, technology, and intellectual property. Information is data that people produce, share, and recombine to serve economic, cultural, and political goals (Balmaan and Dillman 2019). It is exactly this confluence of knowledge with information/data which has made the knowledge dimension the most complex and most criticized dimension (May 1996; Haggart, Henne, and Tusikov 2019).

With rapid increase in the availability and use of information through both private and public actors for various means, the relevance for addressing knowledge as a material source of power has regained prominence in IPE research. Examples of such research include the international deliberations on intellectual property rights (IPR) (Shadlen, Sampat, and Kapczynski 2020) and copyrights (Dobusch and Quack 2013), the vulnerability of companies and governments through ‘data leaks’ (Haggart, Henne, and Tusikov 2019), the regulation of the internet (Seoane and Saguier 2020), the weaponization of copyright in trade wars, increasingly diversifying means of (mass) surveillance (Wood 2013) and the threat to liberal democracies through fake news and ‘post-truth’ (Hopkin and Rosamond 2018).

Regarding sanitation, the knowledge dimension describes the deliberation over the causes of the public issue and subsequently the realm of legitimate solutions to address the identified problems. Thus, regarding sanitation, this concerns the deliberation over causes and threats posed by unsafe sanitation, optimal technologies and management schemes, and the expertise applied to evaluate the performance of sanitation systems in a certain space and at a certain point in time. With regards to the issue of access to safe sanitation and the introduced research question, knowledge and information are not as much a separate structure and are more closely related to the other structures, predominantly to the finance structure through the double role of MDBs as financiers and knowledge brokers. Exemplary of this is the World Bank, the self-declared ‘knowledge bank’ (Kramarz and Momani 2013b). International Organizations (IO), including MDBs perform a particular form of knowledge production and dissemination. Their dominant role in the global context and their multilateral backing gives them a particular legitimacy to socialize states. This means that IOs and MDBs help shape what a state is, what it wants and what it does (Littoz-Monnet 2017). A key means by which IOs and MDBs, together with epistemic communities influence the role of the state in development is through developing popularizing and maintaining paradigmatic policies (Molle 2008; Broad 2006; Cormier and Manger 2021; Haas 1992)

2.2.5 Research gap IPE

In the review of IPE, I have discussed the variety of issues and diversity of concepts which have been developed in its heterodox strand. By organizing the overview of the field along the four dimensions of structural power proposed by Susan Strange, I have shown that these remain relevant and useful categories for analysing the bargaining over public issues such as access to safe sanitation today.

However, the literature review also indicates a key shortcoming. The dimensions of structural power are predominantly treated monolithically. Thus, one dimension is placed in the foreground, while the others are either not treated or are relegated to the background. This is partly due to the fact that territorial processes do not play a major role in Susan Strange's conceptual framework: the conceptualization of the dimensions of structural power and the bargain is not very sensitive to the spatial realities where the different dimensions of structural power overlap and interact with each other. Furthermore, the lacking sensitivity to territorial processes results in the inability to describe or explain how bargaining occurs between local and global levels and in different arenas for decision making. While the literature review shows that there are more territorial sensitive concepts, such as the global production network, there is no conceptual framework that adopts a synoptic approach to the dimensions of structural power and a framework to understand multiscalar deliberations over the rules of globalization is lacking. Empirically, this neglect of territorial processes is also evident in the preference for the global financial system or global consumption and production processes. In contrast, questions of infrastructure and especially basic services in general and sanitation in particular have not yet been prominently addressed in the field of heterodox IPE. However, the explication and analysis of the territorial dimension is central to understanding the implications for collective action of different (interest) groups in the context of the globalizing competition over investment in urban development (Crevoisier and Rime 2021; Crevoisier 2011). In the case of sanitation, this means that how investment in sanitation occurs is a space and time sensitive issue. Territory in this sense is understood as the matrix resulting from various historically contingent intentions and appropriations in which actors negotiate and on which they imprint (Crevoisier 2004).

In sum, there remains both an empirical and conceptual gap in heterodox IPE. Empirically, the concept of structural power from Susan Strange have not yet been applied to the study of infrastructures for basic services and in particular sanitation. Conceptually, there is still a gap when it comes to understanding how the different dimensions of structural power jointly shape the ‘rules of globalization’ as a territorial process.

2.3 The power cube framework

In search for an analytical concept that allows to scrutinize the multiscalar negotiation processes that shape sanitation outcomes between local and global actors, orthodox IPE is not well suited. While Susan Strange asks "Who writes the rules of globalization?" and ensures that her analytical framework is not blind to the different agency of the various actors involved, her approach and research in her tradition has rather addressed what the rules of globalization are. Thus, the processes of writing the rules have received scant attention. Outside of IPE, numerous ideas and theories on power, structure and agency have emerged and are discussed in the academic literature.

An overview of the academic debate on power, structure and agency is beyond the scope of my dissertation, but most would agree that the powerful rarely give up their power easily and therefore change is often associated with conflict and power struggles (Hayward and Lukes 2008). The power cube framework (PCF), developed by John Gaventa (2007) provides an opportune starting point to connect different approaches to power for analyzing societal decision-making. The core proposition of the PCF is that power is not constant for any actor but depends on the situation and issue at stake. These can be explored from three analytical points of view: levels, spaces, and forms. In doing so, the PCF enables to approach the negotiation over investments in concrete sanitation infrastructure and the stipulation of service delivery arrangements through different policies as a process shaped by interest groups, each with different access to power.

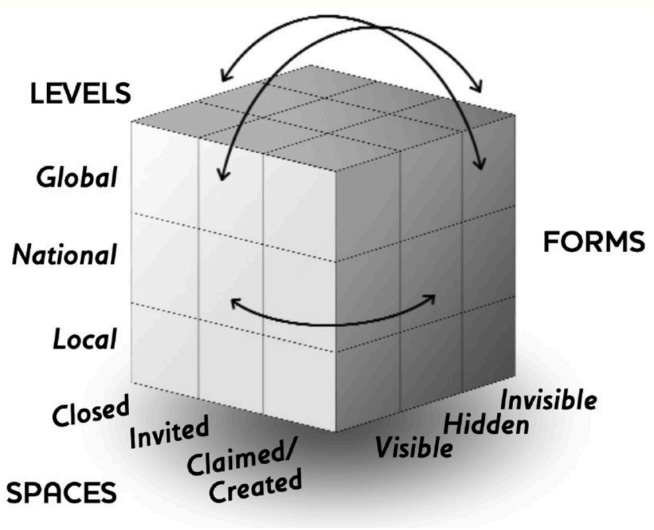


Figure 1: Analytical dimensions of the power cube framework (Gaventa 2006).

The PCF *levels* describe the geographical scales of the main actors and moments in decision-making processes, ranging from local to global. The levels take account of the fact that power operates at all levels, from the global to the local, and that different actors at each level influence power dynamics differently. Examples of the global level are the deliberations over the formulation of SDG6 and the debates whether water and sanitation should be treated as a stand-alone SDG. Linked to that but a deliberation more at the national level is the formulation of national development plans to achieve SDG6. The intervention of a local government together with an NGO to provide public toilets on a large scale and their consideration of the extent to which their project can meet both the needs of the local community and the objectives of the government is an example of a more local level.

The PCF *spaces* describe how arenas for participation and decision-making are socially constructed, focusing particularly on the rules and rights of access to them. Claimed spaces are opened up by subordinate actor groups through claiming a seat at the decision-making table or through forcing powerful actors to sit down and deliberate with them. This often takes the form of strikes and protests but to give an example of sanitation it can also be more subtle through pilot projects for decentralized treatment of fecal sludge that expand into grey zones of regulation. By going beyond what regulation covers, authorities are forced to enter into an exchange about the proportionality of the regulation. Invited spaces are established by various rule setting authorities through inviting a diverse range of actors and interests to participate in decision making. An example for sanitation is the consultation of a new

law, ordinance or policy amongst either the leading actors in the sector or the general public. Closed spaces are exclusive to decision-making by elites, meaning that decisions take place behind closed doors in companies board rooms or inside government departments. An example for sanitation is the bilateral negotiation over tariff increases as part of an MDB financed investment program into water and sanitation infrastructure. In sum, analyzing power dynamics requires understanding how these spaces are created and who has access to them.

The PCF *forms* describe how power struggles are expressed in decision-making processes. The it addresses how openly or consciously power manifests itself and categorizes it as visible, hidden and invisible. Visible power operates in formal decision-making arenas, where grievances can be articulated and participants engage freely. Hidden power involves controlling access to decision-making, limiting alternative choices, and setting biased rules, often occurring in organizational or group contexts. Invisible power shapes psychological and ideological boundaries, influencing individuals' beliefs and self-perception, often through processes of socialization and culture. An example of invisible forms of power that is prominently discussed in sanitation are the cultural taboos and preconception regarding sanitation behaviors that are often seen to hinder progress.

In sum, the PCF challenges static categorizations in power analysis and emphasizes the dynamic and changing nature of power relationships. In the following methodology section, I lay out how I developed both, the synoptic approach to structural power as well as a framework to analyze multiscalar decision making based on the concepts introduced in the literature review.

3 Methodology of the dissertation

3.1 Analyzing stability and change in sanitation from a territorial perspective

My dissertation centres on access to safe sanitation in urban areas as a public issue and how the provision of sanitation affects inequality. Looking at the dominant debates on how access to safe sanitation ought to be provided, the impression grows that a single solution to the public issue has been achieved: vast sewer networks and centralized treatment plants, operated by autonomous or privatized utilities. Yet, looking at the frontiers, where no access to safe sanitation is yet provided, and looking back into the history of how access to safe sanitation has been provided also shows that the public issue of sanitation has been solved through different technological and societal arrangements in different places at different times. Understanding how access to safe sanitation is provided and how SDG 6.2. can be achieved, therefore, is space and time contingent and needs to account for the mechanisms of stability and change. This is not meant as a trivial statement but it demands me to develop a methodology that is sensitive to the territorial dimension and to the evolution over time. Both IPE and the PCF, which I introduced in the previous chapter, do not provide this sensitivity to address the aspects outlined above: the stability and the space for change in the technological as well as socio-territorial arrangements that can provide access to safe sanitation.

To understand stability, I build on IPE theory to describe a typology of *ideal-type sanitation bargains* and how they perpetuate structural power, which ultimately makes a bargain stable. The sanitation bargains comprise both the technological solutions as well as the organizational and socio-territorial arrangements that are needed to make them function. As ideal-types, the sanitation bargains are generic and not space-time sensitive. From a territorial perspective, (non-)functioning sanitation infrastructures and services and the presence of water-borne pollution and disease are the place-specific materialization of bargains. They make visible how risks and opportunities, and

costs and benefits for (un)safe sanitation are distributed across the city and between different actors in a certain situation.

To understand change, I build on the concept of the power cube to describe the *policy pathways framework (PPF)* to understand how policies evolve and are capable to impact on how the sanitation sector changes. The PPF comprises the levels and spaces from the power cube framework to describe how power manifests in bargaining processes. Adding a temporal sensitivity to enable process tracing, the PPF further describes the generic stages through which policies evolve from inception to design and legitimation and finally rollout. While the PPF framework stays generic, it posits that spatial scales (the levels) as well as the temporal aspects are relevant for understanding bargaining over policies. From a territorial perspective, the PPF emphasizes that how, where, and when different actors and actor groups translate between generic sanitation bargains and concrete investment projects is crucial to how change in sanitation provision occurs at the city level. This enables to understand the situations in which one sanitation bargain takes precedence over others.

This counter position of stability and change from a territorial perspective is the main theme of my dissertation and shapes its research design, which is visualized in Figure 2. I operationalize this counter position through focusing on multilateral development banks. They are a key actor for understanding the stabilization of globally dominant sanitation bargains as well es the deliberation over sanitation (investment) projects at the city scale through their double role as key knowledge broker and lenders. Compared to other actors such as for example governments or (I)NGOs they are active and leading simultaneously in financing investments in sanitation infrastructures and in deliberating how sanitation ought to be provided for all across the globe. Governments might provide more funds and set the rules in their country, but their territorial reach is limited. NGOs or philanthropic lenders such as the Bill and Melinda Gates Foundation might be globally active and more outspoken then MDBs but their financial resources are but a fraction of that of the MDBs. This said, I put a special focus on MDBs without neglecting other actors and their agency.

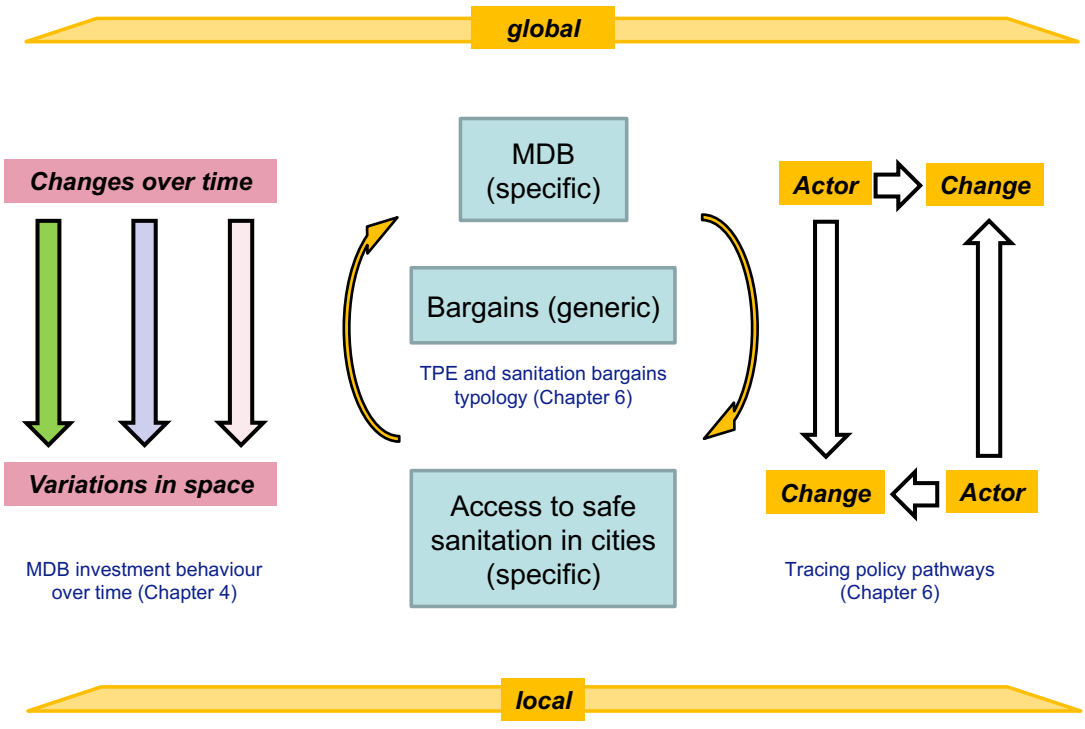


Figure 2: Methodology of the dissertation and the connection between Chapters 2-4. Own elaboration

Together, the space and time contingency of sanitation infrastructures and service delivery, and the focus on MDBs allow to address the territorial deliberation over access to sanitation in cities. In the following I describe for each Chapter how it contributes to the understanding of stability and change in the provision of access to safe sanitation.

Chapter 4 scrutinizes the investment behaviour of MDBs by analysing the technical and social arrangements that have been financed by MDBs and how this has varied between MDBs as well as across space and time. Taking a long-term perspective from 1960 until 2020 and a global scope it shows when periods of stability and moments of change occur. Chapter 5 addresses the processes at play in negotiating sanitation arrangements between local, national, and global actors through focusing on one particular city (Dhaka, Bangladesh) to show how the effective provision of sanitation results from continuous negotiation and change. Taking a multiscalar approach, the study is not limited to the downward translation of 'global' sanitation bargains to the city level, but it also scrutinizes both successful and failed ways in which local experiences have been translated to the global arena. Chapter 6 develops the conceptual five *ideal typical sanitation bargains*. By showing how each sanitation bargain is characterized by particular distributions of structural power, it highlights aspects of stability that arise as actors build, establish and stabilize their interests at the expense of others.

3.2 Complementarity of the chapters

The research of my dissertation addresses the public issue of sanitation that relates to a very broad range of actors, from MDBs to NGOs to governments, and covers a rather long period of time and considers access to safe sanitation in the Global North as well as in the South. As it is impossible to study the entirety of the public issue of sanitation, I have deliberately chosen specific situations (actors, space, time-span) and observed them with different methods (quantitative-qualitative content analysis, case study, theory development). In the following I provide a condensed overview of the methods of each chapter to thereafter explicate how they are different but complementary with regards to the situations observed and methods applied.

3.2.1 Overview of the methods of each chapter

Chapter 4 is based on a quantitative-qualitative analysis of MDBs investment in urban sanitation over time and across world regions. The method centres on a comprehensive text analysis of project appraisal documents (PAD) available in the open-source repositories of the World Bank, the African Development Bank, and the Asian Development Bank. For the data collection, a novel dataset was constructed through qualitatively coding 2435 PADs and by translating the coding into 40 variables that characterize the dataset. The coding scheme applied was developed against the backdrop of the ongoing theorization of the sanitation bargains typology and the information available in the PADs. Taken together, the resulting 40 variables describe the metadata needed to understand stability and change over space and time as well as the technological, territorial, financial, and institutional arrangements that were perpetuated through the MDBs investment projects. The analysis of the data focuses on gaining a long term and global perspective on MDBs investment behaviour in water and sanitation. This is achieved through the quantitative-descriptive analysis of the dataset in R.

Chapter 5 is based on a case-centric process tracing study of Dhaka's water and sanitation sector between 1990-2020. The method combines process tracing with the Power Cube Framework (PCF) to develop the policy pathways framework (PPF). The PPF is a tool to analyse how policies are negotiated over time between local and global actors in different decision making spaces. It suggests that any policy process encounters the four phase

inception, design, legitimation and rollout and that understanding where and under which circumstances they take place is crucial for understanding the outcomes. In doing so, it complements the PCF with a temporal dimension, making it more suitable for scientific analysis. The data was collected together with the International Centre for Diarrheal Disease Research in Bangladesh (icddr,b), primarily through 30 key informant interviews between November and December 2021. The additional data collection included a comprehensive analysis of policy documents and studies as well as a comprehensive analysis of local, national and international actors active in the water and sanitation sector in Dhaka. The analysis focused on understanding the changes in Dhaka's water and sanitation sector as a result of multiscalar negotiations. To this end, the insights gained from the analysis were visualized through the policy pathways framework. This representation crystallizes the parallel presence of top-down and bottom up processes in the deliberation over water and sanitation investments in Dhaka as well as the stabilization of sanitation bargains locally and globally.

The method of Chapter 6 centres on theory development and operationalization through the iterative development of the sanitation bargains typology based on the bargains concept as proposed by Susan Strange (1988). The data was collected in a series of 18 expert interviews which were conducted between September 2018 and July 2022, predominantly with senior experts in sanitation research and policy and with senior staff at utilities. In addition to interviews, a document analysis of key policy reports, seminal research on sanitation systems, and descriptions of the historical development of the sanitation sector was carried out. The data was analysed in an iterative manner that oscillated between theory and data driven typology building and discussions of their accuracy and relevance in the entire U-STASIS consortium. The resulting sanitation bargains typology describes generic sanitation systems as ideal types.

3.2.2 Complementarity of situations observed and methods applied

As I have shown above, the situations observed and the methods applied vary between each Chapter. Yet, my dissertation does not follow a coherent 'mixed methods' design. Rather, I have selected the different situations which I observed and methods that I applied in order to generate an approach of understanding stability and change in the provision of access to safe sanitation: this approach centres on embracing specific (case study) and generic (ideal types & quantitative descriptive analysis) accounts and on building on the explanatory potential of structure (sanitation bargains) and agency (policy pathways framework) centred approaches through addressing different combinations of them in analysing different situations.

3.2.3 Complementarity of the situations observed

The selected situations I observe throughout the chapters of the dissertation vary with regards to the actors whose activities are studied, the places and spaces that are researched, and the time-span for which the analysis aims to provide explanations.

With regards to actors, Chapter 4 is focused on the three MDBs World Bank, AfDB, and ADB and studies their investment behaviour; Chapter 5 includes all actors that are involved in Dhaka's water and sanitation sector; and Chapter 6 adopts a generic understanding of actors as actor types, thereby focusing on their common features rather than scrutinizing specific behaviours or activities of particular actors.

With regards to space, Chapter 4 adopts a global perspective to understand different trends in water and sanitation investments between countries and world regions; Chapter 5 focuses on the local context of Dhaka but addresses

how other places affect Dhaka's water and sanitation sector through multiscalar policy pathways; and Chapter 6 addresses space more conceptually through discussing how the different sanitation bargains distribute costs and benefits and risks and opportunities across space and time.

With regards to time, Chapter 4 takes a long term perspective of 60 years; Chapter 5 takes a short to medium term perspective of 30 years; and Chapter 6 does not aim to analyse a particular moment in time. Rather, the temporality lies in the stabilizing elements in the bargains, such as for example in the different the sunk costs and thus planning horizons of different sanitation infrastructures.

3.2.4 Complementarity of the methods applied

The selected methods I apply throughout the chapters of the dissertation vary with regards to the data collected, the analytical tools used, and the visual representation of the analytical outputs.

With regards to data, Chapter 4 focuses in depth on one particular type of text document: project appraisal documents of MDBs; Chapter 5 centres on expert interviews and complements them through a detailed analysis of reports that describe key actors of Dhaka's water and sanitation sector as well as their activities; Chapter 6; relies on a combination of expert interviews with key texts from scientific literature and policy reports.

With regards to analysis, Chapter 4 combines deductive qualitative coding to describe MDBs investment behaviour with quantitative-descriptive analysis of the investment behaviour of the studied MDBs; Chapter 5 follows and outcome explaining case study analysis to explain why in Dhaka 100% access to safe water supply stands against 0% access to safe sanitation; Chapter 6 develops the territorial political economy framework to describe five different sanitation bargains.

With regards to representation, Chapter 4 produces charts that visualize differences over time and between MDBs; Chapter 5 produces a figure that enables to map policy pathways to provide a simplified overview of the complex territorial entanglements of the bargaining processes studied; Chapter 6 produces a generic compass, based on the sanitation bargains, along which sanitation systems are oriented together with a table that describe the common features of the ideal types.

3.3 Shaping an engaged approach to knowledge creation & application

This chapter describes my learning process and how I developed and refined an engaged approach to research over the course of my dissertation. This engaged approach to research influenced both my knowledge creation and the application of the knowledge I gained. In retrospect, two aspects weave through my dissertation as a read thread. First that knowledge generation and application belong together and second that both of them should aspire to bring about social change towards more socio-ecologically just societies.

In my master's thesis, I examined how the understanding of Fairtrade, and thus the implementation of its rules and regulations, is shaped by various translations that stabilize the interests of powerful actors. A key personal learning was the idea of 'power as translation' which I described based on the ideas of Bruno Latour. Basically, this means that the impulse of a command arises not only from the power of the sender but also from the possibility of a self-serving translation by the recipient. Interested to understand more about how power relations and translations shape globalization I started my PhD journey.

I applied to a PhD position to study 'global socio-technical regimes in the water sector' under the GLORIWA project at EAWAG. The initial idea of the project focused on conceptualizing socio-technical regimes as 'global'. In this regard, my PhD should contribute to specifying transition studies' socio-technical regime concept territorially sensitive through analysing how certain design principles gain dominance in international arenas, and assessing how global regime rationalities diffuse in space. In my first PhD proposal submitted to Eawag in March 2019, I aspired to connect my personal interest in power and translation as well as societal change with the research projects interest in socio-technical systems and sustainability transitions. The overarching research question I aimed to address read "How is the global socio technical regime in sanitation structured and how does it influence radical change in local contexts around the world?" Power at that stage of my studies was conceived as the position in the global actor structure and global discourse network but also as the perpetuation of interests and thus a political concept. The main learnings of the first 6 months of my PhD concerned topics that were completely new to me: Sanitation, innovation studies, socio-technical ideas, and sustainability transition ideas. In retrospect it was a phase of extended reading that opened doors to approaches to research so far less known to me.

Despite the accepted research proposal at Eawag, confidence in me as a potentially successful PhD student was withdrawn in June 2019 after working 9 months for my PhD. In the course of the dispute, and even more so in retrospect, I realized that I was fighting for more independence. When I realized that I would rather fail in my own dissertation than successfully carry out the doctorate my superiors administered for me, I decided to resign from my position at Eawag. Subsequently, I prepared an application for new funding for my research as well as for the funding of an innovation project as a plan B. Luckily, both applications were successful, allowing but also demanding me to constantly meander between knowledge generation and knowledge application from the summer 2020 onwards.

The way I conduct research and thus generate knowledge was critically changed through the development and funding of the U-STASIS research project. It allowed me to have resources to continue my PhD research and required me to find my own profile with regards to empirics, theory, and collaboration. Empirically, I narrowed down the focus on urban sanitation, as it is concerned with a societal challenge of handling wastes that concerns the entire society that goes beyond the sale of a consumption good as is the case in (sustainable) electricity or water provision. Conceptually, I re-centred my focus on power, politics and competing interests from a territorial perspective. Therefore, I escaped from the field of sustainability transition studies and fully embraced the IPE approach based on Susan Strange, intrigued to ponder the questions 'who writes the rules of globalization and who benefits from them'. Yet, I was weary of not getting lost in endless debates about the true nature of power. Therefore, I put the PCF more centre stage. Both of the frameworks, IPE and PCF put the conflict of the distribution of costs, benefits, risks, and opportunities centre stage in the deliberation over public issues. With regard to collaboration, U-STASIS demanded me to strengthen the interdisciplinary aspects of my work. Although this was a mandatory requirement for the funding, it corresponded to my personal interest and how I believe knowledge should be created.

In the following I lay out how the three aspects – empirical, conceptual, and collaborative – shape my engaged approach to knowledge creation by reflecting on the research process that led to each chapter.

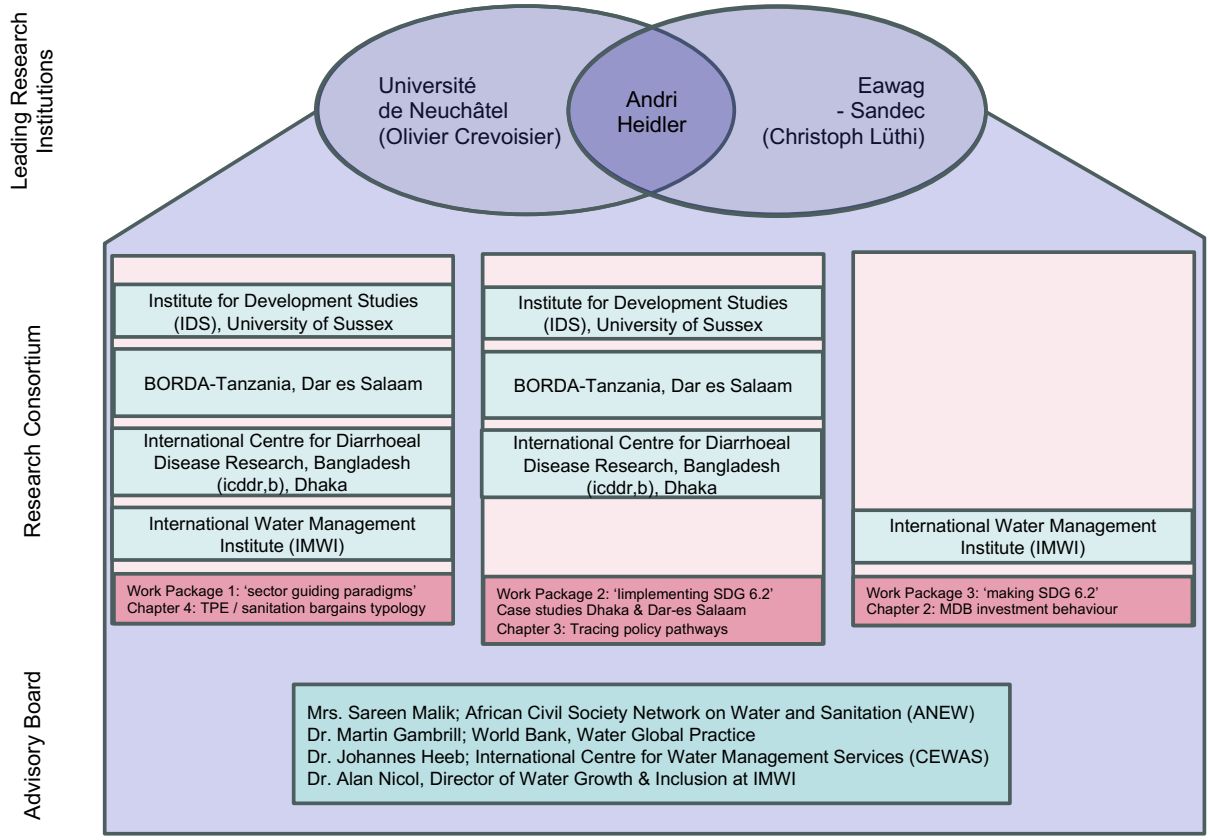


Figure 3: Overview of the U-STASIS research project. Own elaboration.

3.3.1 MDB investment behaviour over time (Chapter 4)

The initial idea to analyse large quantities of text data was rooted in the GLORIWA project. Empirically, the aim of GLRORIWA was to apply social network analysis to existing databases of newspaper articles. Yet, I was sceptical about the usefulness of newspaper articles as adequate data sources to address questions centring on basic service provision in sanitation. This is generally not a topic widely debated in the general news.

The research ambition to gain a long-term perspective on the development of the sanitation sector has remained in the transition to the U-STASIS project. The data was adapted to the new empirical focus and consisted of MDB's project appraisal documents. To find a suitable methodological approach, I visited a course at ETH, I organised a workshop with the geocomputation research group of Prof. Ross Purves at the University of Zürich, I exchanged with PhD students in the SusTec department at ETH who are applying natural language processing (NLP) to understand multilateral finance. As a result, I rejected the idea of a fully automated and quantitative text analysis because of insufficient consistency between project documents of the different MDBs studied (data quality) and lacking ready-to-use tools.

The study also entered new conceptual grounds. The aspiration was to use the sanitation bargains concept to structure the qualitative coding scheme. This meant that there was no longer a template to follow and thus the conception of the research was a continuous and interactive process between the conceptual aspirations and the available information in the data. The successful execution of this time consuming qualitative-quantitative analysis was only possible because of a successful collaboration with IWMI. The funds available enabled to hire three

research interns as well as the collaboration of two scientific staff from IWMI. As the research design was rather innovative, the success of its execution was critically affected by the co-creation of the analytical framework between me and Muhil Nesi, who initially was hired as a research intern for data collection. This successful collaboration is reflected both in her co-authorship and in her further scientific path, in which I supported her in successfully applying for a PhD position at Eawag.

3.3.2 Multiscalar policy pathways (Chapter 5)

The focus in the case studies planned under GLORIWA was to trace how (structural) power materializes when urban water and sanitation infrastructure projects are implemented. Thereby, emphasis was put on the dominance of centralized network infrastructures understood as the global socio-technical regime in water and sanitation. In the change from the GLORIWA to the U-STASIS project, the case studies were newly conceived to first focus only on sanitation and, therein, on the 'competition' between sewered and non-sewered solutions to achieve SDG6.2. The second change was the focus on MDBs. This new empirical focus led to five selection criteria through which Dhaka was selected as one of two case studies: Adoption after 2015 (SDGs); MDB involvement; network and non-network arrangements included; executed in a rapidly growing primary city; considerable amount invested in sanitation (at least 30% of total investment sum). Dar es Salaam was selected as the second case study, which was carried out as part of the U-STASIS research project but does not form a part of my dissertation.

Conceptually, the research aimed at developing a power sensitive approach to processes of change at the societal level, while maintaining the territorial sensitivity as outlined under GLORIWA. To this end it was crucial to advance the power cube framework to make it more sensitive to space and time through the development of the policy pathways framework.

Regarding collaboration, conducting research in Dhaka – together with icddr,b – was a daunting task. Mainly because at the outset of the U-STASIS project, the COVID-19 pandemic struck Bangladesh and for long it was not clear if and in what constellation in person interviewing would even be possible. As a reaction to these circumstances as well as to broaden and deepen the joint understanding of the conceptual aspirations of the research project I carried out a series of online workshops with the entire research consortium of U-STASIS I (see figure 2 for an overview). For the workshops, I developed tasks which in turn were carried out by icddr,b and discussed in various constellations of the U-STASIS research team. The first workshops centred on identifying and describing the different sanitation systems present in Dhaka through conceptualizing them as sanitation bargains. The second workshop centred on mapping all actors with relevance to sanitation and describing their role in each bargain. And the third workshop focused on compiling the sanitation histories, i.e. key moments / developments of the sanitation system in the past 150 years. Each workshop also resulted in bilateral exchanges to clarify the tasks against intermediary insights gained by the team. Altogether, the series of workshops resulted a concise overview of the infrastructural systems, actors, and policies. Against the backdrop of this vast and length preparation, I joined icddr,b for 5 weeks of field work (Nov-Dec 2021), during which we conducted 30 key informant interviews. Interviews were carried out together with Sharmin Khan Louis and Abul Kamal. Organizing the interviews and gaining access to the key informants was a major challenge. We therefore developed the following strategy. I approached the potential interviewees and introduced the research project, sending along a two-page summary. Since there was often no response, Sharmin called to see if there was no interest or if the message had been overlooked. For some interviews, this process went back and forth several times, and correspondence was exclusively through the assistant. For the interview situation itself, Sharmin would facilitate

the introduction between the interviewee and us, including informing the interviewee about how the information of the interview will be handled and signing the consent form. I would lead the discussion, supported by Sharmin and Abul who took extensive notes. After the interview and back in the icddr,b office we compiled interview summaries together, which helped to discuss points that were maybe not yet clear as well as to identify important topics to be addressed in future interviews. Finally, a workshop at icddr,b concluded fieldwork and underscored that a saturation point in regards to the interviewed stakeholders as well as the obtained information was reached. The transcripts and interview summaries were coded in NVivo according to a deductive coding scheme. Sharmin, Abul and me all coded 1/3 of the interviews with some overlap to guarantee cross coder reliability. The writing of the manuscript was led by me with the co-authors providing feedback on different draft versions of the manuscript. To reflect on the application of the power cube, two workshops with John Gaventa were carried out.

From this very intensive fieldwork and collaboration there are three key insights which I want to underscore here. First, five weeks of fieldwork are very short and if it was not for the extensive preparation and very engaged support, it would not have been enough by far. Second, developing the policy pathways framework (PPF) and the ambition to disentangle the powerful, interest laden and thus political dimensions of the development of Dhaka's sanitation sector was challenging. I realized that problematization is problematic in itself: In the writing process I became intimidated about how to describe the roles, competing interests, and neglects of the key stakeholders for Dhaka's water and sanitation sector that we have interviewed and studied. Even anonymizing, I felt, will not cover the identities of the key individual studied, particularly for those where the institution is described. Knowing the central roles of some actors and individuals that we have researched in Dhaka, and the clientelist and increasingly authoritarian rule in Bangladesh, I was afraid to hamper the possibilities of my team for at least their career development. Even having the full-fledged support of my co-authors for the written descriptions of our joint analysis could not cover over the realization that I will never feel any negative consequences of our joint problematizations. Therefore, the identification of generic features from the case became crucial towards the end of the collaboration, scientifically and emotionally. The policy pathways framework as an emancipatory tool should support local actors to problematize to a degree that they themselves feel comfortable to challenge dominant actors and interests. Problematizing the inherent contradictions in the enterprise and utility bargains underscores the structural aspects of the struggles beyond Dhaka. In doing so, the analysis does less problematize specific actors for how they safeguard their interest but in turn reflects on the activities of these actors as a result of the structures that make them act and thereby problematizes actors that work towards reinforcing these structures more generally and in places beyond Dhaka. Third, I learned a lot about what I can offer in a collaboration beyond my contribution to the effective execution of the joint activities, primarily career development of my collaborators. From the outset of the collaboration, I supported the Co-PI at icddr,b in obtaining a PhD position through providing feedback on application letters and research proposal ideas as well as suggesting options for PhD positions. Even though it is not a position I suggested, he successfully started his PhD in February 2022. On the other hand and from the same intention to support where I can, I tried my best to support another key collaborator in getting a chance to visit Eawag and Switzerland but ultimately, I had to realise that it was beyond the resources I or the U-STASIS project had and unfortunately no exchange scheme existed that would enable a visit without much extra administrative work. What I take from all these experiences is that sometimes very small support from different people, even not directly observable, can lead to positive impacts, while ambitious support risks to create high expectations that cannot be met.

3.3.3 Territorial Political Economy and sanitation bargains typology (Chapter 6)

The fourth chapter develops the concept of the territorial political economy (TPE), which to an extent can be seen as the result of the need to develop a conceptual agenda independent from the idea of the socio-technical regime that was able to explain stability. The first typology I developed under GLORIWA was termed "institutional logics in the urban sanitation infrastructure sector" and carried a rather apolitical understanding of institutions. The second typology I developed for the U-STASIS proposal and was termed "sector guiding paradigms" which was already based on Susan Strange's political concept of four dimensions of structural power. The third typology I developed for the submission of a first version of the chapter to Water Alternatives was termed "Global development patterns of the sanitation sector" and gave priority to temporal development over typology building. The article's rejection and the reviewers' feedback prompted me to revisit the idea of ideal types for two reasons: to avoid inadvertently raising the notion of a teleological understanding of time and space and to become more sensitive to the different histories of sanitation systems in the Global North and South.

To operationalize the TPE framework I focused solely on the empirical case of urban sanitation, which was needed to ensure that the concept is both theoretically sound and applicable. Yet, taking up the idea of ideal types, the aspiration was that the typology is useful for sensemaking in any city around the world.

Regarding collaboration, the development of several typologies reflects an emancipatory move away from my PhD starting point under the GLORIWA project – which is visible in the small but consistent changes in each version: towards an understanding of stability through the perpetuation of interests. The third version was already created as part of the U-STASIS project and clearly distinguishes itself from the earlier works as it centres on the four dimensions of power and the notion of the bargain, as proposed by Susan Strange, at their core. The final version of the typology strongly benefited from the successful transdisciplinary collaboration in the U-STASIS project. U-STASIS comprised representatives from academia in sociology, planning studies, public health, and anthropology with NGOs who came from backgrounds in social work, planning, and engineering. I took a central role in planning, coordinating, and executing the U-STASIS project, which enabled but also forced me to collaborate with research institutes and local partners for each chapter of the thesis. The collaboration for Chapter 6, therefore, started for me when I had to reach out and convince the collaborators to participate in a research endeavour focusing on structural power at a global level and through four dimensions to understand the different sanitation systems in (their) cities. I feel honoured, and I am glad and happy for the very positive, pragmatic and open-minded exchanges that the U-STSIS project enabled me to experience. Thus, even though Chapter 6 is a single-author publication, it is strongly influenced by all that I have learned and understood throughout the U-STASIS project and in particular through the exchanges with the diverse perspectives that it brought together.

3.3.4 Overall reflections

The need to develop and apply a novel conceptual framework to understand urban sanitation certainly arose from the distinct PhD journey I took. Emancipating myself from my first PhD position and applying for funding demanded that I distinguish myself from what I had previously learned. At times it was daunting and I felt and was told that I was inventing the wheel anew. But more challenging was that with developing an entire theoretical framework came the pitfalls of theory development, which in my case were: is this a theory of everything? Is it a self-fulfilling prophecy? Is it a circular argument? Is it sensitive enough to space and time? Can it handle the colonial legacy of urban development and of sanitation infrastructures? And so on…

Reflecting on collaboration, the congregated need to communicate to different audiences and the need to distinguish myself from GLORIWA proved a useful breeding ground for new theoretical ideas and frameworks. Theorising for and with the U-STSIS research consortium and throughout all U-STASIS related activities certainly also suited my personal preferences. It felt rewarding to co-create a framework that showed the possibility to generate a shared understanding between the different individuals and organisations that came together under U-STASIS. This made theory development practice and action oriented and the TPE framework less a theory and more a framework.

In sum, the construction of knowledge in my dissertation critically depended on the means available (both financial resources and the network of the involved individuals and organizations in the U-STASIS project) and my role in connecting the all aspects of the research project. Thus, under U-STASIS, research was less focused on unveiling the truth, but as a process of building a joint understanding of the current state of the public issue of sanitation from a territorial political economy perspective.

3.3.5 VaLoo: Plan B and site for applying and testing knowledge from the PhD

In parallel to the above described research process I have been and still am engaged in a project and now association named VaLoo (www.va-loo.ch). VaLoo is the acronym for 'to create value from what ends up in the loo'. The association represents the network of pioneers (cooperatives, entrepreneurs, researchers and NGOs) that develop and implement resource oriented sanitation solutions in Switzerland. The establishment of the association was a two-part process. On the one hand, the voluntary engagement of now above 80 individual and institutional members and on the other hand the enabling project funded through the Migros Pioneer Funds (MPF). I have been involved in both since their outset in early 2020.

The main reason for my involvement was that after quitting my PhD position under GLORIWA, I needed a plan B in case the SNIS funding for the U-STASIS project would not work out. To this end I decided to make use of what I have learned in my 9 months of PhD on sanitation and innovation studies. Together with three colleagues and with tough challenging from the MPF we developed the project that enabled the professional set up of the VaLoo association through external funding. The process started in February 2020 with the first ideas between me and a friend of mine who is co-founder of a mobile composting toilet rental company. Thereafter we submitted a 2 page description of what we aspire to do to the MPF in May 2020. This was followed by a two-minute video pitch in June 2020. After the successful passing of these two steps, a third colleague whom I got to know at Eawag joined our team and the scope of the project was widened according to her interests and capabilities. Together, we submitted a one-page business canvas to describe how we aim to achieve impact with the funded activities in September 2020. Until February 2021, we developed a detailed four-page project proposal. After this step, a fourth colleague joined the project. The final step to be funded was the joint development of a detailed target matrix for the three years of the duration of the funding from August 2021 to August 2024.

The structure of the project reflects key learnings from my experiences at Eawag and from what I had read about innovation and societal change. The project centres on the four pillars Association, Collaboration, Advocacy, and Outreach. The pillar Association aims to establish an industrial association / network for water and nutrients circular economy (i.e. circular sanitation) in Switzerland. The pillar Collaboration aims to enable collaboration between research, government administration and start-ups but also collaboration between potentially competing members of the network. Because many of the hurdles of the network's member have to be addressed jointly,

based on synergies. The pillar Advocacy is exemplary for the need to collaborate. The Advocacy pillar aims to establish an enabling regulatory environment for closing water and nutrient cycles from wastewater / sanitation. Finally the Outreach pillar centres on popularizing the topic of resource oriented sanitation in the sustainability discourse and the create awareness for the potential of water and nutrient circular economy.

My engagement in the project initially varied between 15-30% over the time of the U-STASIS project but has increased since its termination in November 2022 and thus also the end of my PhD salary. Although the workload was almost unbearable at times, the need to quickly shift between analytical work for research and analytical work for 'practice' was very inspiring in both directions. I often called VaLoo my hidden case study, and I certainly benefitted from the many exchanges with practitioners for non-network sanitation solutions in Switzerland. For example, for the compilation and testing of the sanitation bargains typology, it was very useful to identify common features in non-sewered sanitation in Switzerland in comparison to Dar-es Salaam and Dhaka. This added to the robustness of the generic typology, as I had more concrete cases I observed in reality from which I could draw in finding the generic features. Furthermore, my in-depth understanding of the challenges of non-sewered sanitation in Switzerland critically increased my legitimacy amongst technical / engineering actors in fieldwork and served as a pragmatic link in interviews, where I could highlight that similar questions are being debated currently in Switzerland and that I am involved in these processes. On the other hand, VaLoo also served as a testing field for the concepts I developed under the PhD. For example by applying the policy pathways framework for strategizing our involvement in the deliberations over Swiss policies of relevance regulating the recycling of nutrients from pee & poo in Switzerland. In sum, while I ventured into the VaLoo process with what I learned in my 9 months under the GLORIWA project, I have continuously refined VaLoo's activities towards becoming more and more sensitive to power and political processes and less technocratic, just as I have done in my research.

3.3.6 Reflection on the entirety of my PhD journey

In sum, the PhD process was more than producing a manuscript, more than producing three publications, more than communicating about the work we did in U-STASIS. It was all of this together but also a way to engage in life and the world around me. This engaged approach to research is also reflected by what I have generated beyond the pure academic outputs which the U-STASIS project has produced. The video that is still under production or the blog post on onewater.org are rather classical science communication outputs. But the fact that from each collaboration, including the work in Dar-es Salaam that is not reflected in the PhD manuscript, one member of the team advanced his or her career, at least partially through my involvement is the less classical aspect of (international) scientific collaboration which has become dear to me. Because I would not have successfully completed my PhD without these very fruitful collaborations, I am very grateful that I could eventually contribute to the journeys of my collaborators: Give some, take some, learn together, grow together.

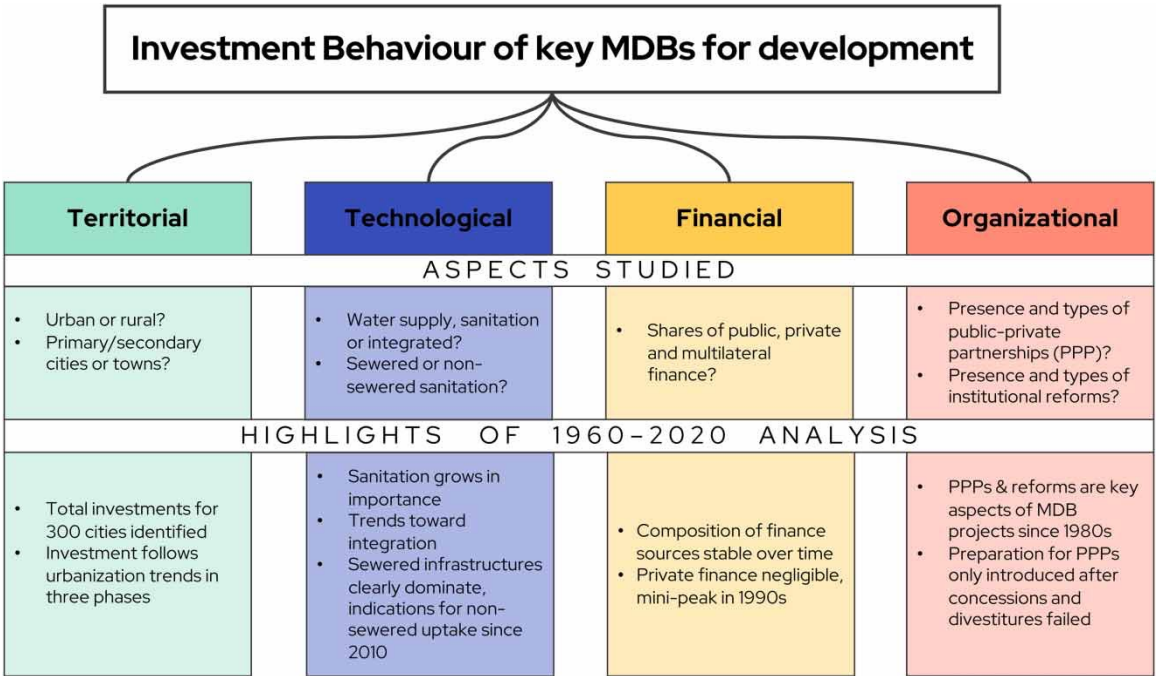
4 MDB investment behaviour in water and sanitation

Published as Heidler, A., Nesi, M., Nikiema, J. Lüthi, C. Multilateral development banks investment behaviour in water and sanitation: Findings and lessons from 60 years of investment projects in Africa and Asia. *International Journal of Water, Sanitation, and Hygiene for Development.*

Abstract

Multilateral development banks (MDBs) play a pivotal role in financing water and sanitation infrastructure projects and thus have a major impact on the development of basic services. Although information about the MDBs' investments is publicly available, it is dispersed and not easily comparable. A comprehensive compilation of MDBs' water and sanitation investments has long been lacking. To address this gap, we assess water and sanitation financing by the three MDBs most relevant to Africa and Asia between 1960 and 2020: the World Bank, the African Development Bank, and the Asian Development Bank. We compile a new dataset by drawing on 3639 water and sanitation projects and assess territorial trends, technology choices, distribution of financial burdens, and reforms to institutional arrangements. We find that MDBs' investments align with changing patterns of urbanization and increasingly finance sanitation infrastructures including non-sewered technologies. However, our results also suggest that institutional reforms have addressed utility efficiency through investment in equipment and skills rather than through increased commercialisation and private sector participation. The leverage effect of MDB investment on private financing is negligible, whereas co-financing from local governments dominates.

Graphical Abstract



4.1 Introduction

By 2050, more than two-thirds of the world's population will live in urban areas. Africa and Asia are urbanizing fastest and will be home to more than 70% of the urban population by then (UN 2019). With accelerating rates of urbanization, the demand for basic infrastructures and services in water supply and sanitation is growing rapidly. In 2015, it was estimated that achieving Sustainable Development Goal 6 (SDG6) globally by 2030 requires new investments valued at US$ 1,700 billion, of which urban infrastructures for achieving SDGs 6.1 & 6.2 amount to US$ 350 billion (Hutton and Varughese 2016).

The political and scientific debates about where these funds should come from, how best to allocate them, and what infrastructures and institutional reforms to aim for have changed significantly in recent decades. How investments in water supply and sanitation respond to urbanization trends and policy debates will strongly influence the development trajectories of these cities and countries (Hutton, Haller, and Bartram 2007).

For low- and middle-income countries, multilateral development banks (MDBs), such as the World Bank, Asian Development Bank (ADB), and African Development Bank (AfDB) are by far the most important multilateral lenders, amounting to an approximate share of 15% of total investments, compared to 75% for governments and maximally 5% for private investments (Estache 2010). MDBs provided over US$15 billion for water and sanitation infrastructure investments between 2010 and 2020 (OECD 2022). Due to their broad mandates and their role as 'knowledge banks' (Kramarz and Momani 2013a), MDBs also act as knowledge brokers for infrastructural and institutional arrangements that decide how to best provide access to safe water supply and sanitation (Engen and Prizzon 2018). Despite the key role attributed to MDBs in financing access to water and sanitation, little is known about their investment behaviour: the territorial, technological, financial and organizational characteristics of their investment projects. Although MDBs do report on their investments, the aggregated data does not lend itself to more detailed analysis. The international Organisation for Economic Co-operation and Development (OECD) official development aid (ODA) data cover MDBs, but the information with which MDBs' investment behaviour can be understood is incomplete. Research and MDBs' own analyses of water and sanitation financing are rare and limited in the technological, temporal, and institutional aspects studied, probably due to the challenge of obtaining accurate project-level data (El Khanji 2021). Quantitative analyses examining the financing of water supply and sanitation showed that financing capital investment projects is by far the most important approach and that multilateral agencies are the dominant institutions (Winpenny et al. 2016), the institutional reform aspects typically prevail and non-sewered technologies are only marginally financed (Hutchings et al. 2018).

We assess the investment behaviour of the World Bank, ADB, and AfDB in water supply and sanitation from their first operations in the 1960s until 2020 and distil how they responded to trends in urbanization and the policy debates about governing access to basic services. The study draws on a newly constructed dataset of 2449 investments drawn from the analysis of 3639 projects. We operationalize investment behaviour by capturing key determinants of sanitation policies in the territorial, technological, financial, and organizational dimensions.

In the territorial dimension, urbanization driven by population growth and global migration has decisively changed the ecological and social conditions of human settlements over the last 50 years. Whereas in the global North the peak of population growth was reached between the 1960s and 1980s, more heterogeneous growth patterns can be observed in emerging economies, reflecting the inherent change in sociospatial structures and increasing economic polarization between urban and rural areas (Carlucci et al. 2020). Water and sanitation infrastructure differ

significantly between urban and rural contexts in both cost and technology (Hutton and Varughese 2016). Since the adoption of the Millennium Development Goals (MDG) in 2000, progress in access to safe water supply and sanitation has been disaggregated between urban and rural (Bain et al. 2018; Bain et al. 2014). We expect MDB's investment to develop as follows:

H1a: The proportion of projects addressing urban water supply and sanitation is higher than the proportion of projects addressing to rural water supply and sanitation.

H1b Primary cities receive the lion's share of MDB investment projects with smaller amounts assigned to secondary cities and towns.

In the technological dimension, research has shown that water supply on average receives substantially more investment than sanitation, and large systems comprise over 80% of investment. Yet the disaggregation between large and small systems can be misleading as both urban and rural are mixed in small systems (Winpenny et al. 2016). The dominant urban sanitation solution has been sewered systems with centralized treatment throughout the 20th century and into the 21st (Nilsson 2016). More recent research has highlighted that sewered infrastructure is unsuitable for many cities of the global South because they are heavily dependent on large amounts of fresh water, require high investment and operating costs, are inflexible and thus demand long planning horizons (Reymond, Renggli, and Lüthi 2016; Schrecongost et al. 2020; Schertenleib et al. 2021). As an alternative, the newly developed concept of citywide inclusive sanitation (CWIS) proposes a flexible technological approach that focuses on the integration of sewered and non-sewered sanitation solutions at the city scale (Gambrill, Gilsdorf, and Kotwal 2020). The core of integrating sewered and non-sewered technologies is the sanitation service chain concept, which unbundles conventional sanitation into five functional groups that need to be provided to achieve safely managed sanitation: containment, emptying, transport, treatment, and disposal or reuse (BMGF 2010; Trémolet, Evans, and Schaub-Jones 2010; Tilley et al. 2008). We expect technological preferences to change as follows:

H2a: Water supply initially receives substantially more funding than sanitation. The gap becomes smaller over time.

H2b: Sewered sanitation is the dominant technology throughout the 20th century, and non-sewered sanitation solutions gain prominence after the year of sanitation in 2008.

In the financial dimension, research and policy have emphasized the need to increase investment in water and sanitation to achieve SDG6 (Hutton and Varughese 2016), yet the roles of various funding sources are debated. Some see a diminishing capacity of public finance and advocate that blended finance fills the gap by mobilizing private finance backed by MDB investments (Goksu et al. 2019; Goksu et al. 2017). Others indicate the lack of evidence for and poor track record of private finance at scale in the water and sanitation sector (Kolker, Kingdom, and Trémolet 2016; Hall and Lobina 2006), predominantly because of its poor risk–return profile (Alaerts 2019); they argue that the role of public banks has been underestimated by research and policy (McDonald, Marois, and Spronk 2021). Whereas public funds make up over 60% of non-household contributions to water supply and sanitation (UN Water 2019), there is little quantitative data on the relative importance of co-financing of public and private funds in multilateral investments to help understand the respective leverage effects of multilateral finance. We expect financing to shift as follows:

H3: With decreasing availability of public sector funding, we expect a tendency towards an increasing relevance of private and other non-public sources of funds.

In the organizational dimension, the discourse on the provision of public services evolved since the 1950s in three main phases, from public administration through new public management to new public governance, leading to a succession of actors at the core of the institutional arrangements (Mumssen, Saltiel, and Kingdom 2018). Under the public administration approach, government agencies aimed to provide water and sanitation services to the entire population through a centralized network infrastructure to which all households were connected by managing it as a monopoly (Mumssen, Saltiel, and Kingdom 2018). Under the new public management paradigm, ring-fenced, autonomous, and ideally private utilities replaced governments in managing natural monopolies (Cruxên 2022, 2021) along commercial principles (Bakker 2003; Hall, Lobina, and Terhorst 2013). Households paid for services through tariffs that were expected to cover the entire cost of operation, maintenance, and investment (François, Correljé, and Groenewegen 2010; Abeysuriya, Mitchell, and Willetts 2005). Initial subsidies and public funds were phased out and replaced by private credit to the utility, by public–private partnerships (PPPs) and even full divestiture (Finger and Allouche 2002; Marques 2016). In the sanitation sector, new public governance is reflected in the organization of sanitation as a service chain along which enterprises offer sanitation services (Schaub-Jones 2011; Diener et al. 2014; Orner and Mihelcic 2018) in a market environment (Couder and Kibutu 2020; Mallory et al. 2020) to meet households' demand (Mara et al. 2010). Reforms under new public governance focus on creating demand amongst households, stipulating an enabling environment for the sanitation economy, and regulating the emerging service providers (IWA 2021; WSUP 2020). Whereas some see this development as logical steps towards efficient water and sanitation services (Goksu et al. 2017; Kolker, Kingdom, and Trémolet 2016), for others it is emblematic of the tendency of MDBs to push for economic liberalization, leading primarily to the depoliticization of basic service provision rather than expanding access (Chwieroth 2008; Sanchez 2019; Bigger and Webber 2020).We expect organizational arrangements to develop as follows:

H4a: Institutional reform components appear in the 1980s and follow the 'maturity ladder'.

H4b: The use of PPPs increases over time.

4.2 Methods

Datasets available from MDBs and the OECD lack information to describe MDBs' investment behaviour in detail. Therefore, this study draws on a newly constructed dataset compiled from project appraisal documents derived from the open-source repositories of the MDBs. It is based on all investment projects with possible relevance to water and sanitation[2], irrespective of financial instruments and subsectors as defined by MDBs (*World Bank N = 1587, ADB N = 1692, and AfDB N = 484*). While cleaning the dataset, 1204 projects were excluded. Reasons for exclusion were duplication or cancellation, pure technical assistance, or a focus on water related activities not linked to SDG 6.1 or 6.2, such as irrigation and integrated water resources management. For the remaining 2435 entries (*World Bank N = 1181, ADB N = 879, and AfDB N = 375*), we coded 40 variables in 4 sets to operationalize the dimensions of investment behaviour by analysing project appraisal documents and online project summaries[3].

[2] For a detailed comparison between the information reported by MDBs and OECD and details on data collection see Annex 1: Data.

[3] For details on all variables refer to Annex 2: MDB variables overview.

To outline the territorial dimension and understand how MDB investments respond to urbanization trends, we describe whether investment projects are implemented in urban or rural contexts and differentiate between primary and secondary cities. To provide detail on the technological dimension, we differentiate between investments in water and sanitation infrastructure. For sanitation, we further differentiate between sewered and non-sewered technologies, and for non-sewered, we specify the type of technologies that are financed by grouping them along the sanitation service chain. To capture the financial dimension, we code the contributions of public, private, and multilateral investors. To provide detail on the institutional dimension, we record whether an investment project promoted PPPs or implemented a specific PPP arrangement. Furthermore, for the World Bank's urban water and sanitation projects, we code each institutional reform component along the World Bank's 'maturity ladder for the urban water sector' (Goksu et al. 2019: 32) and the emerging regulatory frameworks for CWIS (WSUP 2020; IWA 2021) separately. The dataset was analysed using R.[4]

4.3 Results and Discussion

Regarding H1a we find that investment projects in urban water and sanitation comprised 67% of the projects between 1960 and 2020. Projects that relate to both urban and rural contexts are mostly national and regional projects accounting for 15% of projects since the 1970ies. The territorial focus underwent three phases (Figure 1a). In the first phase, between 1960 and 1980, urban investments in primary cities dominated, and rural investments were nearly absent. The 1980s and 1990s were marked by a rural turnaround, in which the importance of investment in rural water supply and sanitation projects increased significantly. At its peak at the end of the 1990s, more than 30% of the investment projects approved focused solely on rural areas. The third phase after 2000 supports H1b, the trend reversed and investments in urban areas gained importance, increasingly in secondary cities. These phases correspond well with the demographic trends in the recipient countries. At the beginning of this period investments targeted the capital cities and the main postcolonial economic centres (see figure 1b). During the rural turn, the newly independent governments aimed to expand access to basic services for all with the support of multi- and bilateral agencies as part of a general attempt to slow rural–urban migration and address areas with poor populations (Schertenleib et al. 2021). The post-2000 urban turn coincided with accelerating urbanization patterns in the global South, where secondary cities and towns became more important (Carlucci et al. 2020; UN Habitat 2022). The projects that relate to both urban and rural contexts are mostly national and regional projects that originated in the 1970s and whose relative importance remained stable at around 15% of projects since then.

[4] All relevant data are available at Eawag's online open data repository ERIC: https://doi.org/10.25678/0008DA

Figure 4: Changes in territorial focus of MDB investment projects over time. Comparing investments in urban and rural context (a) and in primary and secondary cities (b) between 1960 and 2020

The studied investment projects differ in the range of activities and infrastructure financed. We refer to them as sectors and distinguish between pure water supply (*N = 463*), pure sanitation (*N = 210*), and the integration of water supply and sanitation (*N = 656*). In addition, other activities such as waste management, roads and transport, and slum rehabilitation are increasingly linked to investments in water supply and/or sanitation across the period. Such projects are marked with a +: Water + (*N = 376*), Sanitation + (*N = 156*) and Water and Sanitation + (*N = 574*).

Regarding H2a we find that investments in water supply have become relatively less important than those in sanitation over the past 60 years. Until 1980, water supply accounted for more than 70% of investments; after 1990, this proportion fell to less than 50%. Pure water supply projects accounted for more than 50% between 1960 and 1980, whereas pure sanitation projects have never accounted for more than 20% of total projects. The integration of water supply with sanitation as well as with other activities has become the predominant practice since 1980. Whereas in 1980 the proportion of integrated projects was 25%, by 2020 it had grown to 50% (Figure 2A). The World Bank was a pioneer in integrating projects (Figure 2B). Since 1980, integration with other activities (+) has accounted for 20–40% of World Bank projects. In contrast, the ADB (Figure 2C) and AfDB (Figure 2D) focused on pure water supply or sanitation projects until 1990, and followed this with a rapid change towards integrating projects. This trend corresponds well with important policy developments. The International Decade for Drinking Water Supply and Sanitation between 1980 and 1990, which treated water supply and sanitation equally as human rights, led among other things to a better understanding of the impact of improved water and sanitation on health and as an entry point to economic development. This led to a widespread perception of them both as integral to economic development policies thereafter (Najlis and Edwards 1991; Schertenleib et al. 2021)

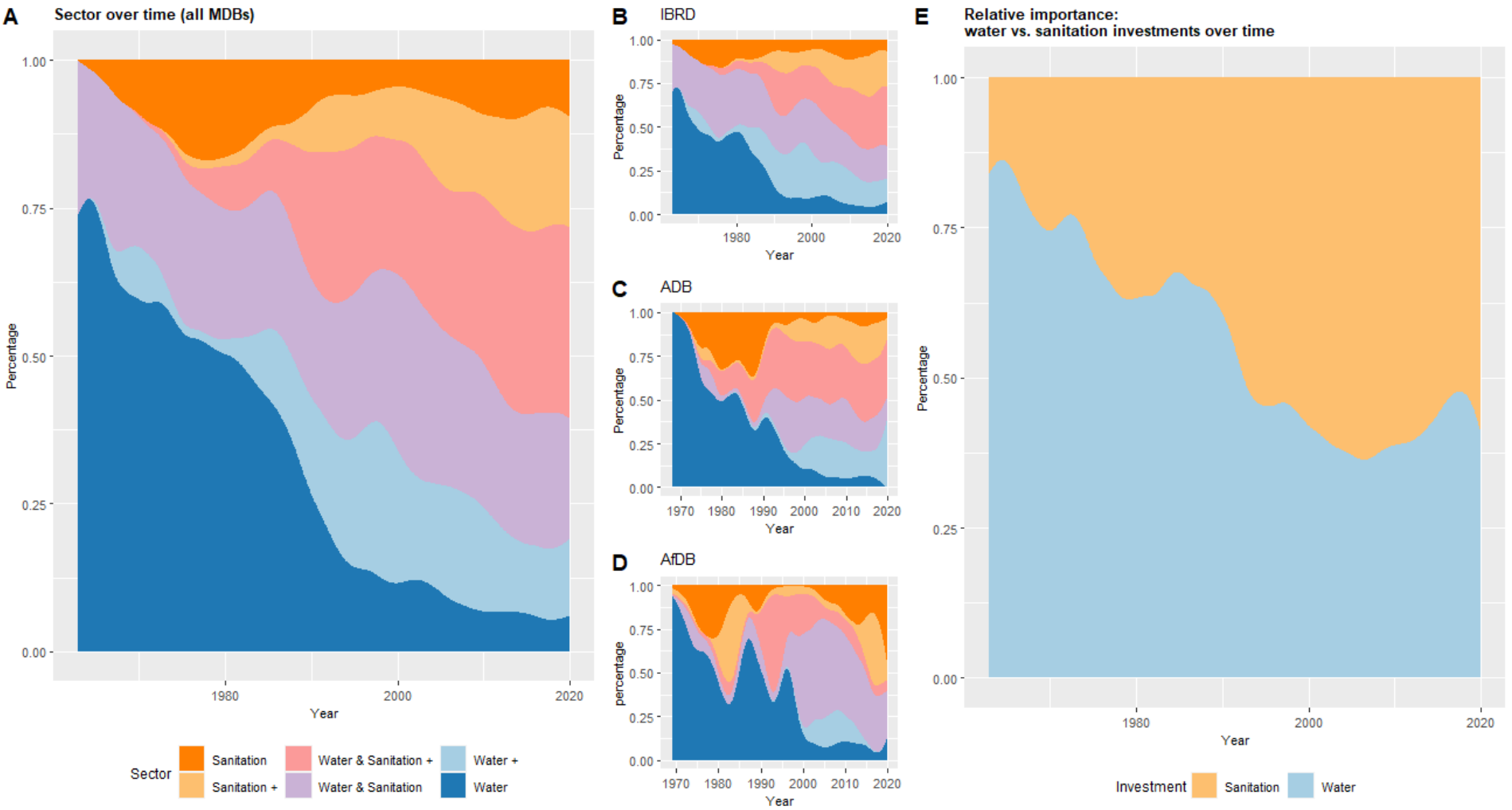


Figure 5: changing priorities between water supply and sanitation sectors over time. Figures 1A-D refer to number of projects per sector. Figure 1E is the relative proportion invested in water supply versus sanitation infrastructures. For pure water supply and pure sanitation, the amounts represent total investments. For integrated projects, the amounts have been derived from project documents.

Regarding H2b we find that investments in drains and conventional sewers are sanitation technologies that most frequently received investment. Out of the 138 World Bank projects analysed, 134 had an infrastructure component. Of these, 105 were purely network infrastructure such as sewerage and wastewater treatment plants, 6 were purely non-sewered technologies, and 19 projects invested in both (Figure 3). Non-sewered sanitation is significantly less important throughout the period, but there are two mini-peaks, one in the 1980s and one after 2008, with the most common investment being in containment technology. The first peak occurs in the Water and Sanitation Decade and coincides with the discussion of low-cost sanitation technologies promoted by the World Bank's Water and Sanitation Program (Kennedy-Walker et al. 2014; Kalbermatten et al. 1982). The second peak follows the International Year of Sanitation in 2008 and coincides with the establishment of the sanitation service chain concept (Tilley et al. 2008), which was adopted and promoted by the World Bank and the Bill and Melinda Gates Foundation (Trémolet, Evans, and Schaub-Jones 2010). Since 2010, non-sewered sanitation has become more common in urban contexts, but its adoption in World Bank investments is only a fraction of conventional sewers and WWTPs.

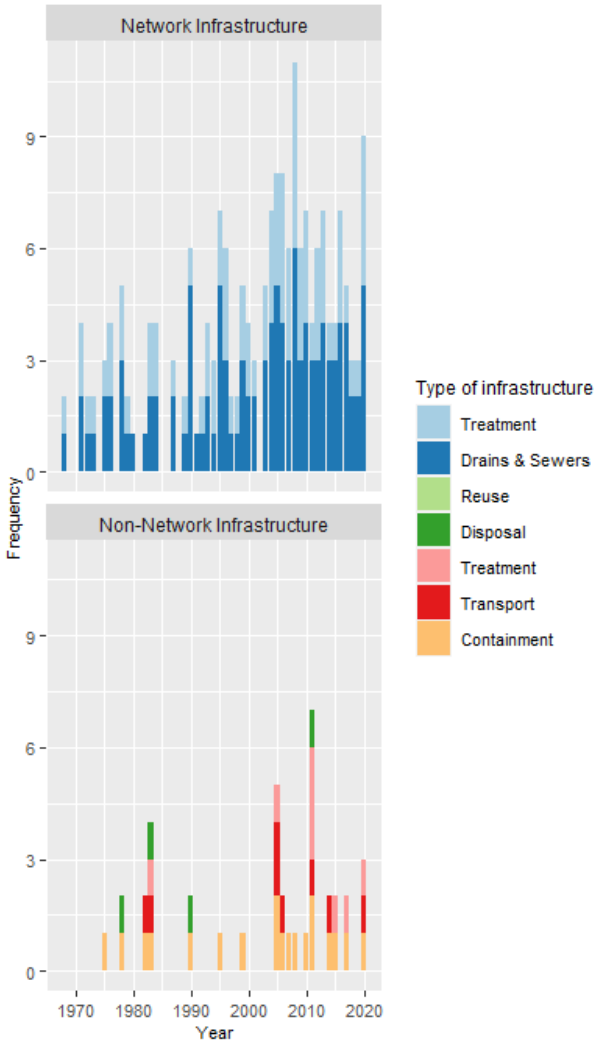


Figure 6: Sanitation technologies over time in the World Bank's urban water and sanitation projects (N = 134)

Regarding H3 we find that the composition of sponsors has neither changed significantly over time (4A) nor does it significantly differ between MDBs (4B). MDBs and governments are by far the most important investors. As MDBs' investments are predominantly loans that governments have to repay, public investments account for over 80%. Government funding becomes relatively less important between 1980 and 2000. These are mainly replaced by multi- and bilateral funding and less by private finance. Overall, private finance accounts for less than 5% of the investments. This balance does not correspond well with the main policy developments. Since 1990, numerous reports, above all those promoted by the World Bank and the OECD, have called for greater private finance investments in water and sanitation infrastructure while delegitimizing the role of public finance (Briscoe and Garn 1995; Goksu et al. 2017; OECD 2019). On the contrary, our observations indicate that if this discourse has had any effect at all, it has been to reduce public investment in water supply and sanitation (Bayliss and McKinley 2007; Castro 2008; McDonald, Marois, and Spronk 2021).

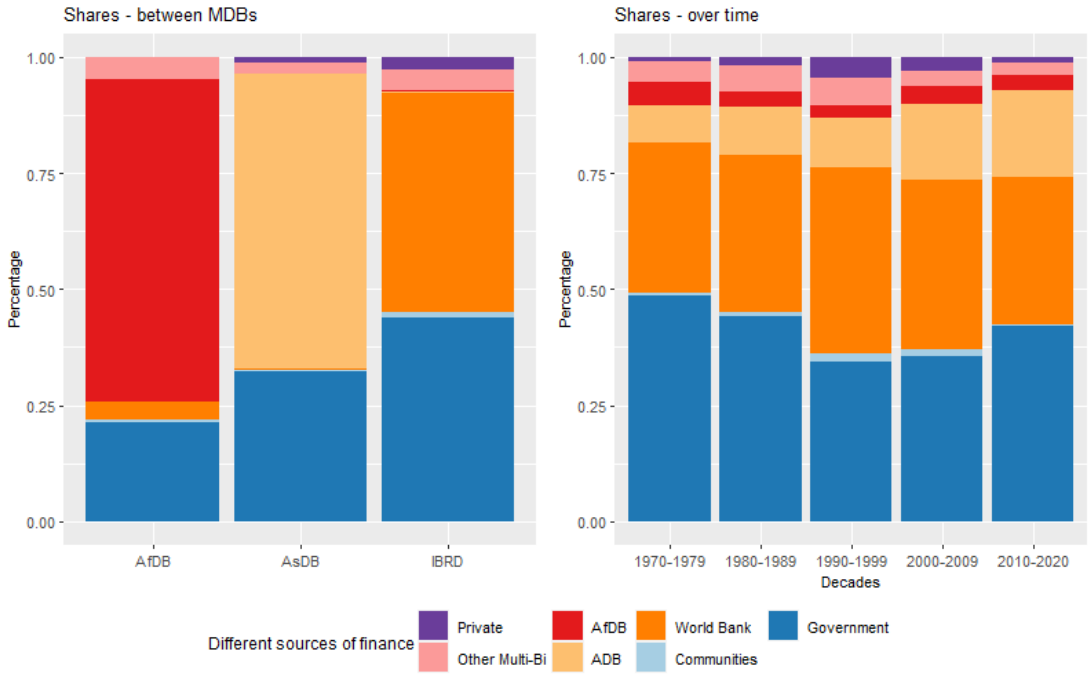


Figure 7: Total investments for water supply and sanitation disaggregated between sponsors

Regarding H4a we find that investments in organizations, institutional reforms and the introduction of PPPs have become core aspects of MDB projects in water supply and sanitation, especially since 1980. We analyse reform components along the World Bank's 'maturity ladder for the urban water sector' (Mumssen, Saltiel, and Kingdom 2018) and find a clear difference between the first two steps of the ladder and the others (Figure 5A & 5B). 'Battling inefficiencies' and 'capacity building' cannot be understood as institutional reforms per se but are attempts to make organizations more efficient through technical improvements and building on human capital. In contrast, steps 3-5 are institutional reforms attempting to attract greater private sector participation as a means of potentially further improving the efficiency and accountability of utilities. Capacity building is the most important institutional reform component throughout the analysed timeline, whereas the others seem to follow a temporal sequence along the maturity ladder.

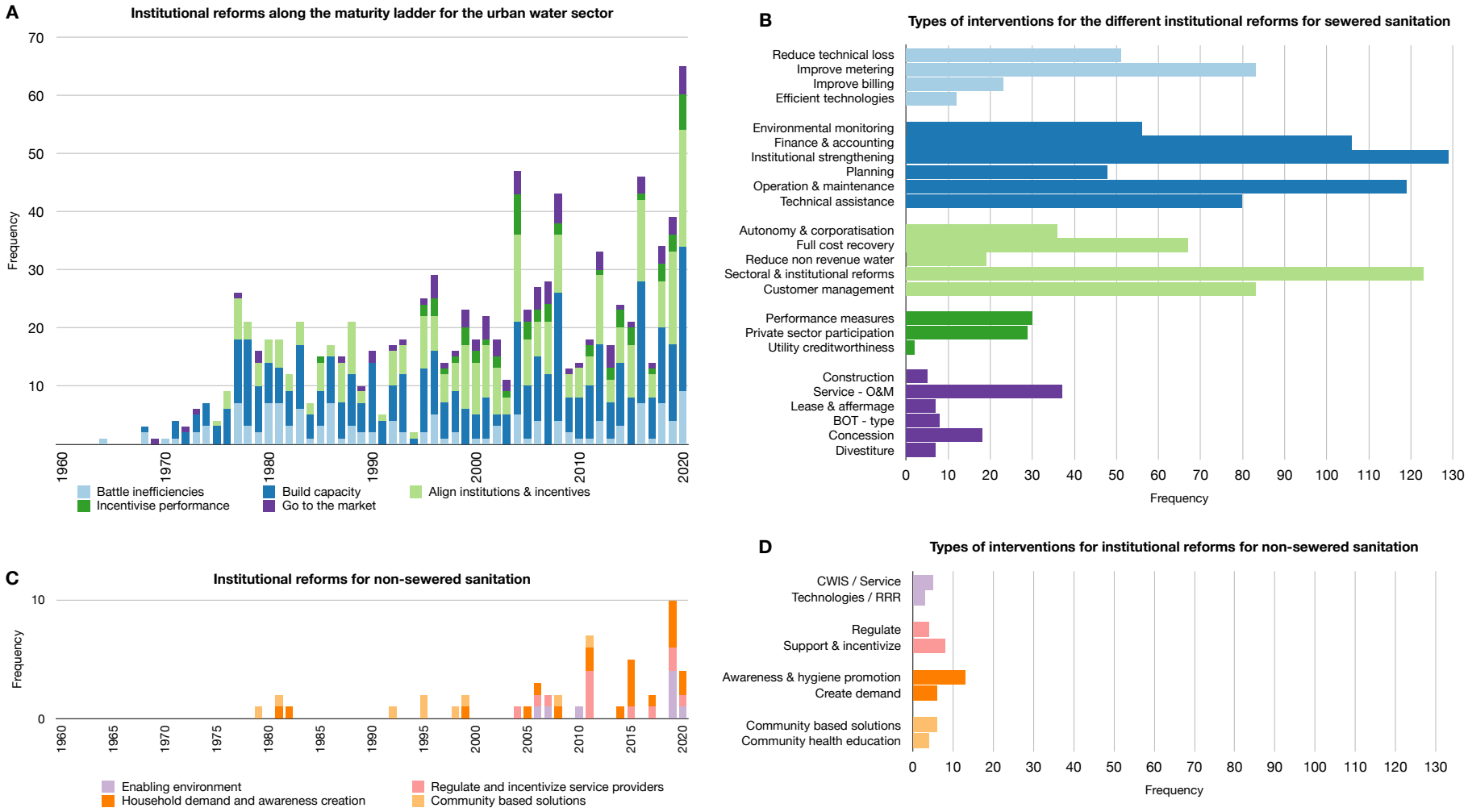


Figure 8: Institutional reforms for sewered sanitation (A & B) and non-sewered sanitation (B & C), differentiated over time (A & C) and between different interventions (B & D) in World Bank water supply and sanitation investment projects from 1960 until 2020.

Regarding H4b we find that promotion and preparation for the introduction of PPPs and the implementation of specific PPP arrangements in MDB-financed investment projects increase rapidly after 1990. Counterintuitively, specific PPPs were sporadic but dominant until 1995, yet preparation for them was absent. From 1995 onwards, both promotion and implementation rapidly became more important, while Figure 6A suggests that promotion lagged behind implementation. Although PPPs in water supply emerged somewhat earlier than PPPs in sanitation, there is no significant difference between the two sectors. However, as most utilities provide both water supply and sanitation, projects that seek PPPs for water supply and sanitation together prevail. A second trend concerns the distribution of risks within PPPs. In the 1980s and early 1990s, PPPs where private actors bear all or most of the risk, such as concessions and divestments, dominate. From 2000 onwards, PPPs where the risks are borne by governments proliferate (Figure 6B and 6C). While supporters claim that this is the result of a learning process (Marin 2009), critics claim that privatisation efforts in the water and sanitation sector have failed and that new forms of PPP risk privatising profits and leaving the costs to the public (Hall and Lobina 2006; Bayliss and McKinley 2007; Castro 2008; McDonald, Marois, and Spronk 2021). Information about institutional reforms for non-sewered sanitation is too sparse to identify clear patterns, but the analysis indicates that sanitation marketing to create demand at households along with regulating and incentivizing service providers have become the key institutional reforms pursued, which replace community centred approaches that were dominant in the 1980ies and 1990ies (Figure 5C & 5D).

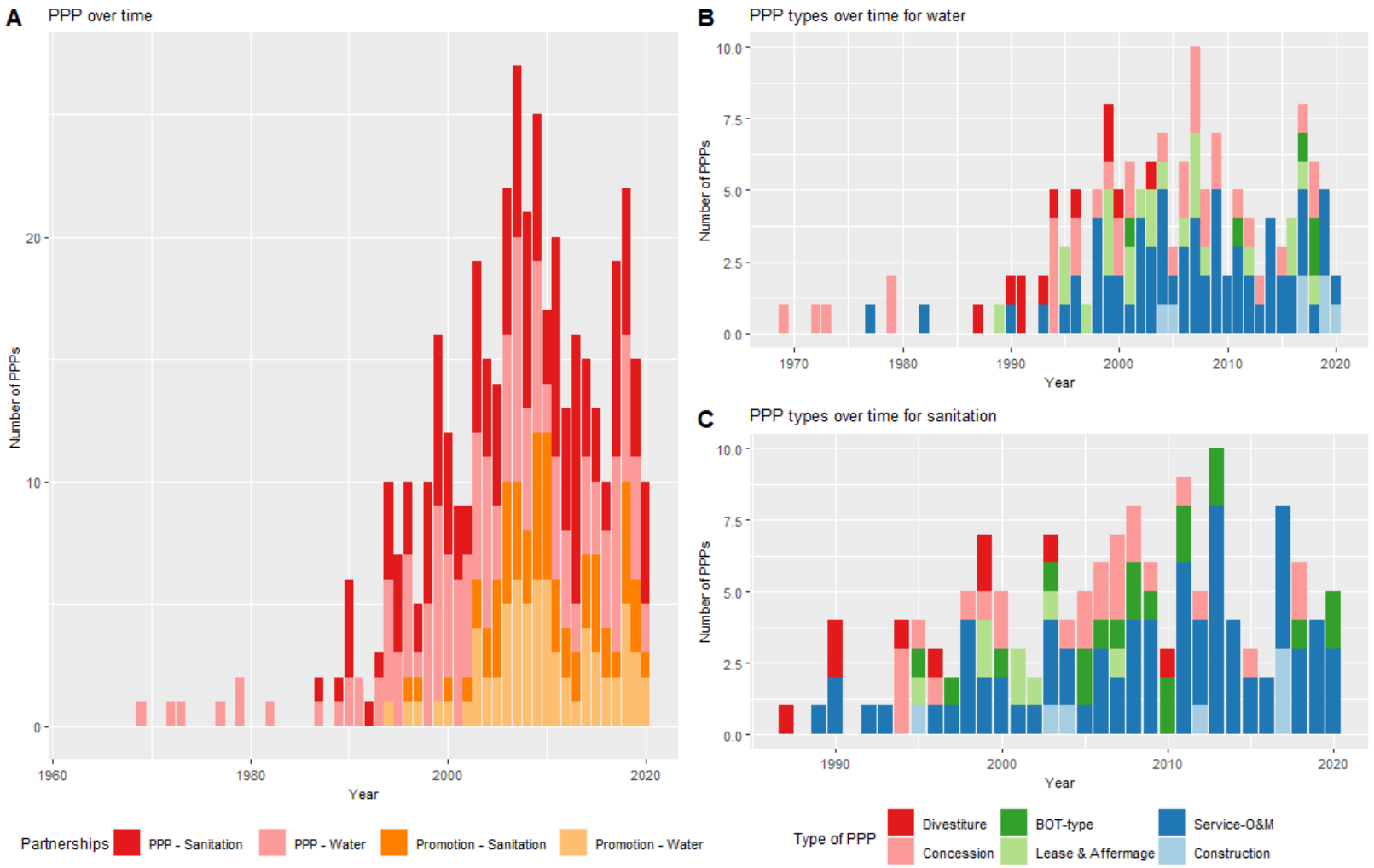


Figure 6: Number of and types of PPP over time. For all MDB's urban water supply and sanitation investments.

4.4 Conclusions

We presented a novel dataset of MDB investment in water supply and sanitation that allowed us to study the investment behaviour of the World Bank, ADB, and the AfDB between 1960 and 2020. We operationalized investment behaviour through the four dimensions of territory, technology, finance, and organization to understand how MDBs respond to changing problem pressures and policy trends.

Our descriptive analysis of 2449 projects found that MDB investments are in line with urbanisation trends. While progress towards SDG 6.1 and 6.2 is disaggregated by urban and rural areas, MDBs are not yet tracking their investments accordingly. To understand how progress can be accelerated in both contexts, this could be helpful. Similarly, MDBs investments have responded to changing challenges by adapting the technological dimension of investment projects. The silo focus on pure water supply vs. pure sanitation seems to be disappearing and sanitation is continuously gaining importance. The integration of water supply and sanitation with other activities underscores the nexus function of water supply and sanitation for sustainable development but makes tracking the effective investments in specific activities more challenging.

The issue that dominated policy trends was the role of private actors in financing and organizing access to safe water supply and sanitation. In contrast to the responsiveness that MDBs showed to changing contexts, they seem to have been weaker in critically analysing their performance and readjusting strategies, particularly in financial and institutional policies. In the light of the time period analysed, the introduction of public-private partnerships (PPPs) in the 1980s and 1990s seems rather arbitrary and less of a strategic response to pressing problems in the field of sanitation. This is indicated by the observation that concessions and divestments are the dominant forms of PPP endeavour until 2000. Only after repeated failure to divest and concede water supply and sanitation throughout the 1990s were PPP arrangements fine-tuned through shifting risks to public actors. The analysis of institutional reforms for non-sewered sanitation in World Bank projects indicates a significant risk that history may repeat itself. The reforms aim at enabling a sanitation economy by targeting households to stipulate demand through awareness and marketing campaigns and incentivising businesses to respond to the potential demand. The market-based approach is in line with early PPPs, where private actors bore the costs and risks of the investments, which they were expected to finance through cost-recovery tariffs. Given the repeated and failed attempts to divest and concede water supply and sanitation through PPPs, the hypothesis that a sanitation economy for non-sewered sanitation can successfully achieve the same transition towards private responsibilities and cost-recovering tariffs to ensure access to safe sanitation does not seem to be empirically supported.

MDBs and the OECD have called for a greater role for private capital and commercial investment in water and sanitation since the early 1990s and are currently stressing the importance of private finance for non-sewered sanitation. This discourse has promoted a leverage function for MDBs in initiating the transition to more private investment through blended finance. Our analysis shows that such leverage has not occurred. Instead, our analysis has shown that MDBs leveraged public investments, which on average account for 40% of the total investment sum in MDBs' investment projects. Over the past 60 years, governments and public utilities have been the main implementing partners in MDB investment projects in water supply and sanitation. Our analysis suggests that MDBs can increase their impact if they focus on leveraging national public funds and abandon attempts to mobilize private funds for water and sanitation, which have not even been marginally successful.

5 Bargaining over sanitation sector reforms

Published as Heidler, A. Louis, S. K., Kamal, A., Ul Alam, M., Lüthi, C., Crevoisier, O. On whose terms: utilities, enterprises or communities? The territorial political economy of water and sanitation sector reforms in Dhaka. *Environment & Urbanization* 2023, doi: 10.1177/09562478221149915.

Abstract

Citywide inclusive sanitation (CWIS) is becoming the dominant paradigm for achieving safe sanitation for all by 2030. Its technical benefits have been explored, but the bargaining over financial and organizational changes CWIS entails have not yet been adequately addressed. Our case study explains the stalled rollout of CWIS in Dhaka, Bangladesh. We analyse policy pathways over the past 30 years through a combined territorial political economy and power perspective to understand their effects on equality. We highlight how donors link the introduction of CWIS to the organization of sanitation through a market; how the utility uses CWIS as an opportunity to avoid costly responsibilities in non- sewered sanitation; and how service co-production through community-based solutions is neglected. CWIS has successfully overcome the dogmatic technological focus in the sanitation system, but for citywide sanitation to be scaled inclusively, the dogmatic focus in the organization and financing of the sanitation sector must also be overcome.

5.1 Introduction

Achieving universal access to safe sanitation for all by 2030, as Sustainable Development Goal (SDG) 6.2 stipulates, presents a formidable challenge, particularly in densely populated urban low-income communities (LICs). To achieve SDG 6.2, current average progress must increase fourfold (UNICEF and WHO 2020). In the sanitation sector, the consensus is that this leap will require radical changes because it cannot be achieved with the conventional approach of large sewerage networks and centralized treatment plants alone (Herrera 2019). Conventional sanitation requires large quantities of water, involves high investment and operating costs, and demands long planning horizons. Thus, it is considered an unsuitable solution for many so-far-unserved and often informal urban settlements (Larsen et al. 2016; Reymond, Renggli, and Lüthi 2016).

As a response, the citywide inclusive sanitation (CWIS) concept, in which all city residents have equal access to adequate and affordable improved sanitation services, is promoted as key to achieving SDG 6.2 (Narayan 2022). Core elements of the CWIS approach are not new, particularly non-sewered sanitation systems and the service delivery framework (Schrecongost et al. 2020; Schertenleib et al. 2021). Yet, their combination with sewered sanitation at the city scale make CWIS a possibly transformative approach in the sanitation sector (Lüthi, Willetts, and Hoffmann 2020). CWIS has the ability to quickly unite broad support behind its principles and calls to action: from multilateral development banks (Gambrill, Gilsdorf, and Kotwal 2020; ADB 2021a) and leading research institutions (Narayan and Lüthi 2020) to global philanthropies (Schrecongost et al. 2020) international non-governmental organizations (INGOs), multinational corporations, and Big Four consultants (Coates and Knezovich 2020; Couder and Kibutu 2020; Rosenboom et al. 2016). These principles, as spelled out in the Manila Principles on CWIS, include Equity, Environmental and Public Health, Mix of Technologies, Comprehensive Planning, Monitoring and Accountability, and Mix of Business Model.

What unites the diverse actors and their proposals for CWIS is the elemental consensus that three areas need to be revolutionized to achieve the paradigm shift towards CWIS: technology, organization and finance.

CWIS advocates a flexible technological approach that focuses on the integration of sewered and non-sewered sanitation solutions, depending on what is best suited to achieve safe sanitation in any particular context (Gambrill, Gilsdorf, and Kotwal 2020). At the core of integrating technologies is the sanitation service chain concept, which unbundles conventional sanitation into five services that must be provided to achieve safely managed sanitation: containment, emptying, transport, treatment and disposal or reuse (Trémolet, Evans, and Schaub-Jones 2010).

To achieve optimal organization of the sanitation service chain, CWIS seeks a transition from the top-down and supply-driven approach of conventional sanitation towards more demand-driven and bottom-up approaches that focus on the delivery of services to households by entrepreneurs in a sanitation economy (Mallory et al. 2020; Carrard, Jayathilake, and Willetts 2021; Sinharoy, Pittluck, and Clasen 2019). The market for sanitation needs to be stimulated by generating household demand through sanitation marketing, awareness campaigns and behaviour change interventions (Gambrill, Gilsdorf, and Kotwal 2020; Kennedy-Walker et al. 2014) and by developing viable business models through purpose-driven start-ups to match sanitation services to households' willingness to pay (Coates and Knezovich 2020; Willetts et al. 2014; WSUP and EY 2017).

The introduction of customizable and low-cost technologies and the organization of sanitation through an economy under CWIS moves households to centre stage in the financing of sanitation. They are expected to cover the full cost of sanitation through fees, and subsidies are seen as ineffective and expensive instruments that are only

appropriate for the very poorest (World Bank 2019). In addition, entrepreneurs are expected to treat collected faeces for reuse to generate additional revenue (Diener et al. 2014; Otoo and Drechsel 2018; Rao et al. 2017). Finally, investment in the sanitation economy is expected to come from the private sector, with start-up funding covered by philanthropy or public funds for leverage and risk mitigation (OECD 2019; Goksu et al. 2017; Goksu et al. 2019).

A major barrier to the transition to CWIS is the perceived lack of an appropriate legal framework that can accommodate the radical change in technology, organization and financing that CWIS entails (Saker, Bernal Pedraza, and Narayan 2022; Magawa 2021; WSUP 2020) The spatial distribution of sewered and non-sewered sanitation is a city-level policy decision involving municipalities, citizens, utilities and the private sector. It has far-reaching consequences, because it determines the investment needs for all actors involved, the benefits and comfort levels of households, and the distribution of business risks and opportunities between utilities and sanitation entrepreneurs.

The six Manila Principles for CWIS reflect the consensus in the sanitation sector that equity and environmental and public health are the goals of any endeavour. They also endorse a mix of technologies, a holistic and inclusive planning process, and a mix of business models accompanied by constant monitoring as tools with which to achieve equity and environmental and public health (Narayan and Lüthi 2020; Narayan 2022). In doing so, they limit questions of accountability to formal regulatory frameworks, and omit the possibility of distributional contention in favour of a technocratic and apolitical conception of synergistic collaboration between 'stakeholders'. This is in stark contrast to an approach to co-production[5] that addresses context-specific pro-poor concerns and priorities (Wilbard, Kyessi, and Limbumba 2022).

Scholarly research has explored the distributional contention of sanitation in developing cities, highlighting the importance of colonial legacies and the competing interests of middle classes and urban poor (Chaplin 1999; Gandy 2006a), while unpacking the vested interests in the debate on private sector participation (Bakker 2003; Bakker 2014; Budds and McGranahan 2003). Scholars further point to the pitfalls of apolitical development approaches (Sanchez 2020, 2019), yet others describe the ability of community-driven initiatives to sustain success (McGranahan and Mitlin 2016; Adams, Zulu, and Ouellette-Kray 2020).

However, scholarly research has not yet adequately addressed the negotiations over organizational and financial arrangements that accompany the translation of CWIS concepts into sanitation service delivery at the city scale. Based on the recognition that local contexts are paramount for sanitation outcomes (Satterthwaite, Mitlin, and Bartlett 2015), we argue that different actors can be assumed to have different vested interests and their own differing ideas about how to organize and finance service co-production under CWIS. The way competing interests shape policy pathways needs to be critically examined to better understand how CWIS can successfully contribute to greater urban equality and what can cause it to fail.

Dhaka provides an opportune context in which to study the ramifications of combining sewered and non-sewered sanitation in an attempt at implementing CWIS. Dhaka is one of the world's most densely populated cities and its population has tripled from 7 million in 1990 to 21 million in 2020 (Ritchie and Roser 2018). Some 20 per cent of Dhaka's population is connected to sewered sanitation, but the main sewage network and the sole sewage treatment

[5] Underlying this text is the understanding of co-production, where citizens, government and non-state actors work together to design and execute basic service delivery bargains, with the community playing the central role.

plant (STP) are barely functional (DWASA 2016a). Of the 80 per cent that depend on non-sewered sanitation, most households either have illegal connections to stormwater drains and water bodies (DWASA 2016b) or hire 'sweepers' who illegally empty septic tanks by hand and dispose of the faecal sludge in the open environment (Zaqout et al. 2020) Sweepers belong to the lowest social class, deprived of most basic rights. Their forebears were brought to Dhaka during the British colonial period, often violently, to clean public places and empty latrines. Since then, this has been the only way for subsequent generations to make a living (Zaqout et al. 2020). Less than 1 per cent of faecal sludge is emptied by vacuum truck operators (DWASA 2016a; Bala 2018). Without any option for treatment, they dispose faecal sludge legally into the dysfunctional sewerage network at designated lifting stations (Bala 2018). In sum, nearly all household wastewater and faecal sludge in Dhaka ends up untreated in the open environment, causing serious negative impacts on environmental and public health (Furlong 2016; Yin, Islam, and Ju 2021).

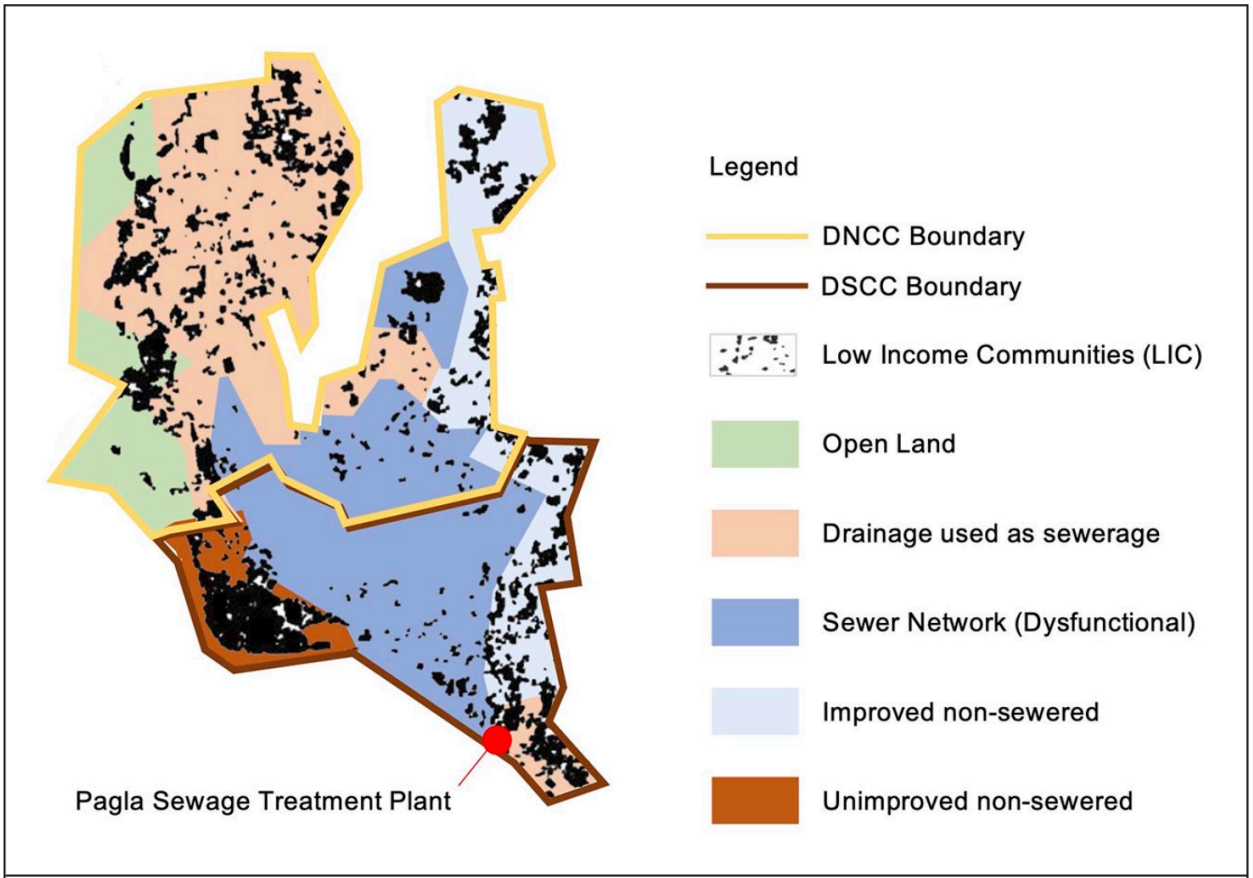


FIGURE 1

Schematic map of the estimated distribution of different sanitation systems and low-income communities across Dhaka in 2015

NOTE: A north arrow and scale were omitted as the map served as a sketch to see the distribution of different sanitation systems. DNCC = Dhaka North City Corporation; DSCC = Dhaka South City Corporation.

SOURCE: Authors' own representation based on DWASA (2016a) and ESA (2018).

Dhaka's devastating sanitation situation lies in stark contrast to the tremendous progress reported for water supply. In 2005, roughly 30 per cent of the population had no access to an improved water source, but this number decreased to close to zero per cent in less than a decade, despite continued population growth. Water quality can still be a concern, especially in LICs, but progress has been immense, especially compared to sanitation (Haque et al. 2020). We trace the bargaining over water policies and sanitation policies in Dhaka from the far-reaching structural adjustment reforms that began with the passage of the Water and Sanitation Authorities (WASA) Act in the 1990s through to the adoption of the CWIS concept through the Institutional Regulatory Framework for Faecal Sludge Management (IRF-FSM) today.

We analyse the bargaining over these policies with a focus on equality in line with the understanding in this special issue (Cocina et al. 2022). We ask where and how are they negotiated, who benefits and who carries the cost; who will obtain new opportunities and who is left with risks. We apply a case-centric, outcome-focused process tracing methodology (Beach and Pedersen 2019). We base our analysis on the concept of territorial political economy (Brugger 2021) which we combine with a power analysis using Gaventa (2007) power cube framework.

In Dhaka, the adoption of the CWIS concept led not to equal access to safe sanitation but to fierce negotiations over responsibilities for and the regulation of non-sewered sanitation. Through the redrawing of spatial and institutional responsibilities, current policy development shifts the costs of enabling a sanitation economy and organizing the sanitation service chain at the city level from the utility to the municipal government, while entrepreneurs are not willing to enter the business. In effect, the risks are left with sweepers and LIC residents.

The next section details the conceptual framework and the methodology. Section III reports the findings, followed by a discussion and conclusions in section IV.

5.2 Conceptual framework and methodology

5.2.1 Territorial political economy

A territorial political economy (TPE) perspective suggests that urban sanitation infrastructure development can be understood as the territorial outcome of political and economic bargains between local and global actors over the improvement of the quality of life in cities (Brugger 2021). The concept of the bargain is at the heart of TPE theory. A bargain denotes an ideal-typical constellation of technologies, financing mechanisms and organizational arrangements that addresses a public issue (Strange 1988); in our case safe sanitation. Applying a TPE perspective allows us to recognize the different underlying bargains that lead to conflicts over the distribution of costs, benefits, risks and opportunities in Dhaka's sanitation sector. TPE posits that the equitable distribution of the material conditions for a meaningful life (Cocina et al. 2022) can be understood by examining the distribution of costs and risks as well as benefits and opportunities of bargains. Two bargains for sanitation can be identified, which we here call the utility bargain and the enterprise bargain.

The utility bargain is organized around the natural monopoly of conventional sewer networks and centralized wastewater treatment plants (Larsen et al. 2016). This monopoly is managed by ring-fenced and ideally autonomous utilities (Finger and Allouche 2002) along commercial principles (Bakker 2003; Hall, Lobina, and Terhorst 2013). Expansion of access to sanitation is supply-led (Lüthi, McConville, and Kvarnström 2010), with households paying for services through tariffs set by the utility that cover the cost for operation, maintenance and investment (François, Correljé, and Groenewegen 2010; Abeysuriya, Mitchell, and Willetts 2005). In line with

new public management principles, initial subsidies and public funds are phased out and replaced by commercial credit or by public–private partnerships (Finger and Allouche 2002). The government appoints a regulator to ensure environmental and social standards are met (Lonholdt 2005).

The enterprise bargain is organized around the sanitation service chain (Trémolet, Evans, and Schaub-Jones 2010; BMGF 2010) along which entrepreneurs offer technologies and services for each step (Diener et al. 2014; Schaub-Jones 2011; Orner and Mihelcic 2018) in a market environment (Couder and Kibutu 2020; Mallory et al. 2020). The expansion of the sanitation system is driven by household demand (Mara et al. 2010) and the entrepreneurs' ability to meet that demand with solutions that customers are willing and able to pay for. The funds to kick-start this sanitation economy come from the global donor community with corporate philanthropists in a leading role (Coates and Knezovich 2020; Parkinson, Lüthi, and Walther 2014). It is expected that, after the start-up phase, entrepreneurs can run their businesses profitably from the revenue they generate (Rao et al. 2017). The government's role is to incentivize and regulate this sanitation economy to guarantee fair competition and ensure environmental and safety standards are observed (IWA 2021).

5.2.2 Power cube

The power cube framework (PCF) helps to make implicit manifestations of power explicit (Gaventa 2007). The core proposition of the PCF is that power is not constant for any actor but depends on the situation and issue at stake. These can be explored through three analytical dimensions: levels, spaces and forms. Figure 2 uses the analogy of the Rubik's cube to highlight how the three dimensions are interconnected.

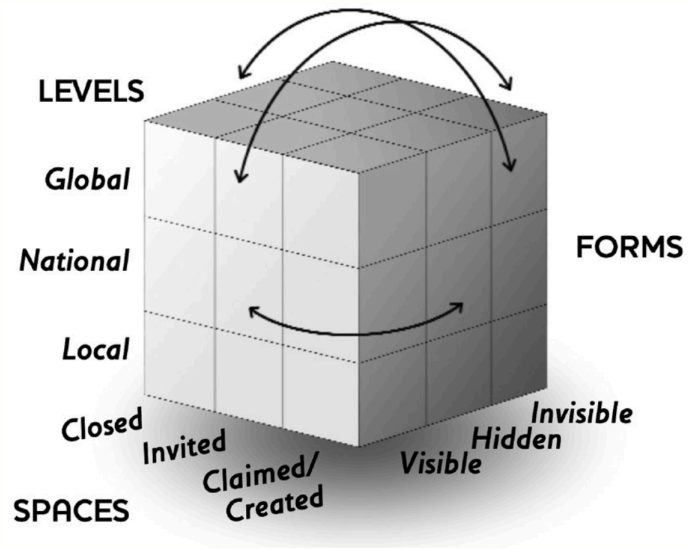


FIGURE 2
Analytical dimensions of the power cube framework

NOTE: Permission granted to the authors from John Gaventa, see acknowledgements for his contribution.

SOURCE: Gaventa (2006).

The PCF enables us to approach policymaking as a process shaped by interest groups, each with different access to power. In acknowledging these power differences, the PCF unmasks the language of 'stakeholders' used in

donor circles, including in the Manila Principles, which suggests that all actors are on a level playing field and hold equal stakes with which to influence the debate. It also provides the tools to understand parity in participation in decision-making processes needed for urban equality (Cocina et al. 2022; Gaventa 2019). The PCF *levels* describe the geographical scales of the main actors and moments in the decision-making processes, ranging from local to global. The PCF *spaces* describe how arenas for participation and decision-making are socially constructed, focusing particularly on the rules and rights of access to them. A closed space is one that is controlled by an actor group, such as companies or government officials, located behind closed doors, for example board rooms, and not open to public participation. Civil society often works to challenge and open such closed spaces to create claimed spaces. Participatory and democratic decision-making processes are characterized by their openness to a range of actors and interests and are understood as invited spaces. Finally, the PCF *forms* describe how power struggles are expressed in decision-making processes. Visible forms of power are the expression of disagreements, for example in debates and reports. Invisible forms indicate the exclusion of issues and actors from debates and agenda-setting. Power is at play in a hidden form in unconscious attitudes towards what can and should be known (Gaventa 2007, 2019).

5.2.3 Policy pathways framework

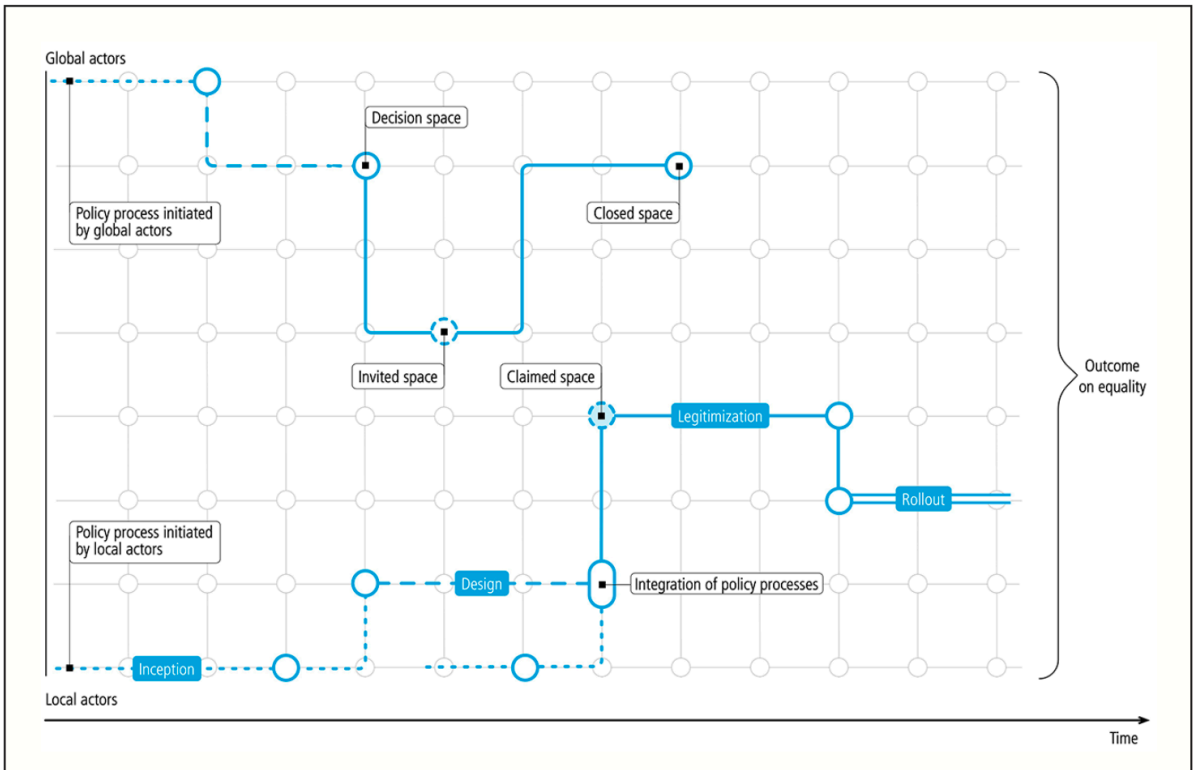


FIGURE 3
Analytical framework to analyse policy pathways towards equality from a territorial political economy and power perspective

SOURCE: Authors' own representation.

In line with the ambition of this special issue to understand the pathways towards urban equality (Cocina et al. 2022) we term the operationalization of our combined TPE and PCF analysis the 'policy pathways framework'. The policy pathways framework provides a visual representation of the concurrent, intertwined and inherently power-laden construction of policies that shape equality outcomes. Figure 3 details an illustrative heuristic to analyse policy pathways from a TPE and PCF perspective. Routes represent bargaining over a particular policy or bargain. Circles represent decision spaces and their power constellations. The x-axis shows development over time, and the y-axis indicates where the dominant actors are positioned between local and global levels. Finally, the line pattern illustrates four generic stages that characterize policy development: conception, design, legitimation and roll-out.

5.2.4 Data collection

Qualitative data were collected through 27 semi-structured expert interviews and document analysis between February and November 2021. We selected the interviewees by actor mapping, which identified possible key players, and complemented this procedure with snowball sampling (Gray 2021). In addition, text analysis of project documents (from multilateral investments, annual reports from key actors and policy documents) was instrumental in reconstructing the evolution of interest dynamics and the agency of actors over the 30-year period included in our analysis (Creswell and Creswell 2017). An overview of the interviews and documents can be found in Annex 4 and 5. Interviews were recorded and transcribed if consent for recording was given; otherwise, extensive summaries were compiled. Transcripts, interview summaries and key passages from documents were coded in NVivo based on a deductive coding scheme informed by the TPE and PCF frameworks with a focus on time and actors; see Annex 3.

5.3 Findings

The current situation of water supply and sanitation in Dhaka needs to be understood against the backdrop of the key policy pathways. Figure 4 summarizes four policy pathways that in concert have decisively shaped the organization and financing of water supply and sanitation in Dhaka by displaying the stages through which they evolved, and the power constellation of crucial decision spaces for their development. The pathways are described chronologically in three stages.

5.3.1 Phase I: Initiating structural adjustment

Between 1980 and 2000, Dhaka's population grew on average by 10 per cent annually, reaching 10 million in 2000 (Ritchie and Roser 2018). The steep population increase and the government's declining capacity to organize urbanization led to an increased proportion of the population living in LICs with no connections to basic services (Hossain 2013; Binta Samad 2009).

The urbanization of Dhaka in the 1980s and 1990s occurred against the backdrop of a national debt crisis. At the direction of the International Monetary Fund and the World Bank, the Government of Bangladesh (GoB) addressed this crisis with comprehensive structural adjustments, including liberalization, privatization and a reduction in public investment (Uddin and Ahmed 2021). This was reflected in the water and sanitation sector through the introduction of the utility bargain with the WASA Act in 1996, which aimed to transform the Dhaka Water and Sanitation Authority (DWASA) into a fully commercial utility (Mannan 2009)

The WASA Act was conceived at a global level and in closed spaces by the World Bank. Its adoption by the Parliament was a condition of the World Bank's funding of the fourth water supply project in Dhaka, where disagreements manifested in open conflict: visible forms of power (Mannan 2009). Resistance formed in the Parliament, an invited space in which the population is represented. Substantial modifications were negotiated before the Act was passed into law in 1996. The World Bank's draft transferred power from the GoB to an independent board to reduce the GoB's influence and granted full financial autonomy and control over tariffs to DWASA to implement cost-covering tariffs. In contrast, the GoB insisted on two government representatives on the board and retained some control over financial matters by stipulating that tariff increases above a five per cent inflation rate had to be approved by the GoB, along with decisions about cases in which the government had guaranteed investments (World Bank 2002; Government of Bangladesh 1996). With these modifications, the GoB used its sovereign power against World Bank pressure to retain some control over the utility.

Although the World Bank was unable to enshrine the logic of the utility bargain in the WASA Act as it had planned, it approved funding for the fourth water supply project in 1996. Yet the GoB continued to resist its disempowerment by not implementing any WASA Act provisions. In response, the World Bank suspended the project for five months in November 2000 and scaled down or cut various infrastructure components, reducing its financial contribution by 40 per cent (World Bank 2002) After completion, the World Bank rated the project as unsatisfactory, the lowest possible rating. When the explanations in the final report are considered, the rating is surprising. The report explicitly acknowledges that DWASA completed the key infrastructure component, a one billion litre per day water treatment plant, under budget and on schedule. However, it contends that *"the same effort was not put into the measures to develop institutional reforms"* (World Bank 2002: 17). The report goes on to sharply criticize the local World Bank office for failing to enforce the implementation of the WASA Act. First, it notes that the disbursement of the infrastructure components was not linked to the successful implementation of the WASA Act's provisions. Second, it criticizes the fact that not all infrastructure components were put on hold once it became clear that the implementation of the Act would be resisted (World Bank 2003). The World Bank's evaluation suggests that the legitimation of the utility bargain through the enactment of the WASA Act had become more important than the actual implementation of infrastructure improvements.

Parallel to the institutional reform of DWASA, the World Bank promoted non-sewered sanitation to serve LICs, which in their view was to be designed and piloted independently of utilities. For this purpose, the World Bank and globally active donors established the local branch of their international training network (ITN) for off-grid water supply and non-sewered sanitation technologies at the Bangladesh University for Engineering and Technology (BUET) (Black 1998). Until 2005, ITN-BUET was mainly concerned with its own establishment, conducting stocktaking studies on urban and rural water supply and sanitation, and redesigning the curriculum for diploma engineers, which until then had only focused on expensive western technologies, to incorporate non-sewered solutions (Interview 2). Over time, ITN-BUET developed into both a vehicle through which the global donor community tested and introduced solutions for LICs in Bangladesh and a central knowledge broker in the development of policies for Bangladesh's water and sanitation sector (Interviews 1 and 2).

In contrast, radical innovations to improve public health were conceived at the local level by NGOs, with one in particular, *Dushtha Shasthya Kendra* (DSK), leading the way. At the time of DSK's establishment in 1988, residents of mushrooming LICs had to rely on illegal water suppliers, which carried the risk of pollution at up to five times the cost of piped water (DSK 1994). Water supply and sanitation became an essential part of DSK's

activities from 1991 onwards, when it successfully claimed a decision space where it lobbied both the Dhaka City Corporation (DCC) and DWASA to provide formal shared water connections to LICs, regardless of their lack of formal land tenure (DSK 1994). DSK designed an agreement with DCC and DWASA whereby DSK bore the risk of infrastructure investment through a security deposit and a guarantee for the payment of all tariffs, in addition to financing operations, maintenance and tariff collection, and acted as a mediator between DWASA and LICs (Interviews 21 and 23) (DSK 1998). By organizing shared water supply for LICs, DSK transformed itself into a quasi-utility. DSK established and trained community-based organizations (CBOs), to manage the shared water access points and collect revenues. This arrangement for connecting LICs with DWASA's water network became known and replicated as the 'DSK model' (Rana and Piracha 2020). By the turn of the millennium, DSK, with financial support from INGOs, had established over 200 shared water points across Dhaka, serving more than 30,000 people. DSK also became the driving force for non-sewered sanitation in LICs. From 1997 onwards, DSK improved containment infrastructures by introducing shared sanitation blocks to reduce the health threat from effluents in LICs. DSK granted interest-free loans to CBOs for the construction of these blocks, which the CBOs repaid in 24 instalments over a period of 30 months with a six-month grace period (Interview 23) (Rojas-Ortuste and Mahmud 2015; DSK 2001).

5.3.2 Phase II: Strengthening global–local interlinkages

Phase II is characterized by the scaling up and formalization of the DSK model and the increased and coordinated pressure by actors from the global level to implement the institutional reforms of the WASA Act to legitimize the utility bargain.

DSK's innovative model was legitimized at the global level when, in 2003, DSK presented its model at the World Water Forum. Thereafter, WaterAid and other INGOs mainstreamed the DSK model in various cities across the globe. Power took an invisible form in the presentation of the model to a global audience, which makes a subtle but important concession to the logic of the utility bargain. Rather than emphasizing that contentions between DSK, DCC and DWASA centred on claiming the human right to water for LICs at the same cost as formal households, the narrative highlighted the slumdwellers' willingness and ability to pay for water (DSK 1998; Ahmed 2003; Singha 1996). International success also helped at home, where the DSK model became an integral part of Dhaka's water system thanks to financial support from global donors. After 16 years of regular bill payments, CBOs were allowed to apply for water connections from DWASA in their own name, without an NGO intermediary and despite the lack of formal land titles (DSK 2011). However, neither the international success nor the local progress could be replicated for sanitation. DSK and other local NGOs started to experiment with mechanical emptying of septic tanks, including the local development and production of low-tech vacuum trucks in 2000. Although three series of vacuum trucks were produced (and many also exported), uptake of mechanical emptying in Dhaka's LICs remained low (Interview 24) (Opel and Bashar 2013).

While DSK continued to provide water and sanitation services to LICs, the stand-off between the GoB and the World Bank over enactment of the WASA Act, and the adoption of the utility bargain continued. The attitude of three successive governments towards the WASA Act remained unchanged, and its provisions were not implemented. DWASA continued by and large to operate as it had before the reform by not raising tariffs, and each government retained close control by appointing a new director.

In response, donors joined forces to demand implementation of the WASA Act and thus embed the logic of the utility bargain in Dhaka's water and sanitation sector. In November 2007, after two years of negotiation, the main donors for water and sanitation in Bangladesh signed a Partnership Framework with the GoB that linked institutional reforms to a roadmap with distinct infrastructure investments from all development partners. Power took a visible form in the adoption of the Partnership Framework, since this was explicitly designed to enforce institutional reforms in line with the utility bargain by demanding joint and time-bound policy actions by the GoB and DWASA to fully implement the WASA Act and turn DWASA into an autonomous commercial operation (World Bank 2008). While the Framework was not binding, the Asian Development Bank (ADB) went a step further by adding the Framework's main demands as enforceable milestones in the Sector Development Program it implemented with DWASA between 2008 and 2016. Prior to the release of the first tranche of credit, DWASA had to select a managing director (MD) in a competitive process and the ministry had to issue 'Rules of Business' for water and sewerage tariff-setting to increase DWASA's autonomy and commercial orientation in line with the WASA Act (ADB 2007).

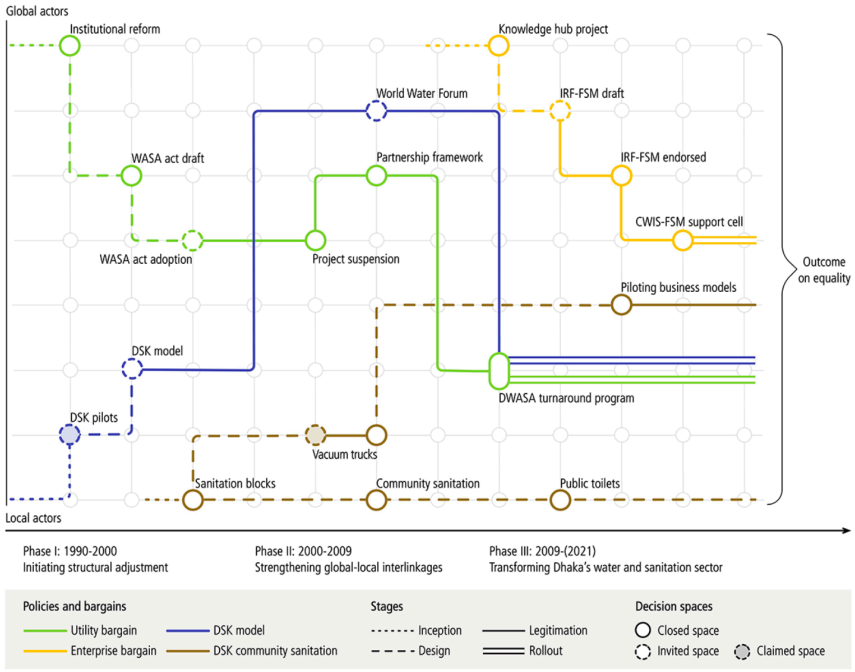


FIGURE 4
Policy pathways towards urban equality in access to water and sanitation in Dhaka, Bangladesh

NOTE: Abbreviations are introduced in the text and summarized in Table S4 online.

SOURCE: Authors' own representation.

5.3.3 Phase III: Transforming Dhaka's water and sanitation sector

Phase III began in January 2009 with the election of the current Prime Minister, and the appointment of the current MD of DWASA in October 2009. The phase is characterized by the new MD of DWASA, who fully embraced the utility bargain and the introduction of the enterprise bargain through the IRF-FSM.

The roll-out of the utility bargain determined all strategic priorities of DWASA by aligning the organization and financing of water supply and sanitation. To strengthen its balance sheet and become bankable, it gave the highest priority to revenue collection and water sales. After DWASA fully embraced the institutional reforms from the Partnership Framework, donors funded the technical improvements to increase water production, reduce water losses and enhance metering (Sharma and Alipalo 2017). DWASA also raised tariffs by 5 per cent annually, which it could do without GoB approval, and by an additional 17 per cent in 2016–17 with GoB approval. DWASA has continued to charge all households within a hundred feet of the sewer network irrespective of connection, a sewage tariff as high as the corresponding water tariff. Even though the sewer network and the STP have been dysfunctional since a devastating flood in 2004, no resistance formed against this practice (Interview 2) (World Bank 2020). DWASA recognized the potential of the DSK model to increase revenues by serving LICs, but with no investment in infrastructure and with no operational risks, as these were borne by NGOs. DWASA introduced NGOs as standard franchise partners for LICs, paying them a commission for supervising CBOs, issuing invoices and collecting revenues (DSK 2019). By 2021, NGOs and CBOs were operating over 7,000 shared water points across Dhaka's LICs, from which over 99 per cent of the tariff was collected (Interview 23). DWASA's efforts to increase revenue were recognized by the ADB, which singled it out as a model utility for South Asia, particularly for its work with NGOs to serve LICs (Sharma and Alipalo 2017).

With the autonomy it has gained, DWASA has further reduced its risks and costs, particularly by transferring responsibility for stormwater to the DCC, arguing that this responsibility had been illegitimately transferred to DWASA, without remuneration, in 1989 through a circular issued by the ministry, without any political process (Interview 19) (World Bank 2016). Between 2010 and 2020, DWASA lobbied successive city mayors to return all assets and responsibilities for stormwater management to the municipality. This political project, in which DWASA invested significant time and resources, ended in January 2020 with the official transfer of all stormwater assets and responsibilities to the DCCs (Interviews 5 and 19). By dismantling its entire stormwater branch, DWASA has improved its financial performance without improving the drainage system. This has had negative consequences for public health and the environment, which have had to bear the costs incurred by DWASA's neglect. In a similar vein, DWASA has neglected sewerage. The additional costs for rehabilitating and operating the existing network are avoided, while sewage tariffs are continuously collected. The effects of DWASA's embrace of the utility bargain and the subsequent focus on economic returns is reflected in the contrasting performance of two infrastructure projects financed by multilateral development banks. ADB's Sector Development Program (2008–2016), devoted solely to water supply, was a success, reaching 100 per cent water coverage. In contrast, the World Bank's Water Supply and Sanitation Program (2009–2016) was a disaster. All sanitation infrastructure components were cancelled due to slow procurement, insufficient capacity and understaffing of the DWASA project team. At project closing, less than half of the planned investment of USD 165 million had been disbursed. The sewerage masterplan was the only tangible output for sanitation (World Bank 2016; ADB 2021b).

From 2016 onwards, bargaining over the responsibilities for non-sewered sanitation and the adoption of the enterprise bargain has taken centre stage. The key bone of contention has been whether DWASA has to accept responsibility for non-sewered sanitation, something it has tried to avoid by all means possible. At the heart of the dispute is the Institutional and Regulatory Framework for Faecal Sludge Management (IRF-FSM). The IRF-FSM was conceived at the global level in the closed spaces of the ADB- and Bill and Melinda Gates Foundation (BMGF)-funded Knowledge Hub Project (2013–2017), designed by ITN-BUET and legitimized through its endorsement by the GoB's ministry in 2017.

The IRF-FSM is based on the enterprise bargain's fundamental assumption that streamlining the institutional and regulatory framework is the silver bullet that enables the provision of sanitation services by enterprises in a market. The IRF-FSM claims that responsibilities for non-sewered sanitation are not explicitly regulated in the laws that currently govern DWASA and DCCs, because neither the WASA Act nor the City Corporation Act use the term 'faecal sludge' (PSB 2017). It concludes that the responsibility for non-sewered sanitation lies with the DCC under the City Corporation Act to *"develop adequate arrangements for the collection and removal of refuse from … public latrines, urinals, [and] drains"* (PSB 2017: 7). Simultaneously, the IRF-FSM downplays the WASA Act with regard to DWASA's mandate for the *"construction, development and maintenance of sewerage systems"* by pointing out that it *"does not specifically mention about responsibilities of the Authority with regard to on-site sanitation* [i.e. non-sewered] *systems or any activity related to emptying of pits and septic tanks, collection, transportation, treatment and disposal and/or reuse of faecal sludge"* (PSB 2017: 8).

Furthermore, the IRF-FSM explicitly challenges the sewerage master plan recommendations, approved by DWASA's Board in 2016, stressing that these are not legally binding. The master plan suggests establishing a sludge management division at DWASA, which would be responsible for emptying septic tanks, either through its own operation or through service agreements with private operators (DWASA 2016a) However, DWASA management effectively rejected the master plan less than three months after board approval by stating that *"understanding the existing legal provisions is crucial for service delivery, e.g. on-site* [i.e. non-sewered] *sanitation is not DWASA's mandate, which is also not covered by the WASA Act"* (World Bank 2016: 47).

The legitimation of the IRF-FSM was coordinated through the Policy Support Branch (PSB), a government unit financed by donors and responsible for water and sanitation policy development. The PSB selected working group members, among whom we find DWASA, major international sanitation economy promoters and local NGOs but no senior representatives of DCCs and ministries (Interviews 5 and 20). The PSB coordinated the process in closed ministry spaces, leading to the minister's endorsement of the IRF-FSM. As deliberations were not documented and decisions were taken by consensus, power took a rather invisible form. Since the IRF-FSM was adopted, BMGF has established and funded the CWIS-FSM support cell within the ministry and tasked it with ensuring that CWIS principles are adhered to in all sanitation investments by government, both on its own and with bilateral and multilateral actors (Interviews 1, 2, 5, 10, 11 and 28). Rather than clarifying the legal responsibilities through public and democratic processes to amend the WASA or City Corporation Acts, IRF-FSM proponents, claiming a lack of time, focus on convincing senior officials (Interviews 1, 11 and 20). This exemplifies how closed the spaces are in which the CWIS configuration for Dhaka is negotiated.

Yet one of the two DCCs opposes the IRF-FSM. In 2011, for reasons unrelated to sanitation, the DCC was split into two city corporations, one for the north (DNCC) and one for the south (DSCC) of Dhaka. So far, IRF-FSM proponents have convinced DNCC's mayor to assume responsibility for non-sewer sanitation and to spatially

divide responsibilities for sanitation between DNCC and DWASA (Interviews 1 and 5). In contrast, DSCC rejects the IRF-FSM's design, questioning how the policy was developed and stressing that it was not duly informed of the implications before its adoption. DSCC insists that sanitation is DWASA's responsibility under the WASA Act, regardless of technology. However, IRF-FSM proponents blame a lack of technical understanding of non-sewered sanitation for DSCC's rejection (Interviews 1, 2, 5, 11 and 16–19).

The stalemate in the roll-out of the enterprise bargain is reflected in the stagnation of the largest investment for sanitation in Dhaka to date. Run under the banner of CWIS, this World Bank-led project allocates 2 per cent of the USD 483 million for serving LICs and non-sewered sanitation (World Bank 2020) Despite this meagre proportion, the non-sewered component is stalling the entire project. DWASA refuses to implement any non-sewered project component with reference to the IRF-FSM, accusing the World Bank of making it a condition for project appraisal although it is against the law (Interviews 16–9). According to World Bank staff, no solution could be found in the first 20 months of the four-year project, although the component is in line with the sanitation master plan. Furthermore, the detailed information on the LICs to be served is based on a report by an INGO with which DWASA is working to test business models for leasing out vacuum trucks to private service providers. Despite substantial investment from global donors in business development since 2015 under the pilot, DWASA has not been convinced to set up its own sludge collection operation nor to enter into service agreements with private operators. Indeed, DWASA has transferred the costs and risks as well as the benefits of any eventual sanitation economy to DCCs and enterprises (Interviews 12 and 13) (World Bank 2020; Bala 2018). After all, when the sewerage system is developed, DWASA will control 90–95 per cent of the market (Interview 19).

As in phases I and II, progress inside LICs has mainly been made by local NGOs. Based on the conviction that a welfare approach with strong subsidies can most effectively reduce the burden of diseases and environmental pollution, DSK has steadily improved community sanitation, mainly by constructing sanitation blocks for communities and schools, and public toilets, using funds from INGOs (DSK 2021). While DSK has improved containment infrastructures in LICs, it has refused to adopt the logics of the enterprise bargain and commercialize its service provision for emptying and transportation (Interview 21). Likewise, DSCC has shown a proactive attitude to ensuring environmental and public health after it had to take responsibility for stormwater management. Stormwater drains are de facto open sewers to which non-sewered sanitation systems from LICs and better-off households connect directly. In response, DSCC has outlined options for basic treatment of the water flowing through these drains to reduce pollution risk and reuse the treated water for irrigation of parks during the dry season (Interviews 4–8).

5.4 Discussion

Applying policy pathways framework to the last thirty years of water and sanitation policy development in Dhaka allowed us to identify four distinct yet intertwined policy processes. The introduction of the utility and enterprise bargain was initiated at the global level by donors, while the DSK model and sanitation service co-production were initiated at the local level by NGOs (see Figure 4). Together, they have shaped today's access to water and sanitation, with strikingly different equality outcomes.

Our TPE analysis revealed how bargaining over priorities and responsibilities has shifted preferences for technology, organization and finance in Dhaka's water and sanitation sector. The decision space analysis through

the PCF has shown how a technocratic notion of stakeholders, viewing all actors involved in the co-production of services as having equal standing and stakes, obscures the actual and unequal distribution of power.

Over the last thirty years, responsibilities and priorities in Dhaka's water and sanitation sector have been dominated by the utility and enterprise bargains. The strong local entrenchment of the utility bargain has resulted in DWASA's over-zealous focus on bankability and cost optimization, leading to its denial of responsibility for stormwater management and deliberate neglect of sewered sanitation. The utility bargain, introduced through the WASA Act, funded and drafted by the World Bank, suggested a distribution of roles and responsibilities that would lead to DWASA's expanded autonomy and commercialization. When legitimization of the WASA Act was sought in the invited space of the parliament, it accepted only a partial commercialization of DWASA. Even the trimmed-down Act was not implemented by consecutive governments. In 2007, leading donors pushed through the roll-out of the utility bargain by adopting a 'partnership framework', which prevented further loans without the WASA Act's implementation. This quickly proved effective, and DWASA's efforts to increase its commercial credentials made it a showcase for the utility bargain from 2009 onwards.

When global actors introduced the enterprise bargain in Dhaka through the IRF-FSM, DWASA used its newfound autonomy to shed any responsibility for non-sewered sanitation and its costs in favour of improving its own balance sheet. The conception of the IRF-FSM took place at the global level, led by BMGF and the ADB. The design, led by ITN-BUET, translated the enterprise bargain into distinct roles and responsibilities to achieve CWIS in Dhaka. Most notable is the transfer of responsibility for non-sewered sanitation from DWASA to the city corporations. The legitimization of the IRF-FSM was coordinated by the donor-sponsored PSB through the invited spaces of a technical working group and a policy review committee, and the closed spaces of the ministry to acquire the minister's endorsement. The working group and committee, composed of representatives from organizations dependent on global donor funding, thus sidelined competing interests. Neither the substantive development nor the process at ministerial level was documented or published. The roll-out led to more visible forms of power when affected actors were officially informed of the IRF-FSM's consequences. DSCC refused to play its intended role, bringing the IRF-FSM process to a standstill. The DSCC did not buy into the promise of a profitable sanitation economy and refused to assume the costs of organizing and monitoring the non-sewered sanitation system. IRF-FSM proponents delegitimize DSCC by blaming its lack of expertise while omitting the possibility of competing interests between DSCC and DWASA.

Undeterred by these frictions, transformational innovation emerged locally for service co-production in both water supply and sanitation.

The DSK model for water supply scaled successfully because it could reconcile competing interests between LICs, informal water suppliers, DWASA, DCC, and the logic of the utility bargain. At its outset, DSK together with CBOs claimed a decision space where LIC residents could engage in service co-production with local government and the utility. The DSK model was legitimized at global level at the World Water Forum in 2003. Finally, the model was rolled out, after DWASA adopted it as a standard franchise model for supplying drinking water to all LICs in collaboration with NGOs and CBOs. The success of the DSK model lies in the organizational and financial arrangement that bolsters citizen co-production. Yet, although LIC households pay the same price for water as other households, this comes at a cost. LIC residents subsidize DWASA by collecting water from shared locations instead of household connections; NGOs take on substantial costs and risks involved with supplying LICs. This

enabled DWASA to supply water to LICs under the utility bargain through outsourcing costs and risks while increasing its own revenue.

In sanitation, DSK and other local NGOs conceived and introduced co-production arrangements with CBOs that substantially improved hygiene and public health inside LICs, including communal sanitation blocks, shared septic tanks, public toilets and non-commercial emptying schemes. Yet, even though NGOs and CBOs claimed a decision space for negotiating disposal of faecal sludge in sewage lifting stations, this did not lead to substantial service co-production with the utility and local government. The main reason was that the global donor community and DWASA became invested in the vision of co-production which replaced shared efforts by communities, NGOs and CBOs with the individual household's interaction with businesses. To this end, proponents of the enterprise bargain support business development and diversification, sanitation marketing and awareness campaigns to generate household demand, and an enabling regulatory framework via the IRF-FSM.

The current effects on equality are clear. While community solutions substantially improved public health and hygiene inside LICs, service co-production in line with the enterprise bargain has failed to provide positive results. Even worse, it enabled DWASA to avoid any responsibility to service households not connected to sewered sanitation, creating a situation in which neither DCCs nor the utility takes charge of close to 80 per cent of Dhaka's sanitation system.

5.5 Conclusion

The TPE and PCF analyses and the policy pathways framework have proven useful theoretical concepts and methodological tools to unbundle the complex policy pathways affecting urban equality in water supply and sanitation. The approach could be replicated in other cities for scientific analysis of policy processes, and its suitability for other sectors could be explored. The methodology can be equally useful for practitioners who aim to understand bargaining over public issues and design pathways towards more equality as part of politically informed programming.

Two conclusions can be drawn that can inform successful and inclusive implementation of CWIS. First, the introduction of CWIS has not stalled because non-sewered solutions are seen as inferior, but because linking them to organizing sanitation as an economy has prioritized the commercial orientation of the utility and the role of households as customers over their rights as citizens to public and environmental health. For CWIS to scale, the flexibility propagated for technical solutions must also apply to the organization and financing of sanitation. Recognizing that public investments and targeted subsidies are integral to realizing public and environmental health will open scope for more effective ways to distribute costs of sanitation equitably between socioeconomic groups and generations, regardless of technology.

To realize CWIS, community-based approaches that have successfully improved public health should be recognized and promoted as promising models for co-producing sanitation services in non-sewered settings, rather than experimenting with sanitation economy blueprints. These may include the community-based approach of NGOs and the supply-driven scheduled emptying schemes of municipalities, which can be outsourced to CBOs or the private sector. In practice, this implies that CWIS proponents should make the diversity of viable financial and organizational arrangements for CWIS as easily available as the technologies for non-sewered sanitation. A flexible portfolio of CWIS options, including organization and financing in addition to technology, offers the opportunity to strengthen local actors in legitimizing local solutions vis-à-vis global bargains. CWIS is more likely

to succeed when demand-driven, supply-led and community-based solutions are combined in context rather than in principle.

Our study has also shown that synergistic collaboration and co-production in multi-stakeholder approaches towards CWIS is far from given and never free from power dynamics. In contrast to the technocratic ideal of multi-stakeholder platforms, they run the risk of shifting decision-making into closed spaces and perpetuating power in less visible forms. As the Dhaka case shows, such spaces risk reinforcing inequalities rather than providing fertile ground for developing pathways to equality. The multi-stakeholder approach to the IRF-FSM led to shifting costs to actors not deeply engaged in the platform, namely households, enterprises and the DSCC, while leaving the health risks with sweepers and LIC communities.

To prevent CWIS from becoming an umbrella term for the top-down imposition of the enterprise bargain and a sanitation economy, proponents should seek to design service co-production arrangements at the local level in invited or claimed spaces, address distributional conflicts transparently and resolve them through locally available political processes. In this way, CWIS can become different from and better than the status quo in technology, funding, organization and implementation.

6 The territorial political economy of urban sanitation

Submitted as Heidler, A., (submitted). Towards a territorial political economy analysis of citywide inclusive sanitation: five bargains to spur the debate. *Geoforum.*

Abstract

Disruptive technologies combined with new paradigmatic planning approaches, such as citywide inclusive sanitation (CWIS), are seen as game changers. Decentralisation and the flexible combination of infrastructures and technologies shall expand access to safe sanitation in the face of rapid urbanization, worsening water scarcity, resource depletion, and climate change. Yet, technocratic approaches such as CWIS tend to underestimate social and political bargaining and the role of structural power in shaping access to basic urban services such as sanitation. Building on political ecology and international political economy, I develop the territorial political economy framework (TPE) to explore specific sanitation systems' distribution of structural power in security, production, and finance arrangements and their global-local interaction. I then use the TPE framework to build a typology of five sanitation bargains combining insights from theory, expert interviews, scientific case studies and key policy documents. Each bargain represents an ideal typical combination of technology, organisation, and finance, with the corresponding spatial and social distribution of costs, benefits, risks, and opportunities. The TPE framework, together with the related sanitation bargains typology, operationalizes the politico-economic and territorial analysis of sanitation systems in cities. When expanding sanitation services to so-far unserved areas in the cities, applying the TPE framework overcomes the limitations of CWIS in its current form to explicitly consider the implications of embedded structural power on households when assessing and selecting technological options and organizational models for distinct territories across the cities scale.

6.1 Introduction

Infrastructure planning and management are at the heart of any discussion about urban sustainability and resilience in the Anthropocene. Access to safe sanitation is no exception. It is an issue that primarily concerns cities but also has global components. The arrangement of actors and infrastructures that enable access to safe sanitation is primarily a local process driven by local actors and firmly embedded in the material and socioecological relations that shape cities. An essential local feature of sanitation is the spatial structuring of the city through the distribution of costs, benefits, and risks, which differs depending on the planning frameworks and management arrangements. However, the debate on best practices in planning, financing, and managing sanitation infrastructure takes place mainly globally. An essential role of global actors is to provide consultancy, finance, and operating infrastructure, often through public–private partnerships.

In the global discourse, unbundling of network infrastructures for decentralization and the flexible combination of modular sanitation technologies are considered the most promising solutions for sustainable sanitation in the face of rapid urbanization, worsening water scarcity, resource depletion, and climate change (Larsen et al. 2016). In the last twenty years, 'disruptive' technologies and 'paradigmatic' planning approaches to sanitation have mushroomed. These range from integrated water resource management (Biswas 2008), the polluter-pays principle (François, Correljé, and Groenewegen 2010), adaptive management (Pahl-Wostl et al. 2010), and blue-green infrastructures (Hamel and Tan 2022) to potable reuse (Ormerod and Scott 2012), source separation and urine recycling (Wald 2022), resource recovery and reuse (RRR) (Rao et al. 2017), sustainable sanitation (SuSanA) (Andersson, Dickin, and Rosemarin 2016; Panesar et al. 2009), the sanitation value chain (Trémolet, Evans, and Schaub-Jones 2010; BMGF 2010; Tilley et al. 2008), and the circular sanitation economy (Mallory et al. 2020). The various approaches generally emphasize the role of modular technologies and the view that there is no one-size-fits-all solution for sustainable urban water management in the face of increasing environmental pressures and rapid urbanisation (Hoffmann et al. 2020).

For cities of the Global South, with less sunk investment in infrastructures, the focus lies on combining non-sewered and sewered sanitation systems at the city scale. In such contexts, citywide inclusive sanitation (CWIS) is an emerging and popular approach. The core of CWIS is a flexible combination of sewered and non-sewered sanitation systems depending on what best suits the local urban context (Gambrill, Gilsdorf, and Kotwal 2020). A particular feature of CWIS is its inherently territorial claim to extend sanitation across the city, including to low-income and informal settlements. Because CWIS optimizes the combination of all existing technology solutions at the city level, the approach is potentially transformative (Lüthi, Willetts, and Hoffmann 2020). CWIS has been able to quickly gather widespread global support, including the World Bank, agenda setting actors such as the Bill and Melinda Gates Foundation, and big four consultants such as EY (Heidler, Louis, et al. 2023).

CWIS has become part of the paradigm shift to achieving safe sanitation for all by 2030 as defined in the globally agreed Sustainable Development Goals (SDG 6.2). Currently, progress in expanding access to safe sanitation is falling short of expectations (UNICEF and WHO 2020). Progress is also much slower than the expansion of other basic infrastructure and services such as water supply, transport, and electricity (United Nations 2021). The main obstacles to accelerating expansion are the high investment costs, long planning horizons, and high water consumption of the conventional 'modern' solutions of sewerage and wastewater treatment plants (Reymond, Renggli, and Lüthi 2016). Thus, the wide acceptance and rapid adoption of the CWIS approach can be understood

as a departure from the logic of the modern city ideal in the sanitation sector. Consequently, CWIS may signal a potential transition towards more 'modest imaginaries' (Lawhon, Nsangi Nakyagaba, and Karpouzoglou 2023).

CWIS's most distinctive feature is that its choice of the right option for the right territorial space is predominantly approached from a technocratic perspective. Thus, decision support tools and idealized planning processes are key to supporting decision makers in applying the CWIS concept (Narayan 2022; Spuhler and Lüthi 2020). However, political ecology and political economy research on sanitation systems have shown that political frameworks (Tsinda et al. 2021), 'political will' (Moe and Rheingans 2006; WaterAid 2021), and historically evolved power relations between actors in the sanitation system at city, national, and global levels (Sanchez 2019; Nakyagaba et al. 2021) are equally limiting factors for successful implementation and operation of new sanitation infrastructures (Abeysuriya et al. 2019). Taken together, this literature underscores how the technical and technocratic solutions to expanding access to safe sanitation are inextricably linked to the social, political, and economic arrangements they mediate or entail. I, therefore, maintain that sanitation infrastructure development is to be understood as involving the inherently political process of negotiating these arrangements and, in particular, the distribution of costs, benefits, opportunities, and risks that each arrangement entails. I ask: What are the different sanitation systems that are possibly combined at the city level within the CWIS paradigm? How does the global CWIS discourse influence the combination of sanitation systems at the city level and across different city zones, such as business districts, residential areas, or informal settlements? What social, political, and economic arrangements are embedded in these systems and how do they interact with spatially distributed socio-economic communities? How are roles and responsibilities divided between the various actors in society? And how does the spatial, temporal, and social distribution of costs, benefits, risks, and opportunities embedded in particular sanitation systems further or hinder inclusivity and equality between the different citizens?

To approach these research questions, I first theorize the global–local–spatial interaction by introducing the territorial political economy (TPE) framework, which I derive by combining insights from urban political ecology research on sanitation and international political economy theory. I then use the TPE framework to propose a typology of five sanitation bargains, each representing a typical combination of technology, organisation, and finance, with the corresponding distribution of costs, benefits, risks, and opportunities. The typology can be used to analyse existing sanitation systems in their territorially anchored manifestation. When expanding sanitation services to so-far unserved areas in the city, applying the TPE framework overcomes the limitations of CWIS in its current form to explicitly consider the implications of embedded structural power on households when assessing and selecting technological options and organizational models for distinct territories across the city scale.

6.2 Urban Political Ecology and International Political Economy: Understanding Sanitation as Territorial Structuring of Public Issues

Political ecology is rooted in critical social theory and a postpositive understanding of nature. It posits that the relationship between humans and nature is inextricably linked to the social relations in which access to natural resources is embedded. Technocratic and neo-institutionalist understandings of sustainability are rejected because they overlook the importance of power and the distributional effects that technologies and institutions convey. Instead, political ecology is interested in how structural power shapes access to and control over resources (Bridge, McCarthy, and Perreault 2015). Political ecology focuses on understanding access to resources, from land, forest, and wildlife to extractive industries and water (Ioris 2012). Similarly, the identification, location and disposal of waste is seen as a process that is as political as the organisation of access to urban resources and the spatial

structuring of cities (Cornea, Véron, and Zimmer 2016; Millington and Lawhon 2018). Research in urban political ecology (UPE) on waste and pollution has examined air pollution (Véron 2006), solid waste management (Cornea, Véron, and Zimmer 2016; Stokes and Lawhon 2022; Makina and Lawhon 2022; Thieme 2015; Thieme 2010), and sanitation (Karpouzoglou and Zimmer 2016; Deelder 2013; McFarlane and Silver 2017). Research in UPE on sanitation has examined cities from historical and contemporary perspectives in the Global North (Silver 2019; Pauli 2020; Swyngedouw, Kaika, and Castro 2002; Gandy 2006a, 1998) and Global South (Gandy 2008; Gandy 2006b; Karpouzoglou and Zimmer 2016; Truelove and O'Reilly 2020; McFarlane, Silver, and Truelove 2016; Truelove 2011; Sanchez 2020, 2019). These studies have emphasized urban sanitation's political and public dimensions as a negotiation between citizens from different urban settlements, governments and global players, mediated by diverse private and public interests. Most research in UPE uses case studies that foreground the local, and the link to global processes is predominantly considered through a bottom-up approach. Such studies start from the concrete materialization of 'the global' in particular territories of the cities studied, either through the presence of 'global actors' such as the World Bank, multinational companies, global philanthropies, and international nongovernmental organizations or 'global ideals' such as modernity, new public management, and integrated water resources management. While UPE studies on urban sanitation integrate scalar dimensions from the local to the global, they are guided by what emerges from a particular case. Given the importance of the global discourse and global actors, a more systematic engagement with the global dimension of sanitation policy and practice is needed, for which international political economy is particularly suited.

International political economy (IPE) and UPE share a common interest in the power to shape and determine the structures within which others have to operate. IPE and UPE focus on how the underlying structures of society are constantly in the making and contested between different actors and their interests. Viewing all structures as malleable in the short or long term is what distinguishes UPE and IPE from problem-solving theories that take the underlying structures as given. Rather than offering solutions, IPE and UPE see their central scientific endeavour as asking: cui bono? How does structural power work to the advantage or disadvantage of particular social groups, perpetuating advantages or disadvantages, and who benefits from them (Strange 1988)?

UPE primarily takes a bottom-up approach that focuses on the local struggle over access to urban resources and is primarily concerned with the intersection of structural power in the production of cities. For IPE, analysing structural power starts by addressing global relations between states and markets to understand the rules of globalization and how they shape local contestation and thus follows a top-down approach. By asking who writes the rules of globalization and who benefits from them, IPE studies how diverse interests and forces prevail in the global arena and how they interact with the specific local interconnections and realities of everyday life (Cohen 2008).

Central to IPE's theory of structural power is the concept of the bargain. A bargain denotes agreements that public and private actors strike over public issues. A bargain comprises three essential elements. The first is the degree to which an issue is perceived as a public or private responsibility. The debates about vaccination in general and compulsory vaccination during the COVID-19 pandemic are examples of how health is perceived by some as a public responsibility and by others as a private matter. The second is the social, political, and economic agreements and measures that sustain the bargain. The perception of the COVID-19 pandemic as a public issue has altered social conventions profoundly, from restricted mobility through lockdowns to compulsory vaccination when entering private and public spaces; it has also drastically changed the economics of vaccine production through,

among other things, a rapid influx of subsidies and triggered a dispute over the political arrangements governing intellectual property claims to vaccines. Third, bargaining is influenced by structural power and has lasting effects by creating path dependencies through formal and informal institutions and the physical restructuring of societies through technical artefacts that maintain the bargains of public and private actors. The COVID-19 pandemic has shown the influence of structural power in the different strategies adopted by governments, from zero COVID in China to the different strict interventions in Europe to more liberal approaches in the United States. The fact that pharmaceutical and technology companies are among the main economic winners of the pandemic years can also be understood as an effect of structural power.

To understand which interests are embodied in a bargain, IPE analyses four dimensions of structural power: security, production, finance, and knowledge. Thus, in contrast to monocausal theories such as international relations, which foregrounds the security structure, or Marxian approaches, such as UPE, which foreground the production structure, IPE argues that structural power emanates from four interrelated dimensions (Haggart, Henne, and Tusikov 2019). In the security dimension, structural power lies with those that can provide or deny physical security. In the production dimension, structural power lies with those who can determine what is produced and by whom and who can consume production. In the finance dimension, structural power lies with those that have the ability to create money and determine the conditions for access to credit as well as deny it. In the knowledge dimension, structural power lies with those who have the authority to determine what is considered legitimate knowledge and who can create, disseminate, and use this knowledge (Strange 1988). Because the legitimation aspect of the knowledge dimension is closely intertwined with the other three dimensions, I follow those authors who do not treat knowledge as a separate structure but as integrated (May 1996).

6.3 The Territorial Political Economy Framework

I develop the territorial political economy (TPE) framework to build and analyse a typology of sanitation bargains, which I understand as ideal-typical representations of infrastructure systems, the social, political, and economic arrangements accompanying them, and their spatial, temporal and social distribution of costs, benefits, risks, and opportunities. Broadly speaking, the public issue in sanitation has evolved since early industrialization from a concern about public health through the protection of water ecosystems and the reduction of pollution to the climate-resilient management of the resources that flow through household wastewater. These developments are well documented, for instance by Sedlak (2014) for water and sanitation or Halliday (2019) for sanitation alone, so we do not elaborate on them here.

The TPE framework builds on UPE's reading of the production of sanitation systems as inherently political processes. I complement this approach with IPE theory, which conceptualises the outcomes of such political processes as bargains public and private actors strike over public issues. IPE highlights that such bargains can be analysed in terms of four dimensions of structural power. In this way, the TPE framework extends the focus on the production structure from UPE with the security and finance structure, while it emphasizes the legitimation aspect of the knowledge dimension, which it approaches as integrated into the production, security and financial structure.

The security structure concerns who is able to provide or deny physical security. Although most IPE studies limit security to protection from violence and war, the protection against, control of, and response to public health threats, of which sanitation is part, also belongs to the security structure (WHO 2007; UN Water 2013). This is

also evident in the wording of SDG6.2, which stresses access to safe sanitation for all by 2030 (Herrera 2019). More generally, it is an established fact that the constant production of human faeces in urban environments is a safety risk to human health and the functioning of surrounding water ecosystems (Mara et al. 2010). In IPE terminology, structural power lies with the public or private actors who can grant or deny security through safe sanitation in their role as service providers and/or regulators, which they are assigned under a particular sanitation bargain. Territorially, this translates into different levels of security that the sanitation system offers across the spaces of the city from the household to the neighbourhood and city scale.

The production structure is concerned with what type of sanitation system is produced and by whom and who can use it. The 'what' concerns the various technological options deployed, including the technologies for capturing faeces (e.g. containers, pits, septic tanks, sewer connection); for transporting them from human settlements (e.g. sewers, vacuum trucks), and for disposing of them with or without treatment (e.g. faecal sludge treatment plants or wastewater treatment plants). Here, the knowledge structure translates systems between spaces through, for example, global engineering services, global technology standards such as ISO (Miörner and Binz 2021), and aspirations to a modern city ideal (Monstadt and Schramm 2017). The 'by whom' concerns the organization of the sanitation system. The organization can be aligned to individual responsibility and market mechanisms to compulsory central provision through network solutions by either public or private monopolists. Here, institutional blueprints and best practice for organizational arrangements can be translated from the global level to the local, for instance, by consulting and as a condition for credit (Heidler, Louis, et al. 2023). Territorially, the logic of whether and how sanitation services are expanded to every corner of the city can be either demand-driven at the request of households or supply-led through default installation and operation by public or private actors. Finally, the production structure includes the model by which operation and maintenance are financed. Options include taxes, paid directly through the public budget but unrelated to the level of pollution households cause; tariffs, generally paid by users according to a 'polluter pays' logic; transfers, cross-subsidies from external actors or different levels of government; and a combination of these (Barraqué 2020). The combinations of infrastructure, operational modalities, expansion logic, and payment models directly affect who can access the services at what cost (Danert and Hutton 2020).

The finance structure concerns who controls the availability of capital and credit for investment, which differs from the financial flows needed to operate a system. In sanitation, the role of capital is first evident in the large differences between the capital intensity of various systems (Hoffmann et al. 2020; Dodane et al. 2012). If a sanitation system is capital intensive, as with sewerage and treatment plants, the structural power of actors managing access to capital is much larger than in systems that are capital extensive, as is the case with non-sewered sanitation. Actors who regulate access to credit can be private, public, or multilateral banks; the public sector can also raise capital through municipal or national bonds. Other actors providing capital include charities and philanthropies. The capital providers decide what technologies and organizational arrangements they finance, whom they lend money to, and what terms they offer. The territorial aspect of finance is expressed through the places and spaces of capital generation and anchoring (Grafe 2020). Vertically, the lender is situated somewhere between the global, such as a multilateral development bank, and the local, such as a municipal bond. Horizontally, capital is made available for distinct parts of cities, which can be simplified as business districts, residential areas, and informal settlements. The situation of the lender and the places of capital lending have to be considered in conjunction.

The TPE framework makes it possible to explore the territorial aspects of sanitation systems in two complementary ways. Horizontally, the TPE framework scrutinizes how sanitation systems structure the geography of a city. The presence of water-borne pollution and disease amongst others make visible how the costs and benefits and risks and opportunities of safe and unsafe sanitation are distributed in spatial, temporal and socio-economy terms across the city. Territory, in this sense, is understood as subject to various historically contingent intentions and appropriations that mark it and thus becomes the matrix in which structural powers operate and on which they imprint. Vertically, the TPE framework analyses the role of dominant actors in the security, production, and finance structure according to where they are situated between the global, such as INGOs, multilateral development banks, or the 'big four' consultants and the local, such as sanitation enterprises, community based organizations or municipal authorities.

6.4 Data and Methods for a Typology of Sanitation Bargains

The TPE framework is a heuristic for the analysis of different sanitation systems. It enables researchers to discern who yields structural power, and thus who benefits by perpetuating their interests in the structures of a particular sanitation system. This can be described by discussing how each bargain entails a distinct structural distribution of the costs, benefits, risks, and opportunities between the actors and socioeconomic groups involved in and affected by sanitation systems. I operationalize the TPE framework by creating a typology of sanitation bargains. The empirical material I analyse for this purpose comes from several types of sources: The first are interviews with experts in academia (5), international NGOs (2), international organizations (2), the private sector (5), and from utilities (4). The second are scientific case studies of different sanitation systems, policy literature on water and sanitation, and key policy documents. To contrast with and complement the documents that focus on specific sanitation systems, I draw on scientific work on the historical development of sanitation systems. This information allows me to identify the qualitative characteristics of specific sanitation bargains in an iterative process. The interviews guided the identification of distinct patterns in the extensive literature covering sanitation systems over time and space, including debates on sanitation technology, operations, and funding at local and global levels. I then identified various cases that share these patterns and looked into the specific cases more closely. Finally, I zoomed out again to formulate the typology by reflecting on historical and present examples and with reference to key policy documents and literature.

6.5 A Typology of Sanitation Bargains

The following sections outline a proposed typology of five sanitation bargains. Under each bargain, access to sanitation is provided through a particular configuration of and arrangements in the production, finance, and security structures. The five bargains are labelled with and presented around the actor who plays a crucial role in the bargain by its ability to provide or deny physical security through sanitation servicing (see Table 1 for a summary). The bargains are introduced as ideal types. Real-life versions tend to be more blurred and carry elements of different bargains.

Table 1: a typology of bargains for the provision of safe sanitation.

Bargains	Household	Municipality	Utility	City Works	Enterprise
Technological System	Non-sewered, unimproved[6]	Sewers (cordon sanitaires) & WWTPs	Sewers & WWTPs	Non-sewered, improved	Non-sewered, improved
Organizational Model	Reactive, household centered	Authoritative & supply led city or nation centered	Reactive based on perceived ability to pay. Network expansion based on return-on-investment calculations.	Proactive base on supply b the cityworks. Coordination of the sanitation service chain is ensured by public actors.	Reactive based on household demand; coordination of the sanitation service chain through market mechanism
Finance	No role for credit / capital	Local public capital / credit	Local & global private capital	Small role for capital	Small role for capital
Security	Security for some,	Security for all (that are perceived as part of society)	Security cities and neighborhoods attracting (global) capital	Security for all	Security for households articulated through economic demand
Distribution (cost, benefits, risks, opportunities)	justified through intersectional discrimination	Justified through city / national patronage	Justified through efficiency in economic (cost-recovery) and technical (network efficiency) terms.	Justified by a right to the city / the residence in a city	Justified through market logic / mechanisms

6.5.1 Household Bargain

In the first bargain, the household takes the leading role. Sanitation is a private affair and largely depends on its affordability for the individual household. It is the oldest bargain but still prevalent in fast-growing cities in the Global South. The household bargain is organized around containment technologies at the scale of the house, such as containers, pits, and septic tanks, without any treatment infrastructure. Households purchase or construct containment infrastructure. To empty pits and septic tanks, the household hires an informal private service provider. These are typically individuals from lower social strata: culturally and/or socially stigmatized groups. Their names are euphemistic and mask the unhealthy and degrading nature of their work. Historical examples of their important role in the functioning of the household bargain are reported for the 'night soil men' of the Victorian Great Britain and in China, Japan, and Switzerland (Illi 1992; Ferguson 2014). Reports on the contemporary role of manual emptying refer to, amongst others, the 'frogmen' in East Africa (Jenkins, Cumming, and Cairncross 2015; Grisaffi et al. 2022; Mallory et al. 2021) and the 'sweepers' in Bangladesh (Zaqout et al. 2020). Most of them work with no or very rudimentary tools and no or insufficient protection gear. All services and technologies are provided in an informal market. The government is absent as a service provider and as a regulator. Wastewater

[6] *Un/Improved* according to the definition of the joint monitoring program (JMP) (UNICEF and WHO 2020).

or faecal sludge is discharged into the environment. In the household bargain, the finance dimension is of limited relevance, as there is rarely any investment that cannot be covered out of pocket. Thus, the arrangements that govern access to credit are of little relevance. Households bear all costs related to sanitation through out-of-pocket expenses. Households can gain security only from informal, manual pit emptier, who deliver it by taking great personal health risks (Chumo et al. 2021). Despite this unhealthy situation for manual emptiers, they continue to provide their services reliably for households because they are forced into their roles through intersectional marginalization in social, cultural, economic, and gendered terms and have no option to leave (Monteiro and Nalini 2021; Raghavendra and Kumar 2022; Philippe et al. 2022). Although the household bargain remains widespread, particularly in rapidly urbanizing areas of the Global South, it cannot provide safe sanitation. First, it rests on the principle that certain groups in society sacrifice their health for that of others, and second, public health is not addressed as a public issue. The provision of sanitation in the household bargain is, next to open defecation, the type of sanitation that should be ended by SDG 6.2.

6.5.2 Municipality Bargain

The second bargain places municipal authorities in the driving seat. The municipality bargain is driven by the view that sanitation is a severe public health risk threatening the rich and the poor. Hence, addressing this risk is seen as a central duty of city authorities (Szreter 2002; Rosner 2020). This view sprang from the epidemic experience of waterborne diseases during early industrialization (Halliday 2019) and later became a sign of progress and the modernity of a city (Kaika and Swyngedouw 2000). Over time, the priority of protecting public health was extended to protecting water ecosystems. Against the backdrop of burning rivers and dying lakes due to eutrophication from municipal and industrial effluents, and with the strengthening of nation states, the urge to protect national water ecosystems developed. (Federer 2015; Kline 2011).

The focus on protection has implications for the organizational structure. The municipality bargain is organized around technologies that enable entire cities and their surrounding water ecosystems to be protected from disease and pollution: vast sewerage networks and centralized wastewater treatment plants (WWTP) (Mengist 2020). The system is operated and managed by municipalities along the principles of public administration (Mumssen, Saltiel, and Kingdom 2018). The municipal budget fully covers the costs for operation and maintenance of the sanitation system from tax revenues (Gandy 2006b; Acey et al. 2019). The security dimension is exclusively occupied by public actors. Municipalities act as service providers, and national ministries as regulators. In its ideal form, the planning spaces include the entire city area; sewered sanitation covers all localities the same way across the urban territory. Accordingly, territorial expansion of the sanitation system is supply led and top down by the use of eminent domain and displacement to make room for infrastructure (Gandy 1998).

In the municipal bargain, the finance dimension becomes important because of the very high investment requirements for sewerage networks and WWTPs. Under Keynesian economic ideals of the mid-20th century, sanitation was approached as a strategic tool for developing cities and nations by providing the same levels of service to all citizens. Followingly municipalities were able to create credit to cover the investments, either through issuing bonds, which means they are able to generate credit under terms that they define, or they lend from national or multilateral development banks, meaning that national or international public actors determine the conditions to access credit (Larsen et al. 2016; Crow 2007).

The lion's share of the costs of the sanitation system are covered by public actors, the municipal and national authorities, and private actors play a negligible role. The benefits of public health and functioning ecosystems can be enjoyed by all citizens, and the opportunities for the entire urban population to shape their lives increase. Risks from pollution are drastically decreased, yet new risks are also created through overspending, overusing water, and overusing and not recovering other resources that flow through wastewater.

Sanitation systems in line with the municipal bargain were first described for industrializing cities confronted with the spread of cholera. It is thus impossible to describe the municipality bargain without reference to the colonial context in which it first emerged. Under the global political economy of colonialism, the ability of industrialized municipalities to generate capital by issuing bonds and taxing depended critically on the exploitation of people and nature in the colonies (Bhambra 2020). As a result, in imperial centres of the Global North, the safeguarding of public health through sewer networks became the norm. In stark contrast, in colonial centres across the Global South, the spread of diseases such as cholera was prevented through racial–spatial segregation with *cordons sanitaires* (Beverley 2011; Stock 1988). *Cordon sanitaires* are used to contain the spread of disease, from the bubonic plague in medieval Europe to the separation of entire cities from the outside world during the COVID-19 pandemic. In colonialism, however, they were not used to respond temporarily to pandemic outbreaks, but to permanently separate the 'unhealthy' colonised from the 'healthy' colonisers. This was cheaper than building sewers, which were only implemented in areas inhabited by settlers to provide a European lifestyle and to manifest the power of the colonizers (Njoh 2009; Beverley 2011). Segregation through *cordons sanitaires* is a particular example of what Achille Mbembé (2003) called 'necropolitics', because it dictated the unhealthy living conditions of the colonized, giving them the status of the living dead.

The municipal bargain remained the dominant mode of sanitation provision in the Global North until the 1980s, before the utility bargain started to spread. As the recent increase in remunicipalization endeavours shows (McDonald 2018; McDonald 2019), the municipality bargain is not a historical period or a dusty modern ideal, but a coherent arrangement of technological, social, and political systems that continues to influence the design of sanitation systems today. The territorial dimension is horizontally characterized by the prioritization of the municipality, which aims to serve all citizens of the city. Most cases show that it tends to be applied inclusively, but if entire groups of people are not considered equal, it can also be very exclusionary, as the case of *cordons sanitaires* shows. Vertically, the global level is of limited importance. It is most visible in the importance of multilateral development banks for sanitation investment projects, especially for low-income countries (Heidler et al. 2023).

6.5.3 Utility Bargain

The utility bargain has much in common with the municipality bargain in its provision of sanitation through sewer networks and centralized WWTPs, but it differs in all other aspects of the production structure and the finance and security structures. The key actor is not the municipality but the utility, which is in charge of service provision. The utility is a ring-fenced and autonomous entity, ideally an incorporated firm owned by public capital, private capital, or a mix (Finger and Allouche 2002). The utility provides the sanitation services on behalf of the municipality under a contractual agreement and operates along new public management principles or commercial principles if the municipality divests itself of the water and sanitation sector completely (Bakker 2003; Hall, Lobina, and Terhorst 2013). Efficient service provision is ensured by competition for the market. Contractual public-private partnership agreements differ in how asset ownership, capital investment, commercial risk,

operation and maintenance are distributed between public and private actors (Budds and McGranahan 2003). Households pay for services through cost-reflective tariffs set by the utility that cover the cost of operation, maintenance, and credit (François, Correljé, and Groenewegen 2010; Abeysuriya, Mitchell, and Willetts 2005). The focus on cost-reflective tariffs has territorial implications. Although expansion is supply-led and shall extend to the entire city, prioritization of territorial expansion is guided by the future customers' ability to pay (Lüthi, McConville, and Kvarnström 2010; Adusei et al. 2017).

In the finance structure, the ability to deny or provide water and sanitation investments with access to credit lies with global commercial banks and investors (Cruxên 2022). In line with new public management principles, subsidies and public funds are phased out as sources of capital to cover investments and are replaced by commercial credit or by public–private partnerships (Finger and Allouche 2002; Mumssen, Saltiel, and Kingdom 2018). Private utilities, such as Suez and Veolia that operate in line with the utility bargain have existed since early industrialization (Schiffler 2015; Public Citizen 2004), yet the high tide of the utility bargain started after the neoliberal turn in the 1990ies (Leopold and McDonald 2012). While the creation of utilities mushrooms, global capital has shown little appetite in providing credit to the (water and) sanitation sector (Heidler, Nesi, et al. 2023). As a result, various attempts to attract global private capital, such as blended finance, in which public funds are used to leverage private capital in line with the private lenders' rules and conditions, characterize the finance structure under the utility bargain today (Goksu et al. 2019; Goksu et al. 2017).

Utilities, municipalities, and public regulators share the power to ensure security. The municipality is still responsible for providing access to safe sanitation, which it outsources to the autonomous or private utility. It monitors compliance by establishing a regulator who ensures environmental and social standards are met (Lonholdt 2005). In TPE terms, the regulator not only ensures the quality of the sanitation system but is also responsible for balancing the powerful roles of utilities and municipalities in the security structure so that no actor uses the security structure to dictate the terms under which security is provided or denied.

Costs fall to a larger degree on households who ideally finance the entire sanitation system through cost reflective tariffs. The benefits of public health and functioning ecosystems can be reaped by all citizens in case of full network extension. Furthermore, it proposes sanitation infrastructure as an investment opportunity and their operation as a business opportunity to globally operating private utility companies. Yet, the utility bargain bears the risk of not extending access to safe sanitation to cities and areas inside cities that are unable to attract investments or cover the costs through tariffs.

6.5.4 Enterprise Bargain

The enterprise bargain has in common with the utility bargain the importance of market mechanisms and the central roles of private actors in the production, finance, and security structure, but it differs critically in the technologies employed. Sewers and WWTPs are replaced by modular technologies such as septic tanks, vacuum trucks, and decentralized faecal sludge treatment plants. The enterprise bargain is organized around the sanitation service chain, from containment to emptying, transport, and treatment, along which independent enterprises provide different technological solutions and services for safe sanitation (Tilley et al. 2008; Trémolet, Evans, and Schaub-Jones 2010; BMGF 2010). The immense advantage of this approach to reaching densely populated settlements lies in the flexible combination of various technologies according to what fits best (Gambrill, Gilsdorf, and Kotwal 2020). The enterprises provide sanitation services in a market environment, the 'sanitation economy',

run on commercial principles. The territorial implication of the enterprise bargain's market logic is that the expansion of access is driven by households' demand for safe sanitation and their ability to pay for it (Mallory et al. 2020; Couder and Kibutu 2020; Adusei et al. 2017).

This implies that the security dimension loses importance compared to the supply-led utility bargain and even more so to the top-down municipal bargain. In the enterprise bargain, security in the form of safe sanitation is not led by supply or provided top-down by default as a requirement but allowed to emerge based on household demand as an optional service. Assuming that similar protection can be acquired by other means, such as packaged food and water (Kooy and Walter 2019), vaccination and medical treatment against waterborne diseases such as cholera (Khan et al. 2018), sanitation becomes an 'opt-in' feature that is suggested to households through social marketing, demand stimulation, and behavioural change interventions (Barrington et al. 2017). In line with new public governance principles (Mumssen, Saltiel, and Kingdom 2018), the government's role is to incentivize demand and regulate this sanitation economy to guarantee fair competition and ensure environmental and safety standards are observed (IWA 2021; WSUP 2020).

The financial dimension differs in two ways from those of the utility and municipality bargains. First, non-sewered sanitation solutions are far less capital intensive, cost sunk in infrastructure investment is lower, and return on investment shorter (Hoffmann et al. 2020). Second, in the sanitation economy, as the enterprise bargain is called in the sector, corporate philanthropies, angel investors, and impact investors that are more akin to investments in start-ups, play a leading role in creating credit and determining conditions to access it. Currently most investments in non-sewered sanitation are coupled to the search for new enterprise models that can shape the development of a transformational sanitation (Coates and Knezovich 2020). As investors and enterprises embark in expectations of a profitable business, the expansion of the sanitation system is driven to areas of the city where households are able to articulate the need for safe sanitation as an economic demand. While governments aim to steer the expansion in a pro-poor direction, studies indicate that incentivizing the sanitation economy is far from straight forward and subsidies are captured by enterprises rather than enabling access to safe sanitation low income communities (Mpanang'ombe, Bray, and Tilley 2021).

Costs in the enterprise bargain are covered entirely by households through out-of-pocket expenses, which is possible through the drastically lower total cost of non-sewered sanitation systems and circular business models that gain additional income from selling resources recovered from faecal sludge (Mallory et al. 2020). The benefits of public health and functioning ecosystems are more splintered across the city and generally more affluent areas which can afford to pay for safe sanitation (van Welie 2019). Furthermore, sanitation emerges as an economic sector providing business opportunities for small local entrepreneurs, global technology developers, and other companies. Yet, the enterprise bargain bears the risk of limited protection of public health and water ecosystems where households in the city are unwilling or unable to express an economic demand for safe sanitation.

6.5.5 Cityworks Bargain

Whereas the first four bargains form coherent discourses, the fifth and final bargain is only fragmentarily articulated in research and policy. To my knowledge, there is no coherent description of a sanitation system that aligns with the cityworks bargain. Therefore, I derive the cityworks bargain from the analytical framework and illustrate the elements with examples of its materialisation in cities and discourses.

The cityworks bargain takes the technological flexibility of non-sewered sanitation as a starting point and combines it with the central role of public actors, such as cityworks in the production structure, public banks in the finance structure, and regulators in the security structure. Access to safe sanitation is supply led and authorities ensure that all households are provided with safe sanitation. The planning logic is focused on integration and the spatial planning horizon includes all areas of the city that are not yet served. This is opposed to the demand-driven approach in which safe sanitation is merely 'nice to have' at the discretion of households. The priority of the security dimension is grounded in the view that households produce sewage in any case, and that managing this sewage is a key public responsibility, because unsafe sanitation poses a risk to the functioning of society by threatening public health and the environment.

The prioritization of security has implications for the production and finance dimensions. The cityworks is in charge of organizing the entire sanitation system through a flexible combination of all available technologies to fit best each situation. In non-sewered systems, the public authority, not the household, takes responsibility for safe containment, as safe sanitation is impossible without safe containment. This blurs the boundaries between public and private components of the sanitation system, which are generally presented as clearly separated by property boundaries (Kennedy-Walker et al. 2020). Rather than simply enforcing safe containment, the public authority subsidizes containment through targeted schemes or even proactively constructs private or communal containment infrastructure. A prominent example is the Swhatch Bharat Mission in India, which has provided over 20 billion USD in subsidies to finance containment infrastructure for rural sanitation (Mehta 2018; Luthra 2018). For simplified sewer systems, as the example of Dar es Salaam shows, the cityworks constructs household connections up to the squatting pan, ensuring that households are connected regardless of their willingness or ability to pay (Luptan 2022). Concerns about public health security even imply that, in the case of Dar es Salaam, the boundary between public and private components of the sanitation system has consciously been blurred.

Pit emptying and transport of faecal sludge are led and controlled by the public authority through scheduled emptying at regular intervals to ensure that no wastewater is released into the households or surrounding areas at any time. The public authority carries out scheduled emptying or contracts it to utilities, NGOs, community-based organizations, and companies (Mehta, Mehta, and Yadav 2019; BORDA 2019). Because the organization of sanitation is supply led, the operation and maintenance of the sanitation system is financed by combining tariffs according to pollution where possible and cross-subsidies from taxes or transfers where households do not have the ability to pay. The use of cross-subsidies between different sanitation systems and socio-economic groups breaks with the full cost recovery principle enshrined in the utility and enterprise bargains. Research from Kenya demonstrates that more affluent households support the idea of cross-subsidies and are willing co-finance sanitation services in low-income areas. Acceptance is highest when the additional levy is an eight per cent top-up on their sanitation fee and is transparently shown on the bill (Acey et al. 2019).

As with the enterprise bargain, the finance dimension is less relevant in the cityworks bargain because capital needs are significantly lower for non-sewered sanitation technologies such as pit latrines, vacuum trucks and faecal sludge treatment plants (Dodane et al. 2012). Because the public authority is in charge of the entire sanitation service chain, it can further distribute the cost of constructing containment infrastructure between users of different systems as well as over time. This is crucial in cases where the upfront investments for containment cannot be borne by households (Danert and Hutton 2020). With reduced investment needs, public actors are increasingly able to provide the capital and credit for investment in water and sanitation infrastructure, e.g. through government

loans or bonds. Studies have shown that participatory budgeting at the city level has the potential to increase investment in water supply and sanitation, even if it results in additional costs for the population through higher taxes (Novy and Leubolt 2005; Cabannes 2004; Menegat 2002). The growing importance of public banks and regional development banks, also in financing public infrastructure, is another example of how public actors are taking more influence in the finance dimension (McDonald, Marois, and Spronk 2021).

6.6 Discussion & Conclusion

As decentralisation and flexible combination of different technological solutions for citywide inclusive sanitation (CWIS) is likely to increase in the coming years to achieve SDG 6.2, it is important to have more theoretical clarity and stronger empirical evidence on what is combined in a given situation. This understanding should go beyond technological solutions and stress the spatial and temporal aspects of the distributional effects associated with the infrastructures deployed.

To this end, I introduced the territorial political economy (TPE) as an analytical framework and derived a typology of sanitation bargains. The typology presented in Table 1 identifies five sanitation bargains and presents them by indicating their ideal type. Their detailed descriptions outline the variants that can be observed across space and time, which are tend to be more blurred.

The household bargain is the ideal type of unsafe sanitation among the five bargains. The provision of sanitation aligned to the household bargain is, next to open defecation, the type of sanitation that SDG6.2. aims to end. The analysis of the household bargain with the TPE framework highlighted how unsafe sanitation through manual emptying persists as a result of a particular distribution of structural power rooted in intersectional discrimination against minorities in religious, cultural, economic, gendered terms.

The remaining four bargains, the municipality, utility, cityworks, and enterprise bargain, deliver access to safe sanitation. Figure 1 summarizes the four ideal-typical sanitation bargains in a two-by-two matrix along dominant actors in the dimensions of structural power and core technological system. These two aspects have emerged as the primary distinctions between the different sanitation bargains. On the technology aspect, bargains differ whether they are built upon network infrastructures such as sewers and WWTPs or whether the technological system is unbundled into functional groups, as is the case with non-sewered sanitation. On the actor aspect, the key distinction is whether public authorities or private players are dominant in the security, financing and production structures. In sum, Figure 1 underlines that the introduced sanitation bargains form ideal typical corners in relation to which different sanitation systems are designed and implement. Citywide inclusive sanitation should thus be understood in relationship to them.

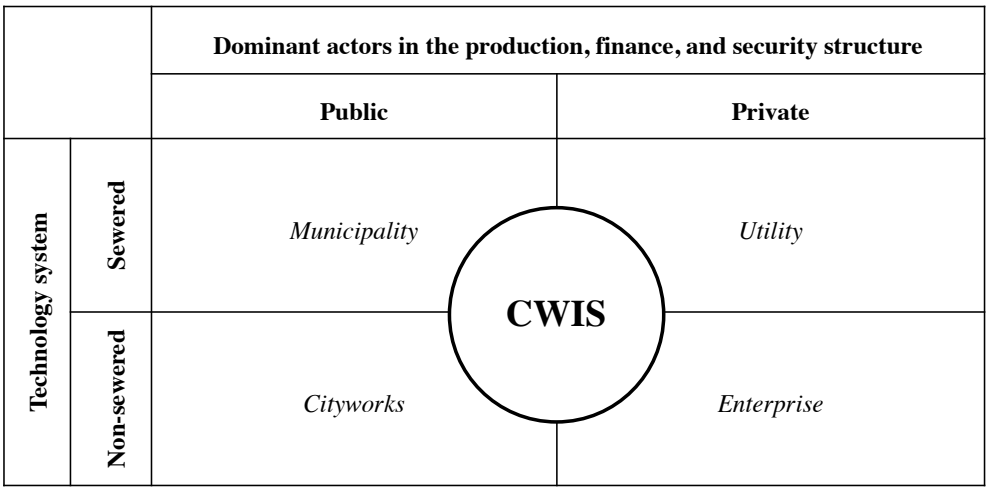


Figure 9: Ideal type sanitation bargains in reference to key dimensions (source: author).

The attention devoted to each bargain by policy and research differs. The municipality bargain has been the centre of research and policy for decades. It is considered the expression of modernity in sanitation, yet increasingly criticized as a resource intensive and illusive one size fits all approach that hinders development. The utility and enterprise bargains are currently most prominent in research and promoted by key policy actors to the point that they have been propagated as the new standards for sewered and non-sewered sanitation respectively. In contrast, proponents of the cityworks bargain tend to be mavericks that have not yet established a coherent research or policy agenda.

This is also reflected in the CWIS agenda. The propagation of a flexible combination of technological solutions is at odds with its narrow focus on private actors dominating the production and finance structure. This leads to the combination of organisational and financial arrangements as a matter of principle and not dependent on context. A prominent example are the regulatory blueprints for creating enabling environments for the sanitation economy (Coates and Knezovich 2020). The focus on new business models further leads to a territorial expansion logic guided by future users-as-customers' ability to pay. City territories inhabited by wealthier socioeconomic groups are more likely to get the environmental and health benefits of safe sanitation while city areas inhabited by people to not able to express demand for sanitation services on the market continue to live in poor environmental condition and exposed to public health risks (Bala 2018). Therefore, the way the enterprise and utility bargains currently dominate the CWIS agenda tends to accentuate unequal spatial and temporal distribution of the costs, benefits, risks, and opportunities of sanitation.

This is a design flaw of CWIS, as it artificially limits the organisational and financial options for providing safe sanitation. As the Figure 1 suggests, the debate on CWIS as a ‚how to' approach for combining different technologies across urban spaces should be separated from, but related to the debate on how the actual service provision is organized and financed. Against the backdrop of a one-sided focus on promoting private actors, I argue in line with similar claims for water supply (McDonald, Marois, and Spronk 2021; McDonald 2018), that sanitation systems that forefront public actors in the production and finance structure need to be given the same consideration when designing the expansion of non-sewered sanitation to make CWIS indeed inclusive and to avoid a spatial, temporal, and socioeconomic distribution of benefits, costs, and risks that segregates

communities. To inform the debate, research into service delivery models based on the cityworks bargain needs to be intensified. To this end, I offer some starting points in the concluding section.

In order to broaden the understanding of the cityworks bargain, research should document existing sanitation systems, describe shortcomings and critical lessons for their effective functioning, possibly but not exclusively from a TPE perspective. A first effort could be to understand the different public actors responsible for the production, security and financing structure. Here a critical question to be addressed is where community based organizations and community led approaches to sanitation lie and how they fit into the picture. This is crucial as community based organizations and local NGOs are often driving forces behind the development of sanitation systems and organizational models inclined towards the cityworks bargain, an example being the 'DSK Model' in Bangladesh (DSK 2021; Heidler, Louis, et al. 2023).

Each dimension of structural power should be examined empirically and theoretically to test and improve the TPE framework. In the case of the production structure, this generally refers to the organisational model. That is the combination of the ownership of technologies and infrastructures and the responsibility for the functioning of the different steps along the sanitation service chain, in interaction with the cash flows that finance the operation and maintenance of the sanitation system. The effectiveness of a combination of taxes, tariffs and transfers with different degrees and tools of cross-subsidisation needs to be studied in detail and compared with full cost recovery through the polluter pays principle.

In the security structure, the various ways public actors monitor and enforce safe sanitation along the sanitation service chain, and the implications thereof, need to be better understood. As with sanitation infrastructures, the development of new technological solutions for monitoring non-sewered sanitation as well as an in-depth understanding of their limitations in regards to their spatial and temporal structuring of the distribution of costs, benefits, risks, and opportunities are of equal interest.

Although less investment in infrastructure is needed, the finance structure remains central to the Cityworks Bargain. The possibility of small investment for an incremental expansion of the sanitation service chain opens a range of different capital sources, including local public and community finance. Future research could explore the modalities of how such capital is generated and provided. A critical aspect to be addressed is the extent and conditions under which sanitation systems aligned with the cityworks bargain function independently of global capital flows and to what extent they depend on them.

The explicit and equal consideration of all safe sanitation bargains for CWIS, as Figure 1 indicates, has the potential to make CWIS more robust as it will enable its proponents in research and policy alike to find new organizational models for both private and publicly dominated sanitation systems, making CWIS more inclusive in the spatial, temporal, and socio-economic distribution of the costs, benefits, risks and opportunities of providing access to safe sanitation in cities.

7 Conclusion

A turnaround in expanding access to safe sanitation is urgently needed as progress on SDG6.2 falls short of expectations (UNICEF and WHO 2020). In this respect, combining sewered with non-sewered technologies and the change from supply-led towards demand-driven sanitation provision is widely described as a key solution. Despite the prominence of such fundamental paradigm shifts in the global policy discourse, social science research has paid little attention to the potential combinations of different sanitation systems at the city level and their interactions with urban inequality. To address these shortcomings, my dissertation examined sanitation in two ways: Concerning the processes that have the potential for transformative change in the sanitation sector, I explored how the negotiations over how access to safe sanitation is provided unfold at various levels and in different arenas for decision making. Focusing on the combinations of sanitation infrastructures and service delivery arrangements into new sanitation systems, I studied how sanitation bargains interact with urban inequality. Thus, my dissertation provides insights into the processes through which sanitation policies change and the structures that provide stability to different configurations of sanitation systems. A key focus throughout the dissertation lies in the role of multilateral development banks (MDBs) in sanitation. Therefore, I describe the key findings in the following sections, focusing on MDBs, change, and stability.

7.1 Key insights: MDBs, change, and stability

7.1.1 Multilateral Development Banks for Sanitation

Throughout the dissertation chapters, the central role of MDBs in the (global) sanitation sector is scrutinized from different perspectives.

Chapter 4 finds that MDBs are, next to governments, the key investors for sanitation infrastructure, while private capital is negligible. The analysis provides evidence of the capacity of MDBs to propagate new approaches to technology and institutional reforms by embedding them in investment projects worldwide. For example, the studied MDBs have pushed for new public management and private sector participation in the production structure. This is reflected not only in how public–private partnerships enter the water and sanitation sector, but even more so in the way, MDBs stick to their preferences. In a first wave until roughly 2000, divestitures and concessions dominated, and only multiple failed attempts to divest and hand over water and sanitation to the private sector in the 1990s prompted the MDBs to review their policies. Even then, the adjustment was not to review the aim of putting the private sector at the centre of water supply and sanitation but to make PPP arrangements more palatable by transitioning risks to the public sector. In contrast to other aspects of MDB investment behaviour, their role in institutional reforms is shown to be less aligned with lessons learned and common understanding at the global policy level and more of a testing ground for introducing new institutional and financial arrangements aimed at moving the sanitation sector towards the utility bargain.

Chapter 5 describes how MDBs act as key knowledge brokers for water and sanitation technologies and policies by analysing the role of the World Bank and ADB in Dhaka over the last 30 years. In the case of Dhaka, the MDBs perform this brokerage function in two ways. Concerning non-network solutions for water supply and sanitation, the World Bank established ITN-BUET as a local counterpart to assist in the translation of its preferred technologies and policies into the local context. Concerning the overall water and sanitation sector, the MDBs have used their lever on finance to advance broader political agendas, such as privatization and liberalization,

through the joint enforcement of the WASA Act. The knowledge brokerage role of the MDBs is not a unidirectional process. For example, the ADB translates the developments in Dhaka's water and sanitation sector to the global policy discourse by showcasing DWASA as a model for progressive utilities. A prominent report explains to the international community how DWASA has managed to provide 100% of Dhaka's citizens with access to safe water supply (Sharma and Alipalo 2017). Missing from these descriptions is the DSK-Model, which was invented and developed by the NGO and ultimately enabled DWASA to succeed. The report highlights the utility to emphasize that even informal settlements can be supplied with water for profit.

Chapter 6 does not analyse the activities of the MDBs in detail, but the chapter nevertheless generates insights into the agenda-setting roles of MDBs. The World Bank and the ADB are among the developers and advocates of the CWIS approach. The MDBs propagate a vision of CWIS that centres on the creation of a sanitary economy. How the MDBs are joining forces with global philanthropy and multinational corporations, and the emphasis they are placing within CWIS, indicates that CWIS is not only a new paradigm for sanitation but just as much part of MDBs broader agenda to advance the financialization of basic services.

7.1.2 Change: policy pathways framework

Regarding change, Chapter 5 develops the policy pathways framework (PPF) as an analytical tool that is sensitive to structural power and capable of scrutinizing change processes. The PPF operationalizes the power cube framework for case-centric process tracing. To this end, the PPF analyses the levels and spaces in which policies are negotiated and traces policy development over time. Beyond the qualitative-descriptive analysis, the PPF allows to visually represent the concurrent, intertwined and inherently power-laden construction of policies that have shaped the sanitation sector in a given place and time. Through applying the PFF to 30 years of policy development in Dhaka, the chapter produces four relevant insights beyond the case. First, the multiscalar characteristics of the bargaining over sanitation policies, namely the levels and spaces, decisively shape the outcomes. Actors yielding prominent positions in the dimensions of structural power were capable of creating closed spaces through which they introduced policies preferable to their interests. For example, the MDBs created the closed space in which the partnership framework was negotiated, making it conditional to roll out the utility bargain to access further credit. Second, when policies were deliberated in invited spaces accessible from the local level, resistance to top-down imposition occurred. An example is the change to the WASA Act in the parliament. Third, innovation at the local level occurred through pioneering actors claiming a decision space and thus forcing the authorities and powerful actors to deliberate about their proposition. An example of this is the pilots for the development of the DSK-Model. Fourth, innovations only scale successfully if they conform to the logic of the dominant bargaining at the global level. An example of this is the different adoption of DSK's model for water supply, which was in line with the utility bargain, compared to DSK's approach to sanitation service delivery, which was in line with the cityworks bargain and failed to scale.

7.1.3 Stability: territorial political economy and sanitation bargains

Throughout the dissertation chapters, the different combinations of sewered and non-sewered technologies with social, political and economic arrangements that enable access to safe sanitation are scrutinized from different perspectives. Overall, this led to developing the territorial political economy framework and the sanitation bargains typology to describe generic sanitation systems as ideal types.

In Chapter 4, the emerging contours of the sanitation bargains typology help to organize the analysis of the MDBs' investment behaviour. The analysis structure is arranged to generate combined insights into territorial, technological, financial, and organizational trends. Thus, the production structure is represented in the territorial and organizational aspects, the finance structure is directly represented in the financial aspects, the knowledge structure is represented in the scrutiny of the MDBs, and the security structure is represented in the organizational aspects. The analysis showed that the municipality bargain, supply-led sewered sanitation with public actors in the lead, is dominant from the start of the analysis in 1960 until 1990. Following a relatively rapid and globally homogenous change, the utility bargain dominates from 1990 until 2020. While the contours of the enterprise bargain are detected in the detailed analysis of the World Bank, they have not been consistently integrated across the board until the end of the analysis in 2020.

Chapter 5 introduces the notion of the sanitation bargain and defines it as an ideal-typical constellation of technologies, financing mechanisms and organizational arrangements that address a public issue. The chapter describes the utility and enterprise bargain as the first coherent ideal types. Introducing the sanitation bargains typology into the case study analysis in Chapter 5 enabled us to describe how policies interact with urban inequality through their distribution of the costs and risks and, benefits and opportunities of accessing sanitation. By making the distributive effects that accompany the policies visible, the sanitation bargains help to understand the conflicts between the different actors in Dhaka's water and sanitation sector. Furthermore, the application of the sanitation bargains enables the identification and description of periods of relative stability in the case of Dhaka.

Chapter 6 develops the theoretical underpinning of the sanitation bargains typology by introducing the territorial political economy framework, which is operationalized through the development of the typology. The first line of differentiation is the prominence of public or private actors in the dimensions of structural power. In other words, this translates into whether sanitation is supply-led through public actors in charge or demand-driven with private actors in charge of service provision. The technological system, i.e. sewered (network) and non-sewered (non-network), is the secondary line of differentiation. The presence or absence of the sewer network has a strong impact on the upfront investment needed. It thus shapes the relative importance of the production and financing structure and the actors that can gain prominence in each dimension of structural power. The unbundling of network infrastructures enables different actor types to gain prominence in sanitation service provision along the sanitation service chain, and non-sewered sanitation requires a significantly lower upfront investment that can be provided from different sources. The combinations of infrastructure (sewered vs. non-sewered) and the dominance of actors (public vs. private) translates into distinct operating models, which create a distinct distribution of the costs, benefits, risks and opportunities among different actor groups within a given sanitation bargain. In sum, the double dichotomy (public vs private and sewered vs non-sewered) results in four ideal types that can provide access to safe sanitation, labelled as municipality, utility, city works, and enterprise bargains. The fifth ideal type, the household bargain, describes the logic under which sanitation is organized but is not geared towards safe sanitation.

In the following, I will provide some more detail on the household as well as municipality bargain to underscore how the provision of sanitation interacts with urban inequality.

Under the household bargain, sanitation is a private, not a public issue. Thus, sanitation is a challenge to be solved by the private household or a gated community. Private actors take precedence in all dimensions of structural power. As a result, the risks are externalized to ensure the protection of individual health and cleanliness in the private space for those who can afford to pay for sanitation services. This often works at the explicit expense of

groups that are structurally marginalized by class, caste, race and gender. Thus, the household bargain reinforces that unsafe sanitation prevails and urban inequality increases with the demarcation line being the ability to pay.

Under the cityworks bargain, sanitation is a central public issue, and public actors hold sway in all dimensions of structural power, for example, cityworks in the production structure, public banks in the finance structure, and public regulators in the security structure. As a result, the technological flexibility of non-sewered sanitation is leveraged to supply access to safe sanitation to all parts of the city, including informal settlements, to ensure that wastewater is no threat to public health and the environment. This does not mean that there is no space for private actors in service delivery or the development of technological and organizational solutions. Rather, in contrast to the enterprise bargain, sanitation is provided supply-led. This means that whether sanitation is provided is not the decision of customers or households which need to demand it, but a public decision for which the costs are covered according to the ability and not the willingness to pay. The priority of public actors in the security dimension is based on the perception that any household generates wastewater. If it is not safely managed, it is a public concern as it poses a risk to other members of society by threatening public health and polluting the environment. In theory, the cityworks bargain holds the most potential to increase urban equality.

The insight of the sanitation bargains typology with regards to the CWIS framework lies in underscoring how the provision of access to safe sanitation at the city scale and the generic deliberation over sanitation systems are inextricably linked. Thus the resulting CWIS framework as a global blueprint as well as the specific sanitation system at the city scale are the result of a political deliberation on how to combine the different generic sanitation bargains.

7.2 Positionality and limitations of the thesis

As I stated in the introduction, my positioning was a crucial aspect in shaping my engaged research approach and thus enabled and limited my findings. Knowing the credibility I carried through my affiliation at Eawag-Sandec and Université de Neuchâtel, I was keen to leverage it to access sites and encounters not accessible to all. Thus, I explicitly aimed to ‘study up’ and investigate actors equally powerful than me or even more powerful than me (Kubota 2016). This decision is based on my perception that to improve the conditions for the peripheries of society, which in the case of sanitation are those that lack access, the core needs to be scrutinized, understood and changed. Not observing the contexts, not engaging with the actor groups, and not scrutinizing the systems where the challenges for access to safe sanitation are greatest were thus deliberate choices for me.

My personality and, thus, my positioning are also reflected in the diverse perspectives I adopted in my dissertation. I could have devoted my entire thesis to each of the three research approaches in the chapters. The fact that I did not do so imposes significant limitations on each chapter. Therefore, I will briefly outline the limitations of each chapter in relation to the possibility of devoting my entire dissertation to each perspective.

For a quantitative dissertation, as it would have been possible by devoting all attention to the research process designed in Chapter 4, there are significant limitations in regard to data quality and analysis. Regarding data, Chapter 4 is limited to the World Bank, the ADB, and the AfDB. Thus, the Interamerican Development Bank (IADB) and the European Investment Bank (EIB), two major MDBs are missing. Furthermore, the data is limited to project appraisal documents (PAD) produced during the appraisal process. This means that no information concerning the effective implementation of the appraised projects or the overall outcomes of the water and sanitation sector is part of the dataset. Regarding analysis, chapter two is limited to a descriptive quantitative

analysis of qualitative data. Thus, neither causal relationships have been explored nor advancements in quantitative methods and analysis have been aspired. However, this would be urgently needed to better inform policy making based on long term evidence of the effectiveness and impacts of the investment decisions of MDBs.

Compared to a case study-based dissertation, as it would have been possible by devoting all attention to the research process designed in Chapter 5, there are major limitations regarding fieldwork exposure and qualitative data collection. Regarding field work exposure, I had only five weeks in Dhaka, which is a minimal time to dive into the details and intricacies of Dhaka's water and sanitation sector. This short fieldwork neither allowed me to observe how sanitation is provided nor did I spend time in informal settlements. Finally, focusing on the other chapters that care less about Dhaka's case meant that I could not follow up with many interesting aspects I encountered. For example, the VacuTug, the first vacuum truck for faecal sludge management in informal settlements, was developed in Dhaka and is still being produced and distributed globally. Similarly, the details on the DSK Model or the IRF-FSM process could fill a single case study.

Compared to a dissertation that centred on theory development, as it would have been possible by devoting all attention to the research process designed in Chapter 6, there are major limitations regarding the depth of the theoretical engagements. In Chapter 6, Susan Strage's work is not thoroughly examined. By this, I mean that internal contradictions, nuances of her work, and other essential works beyond "States and Markets" are not addressed. For example, I have engaged intensively with the philosophical foundations of her approach to structural power. For her, the different interpretations of the social values of freedom, security, prosperity and justice are the philosophical starting point for her reflections on structural power. Yet, theory development and philosophical deliberations in Chapter 6 were also limited through the publishing outlets available for the empirical issue that was central to the dissertation.

Finally, the diversity of the chapters demanded that I devote the core of the introduction and discussion of the entire dissertation to describing how the different perspectives can speak to each other to form a coherent picture larger than its parts. Thus, for me it was beyond the scope to devote the introduction of the dissertation to provide parts of the additional insights to provide more background for each paper.

7.3 Implications for theory and action

7.3.1 Implications for research

The introduction and application of the territorial political economy (TPE) framework has two major implications for research. The first implication lies in the possibility the TPE framework provides to understand the mutual interdependence of various dimensions of structural power to understand stability in basic service provisioning. This enables researchers to unpack the web of power relations that interact with urban inequalities into its constituent elements and thus open them for analysis. The TPE framework is a first step towards a synoptic understanding of structural power to make IPE more territorially sensitive. Future research could, therefore, further explore a synoptic approach and deepen the understanding of its territorial implications. The interest in such a process has been explicitly expressed in the call to cross-fertilize studies from critical IPE with research from urban political ecology (Babic and Sharma 2023). The second implication lies in studying basic services that depend on capital-intensive (network) infrastructure. The TPE framework has shown that whereas the finance dimension is of general importance, it is directly linked to the importance of credit for the provision of basic infrastructures and services. Actors in the finance dimension can create credit and determine the conditions for

access to credit, thus dictating the social, political, and economic arrangements through which basic services are provided. Thus, the need for credit determines the relationships between global actors who can provide financial capital and local actors who need investment. The decentralization of infrastructure is generally connected to a reduced need for credit. As a result, decentralization provides an opportunity for local actors and cities to emancipate themselves from global finance and possibly provide basic services in ways that deviate from the globally dominant bargains. The extent to which this is the case should be investigated in future studies.

The sanitation bargains typology as an operationalization of the TPE framework lends itself to be applied in other sectors and other cases. The differentiation of the dimensions of structural power in production, security, and finance, first and foremost, through identifying the key actor in each and the differentiation between networked and non-networked infrastructures, will also be useful for understanding the provision of basic services in water and electricity and maybe even transport. The testing of the bargain typology should also aim at improving the TPE framework by optimizing how the dimensions of structural power feed into the description of the ideal types that are identified. In this regard, the variation of the application of the bargains typology between different sectors and cases seems promising. Thematically, water supply is an opportune sector to which the bargains typology and the TPE framework could be applied to further develop them. On the one hand, the socio-hydrological processes that link water supply and sanitation result in the central relevance of similar actors, mainly the same utilities. On the other hand, a vast existing body of knowledge critical social science on water supply can foster possible the translation of the sanitation bargain to the water sector.

The policy pathway framework (PPF) has proven to be a useful analytical tool through its dual focus on the dynamics of negotiations and power struggles and characterization of arenas for negotiation. First, the PPF enables the synthesis and neat display of bargaining processes over time. Second, the PPF enables researchers to directly indicate the links between power distribution in key areas of decision making and their relationship to the distribution of structural power from the local to the global level and between closed, invited, and claimed spaces. This conceptual extension makes it possible to focus on the processes and actors that constitute the everyday governance of urban sanitation while not turning a blind eye to structural power. This extension is important because many studies in heterodox IPE but also in related fields such as urban political ecology are dominated by the description of specific constellations of structural power in a particular place and time. The study of how the distribution of structural power is changing and how this in turn affects processes of urbanization and their interaction with inequality has received less attention. Thus, a dual focus on dynamics over time and across levels and spaces of negotiations allows the policy pathway framework to make implicit manifestations and considerations of power explicit.

Finally, the dataset produced in Chapter 4 provides an opportune starting point for future quantitative and qualitative analyses. The dataset can be further analysed by asking new questions and expanded to include other MDBs, and it can also guide the identification of case studies. Because it identified investments in over 300 cities, this information could be contrasted with the growing number of 'excreta flow diagrams'[7] (currently 241 SFDs in 235 cities). One possibility is to identify cities that achieve safely managed sanitation at the city level with comparatively low levels of investments or those that seem not to make any progress at all despite relatively large investments. As the dataset is proposed as a starting point for a more detailed, qualitative–quantitative analysis of

[7] https://sfd.susana.org/about/worldwide-projects

multilateral investment into basic services, it is made publicly available to invite researchers, MDBs, and international organizations to expand upon it.

7.4 Implications for action

The findings of this thesis are particularly relevant for actors that aim to advance CWIS as a concept and that are engaged in achieving citywide and inclusive sanitation in cities.

For actors that promote CWIS, such as the World Bank, ADB, BMGF but also SuSanA and INGOs, and other organizations behind calls for CWIS, the findings suggest that the flexibility that CWIS currently offers in technology must be extended to organization and financing. To this end, the systematic collection and synthesizing of existing financial and organizational arrangements for non-sewered sanitation is more promising than the current focus on promoting an abstract vision of a sanitation economy based on private investments and household demand, where safe sanitation is provided as a result of a functioning market. The city works bargains can serve as a starting point in such an exercise to contrast the hegemonic discourse that is centred on the enterprise bargain. The ways of organizing and financing non-sewered sanitation should be presented and provided as a portfolio of options in parallel to, for example, the existing compendium of sanitation technologies (Tilley et al. 2008). In the presentation and evaluation of organizational and finance arrangements, prime attention should be paid to the inherent trade-off between security and finance. The conflict arises chiefly because unsafe sanitation for marginalized urban dwellers and pollution of the environment is always the cheapest option for financial actors.

For actors working to achieve CWIS in cities, such as INGOs and MDBs at the global level, and even more NGOs, CBOs and activist practitioners at the city level, the findings suggest that there is a need to move away from the ‘misleading language of ‘stakeholders’ and ‘good governance’, which downplays conflicting interests and falsely suggests that all actors are on an equal footing. For this endeavour, the policy pathways framework offers a practical tool with which to analyse the divergent interests and how they shape sanitation systems at the city level. Making the different competing interests visible will support MDBs and (I)NGOs in politically informed programming and becoming more accountable to the public, which funds them to a large degree.

For actors at the city level, the three conceptual tools introduced in this thesis—the territorial political economy framework, the sanitation bargains typology, and the policy pathways frameworks—can support the planning process and analyse ongoing urbanization processes and how they interact with inequality. They are deliberately designed to speak effectively and pragmatically to activists and practitioners and empower them in strategizing and embarking on pathways toward greater urban equality.

8 Annexes

8.1 Annex 1: MDB Data

8.1.1 Structure and scope of the analysis (& exclusion)

The article is based on a newly compiled database of financing for water and sanitation for the World Bank, ADB, and AfDB, which was constructed 'bottom up' by coding project-level information provided by the banks. The MDBs under study use different structures in their project databases, but each has a sector that includes water and / or sanitation (and potentially other basic urban services such as solid waste management). For projects investing in different sectors, the cumulative amount is reported.

Data on MDB investments was collected based on the definition that underlines the water Sustainable Development Goals 6.1 (Water) and 6.2 (Sanitation). This is in contrast to the Organization for Economic Cooperation and Development Assistance Committee (OECD/ DAC) dataset which combines water and sanitation as well as water resource management into a single aggregate code, while agricultural water use, hydroelectric power, and flood protection are found under other aggregate codes. As each studied MDB reported differently, we disaggregated and reaggregated the data to relate flows more closely to the definition of the water sector that underlines SDG 6.1 and 6.2, resulting in the six sectors *water, sanitation, water & sanitation, water (+), sanitation (+), water & sanitation (+).* Investment projects were excluded if they did not address any activity that falls under SDG 6.1. or SDG 6.2. The main other sectors which the MDBs reported under their water and sanitation activities are integrated water resource management (401), disaster resilience (67), solid waste (60), irrigation (57), roads & transportation (32). Furthermore, pure 'technical-assistance' projects (511), that is investments that targeted the build-up of capabilities, feasibility studies and so on, cancelled and duplicated (171) projects were excluded.

8.1.2 Data sources and coding.

To operationalize the dimensions of investment behaviour through we primarily drew on project appraisal documents, which were published by the banks following the approval of a project under their access-to-information policies[8]. While basic information, such as project name, country and financing amount, is often published on the bank's website in a uniform way, further data needed to be extracted from documents with significant variations in structure and detail, which often represent different stages of the approval process. Thus, the data were manually coded by the first and second author together with two research assistants. In case no project appraisal documents were available, project completion reports were used which provide information "at appraisal". If no documents were available, only the details from the MDBs data portals were used. To further ensure the quality of the dataset, consistency checks were conducted on projects that were co-financed by several MDBs. Appraisal information was preferred over disbursement information because they are more consistently available across banks and because they reflect the investment behavior the banks aim for. The table in annex 2 provides an overview of all the variables in the dataset. The analysis of the institutional reform components was carried out in Atlas.ti through qualitative coding of project appraisal documents.

[8] World Bank: https://projects.worldbank.org/en/projects-operations/projects-home

ADB: https://data.adb.org/dataset/adb-sovereign-projects and https://data.adb.org/dataset/statement-adbs-sovereign-loans-1968-2017

AfDB: https://projectsportal.afdb.org/dataportal/VProject/list

To convert local currencies to US dollars, we used yearly exchange rates from the International Monetary Fund's International Financial Statistics (in cases where project appraisal reports provided both local currencies and US dollars, we directly used the provided US dollar figures). In a second step, nominal amounts were converted to real 2020 US dollars using the United States Consumer Price Index from the International Monetary Fund's International Financial Statistics.

8.2 Annex 2: MDB variables overview

Table 2: Variables for qualitative content analysis of MDB's project appraisal documents.

Variable name	Variable description	Operationalization (values)
ID	Identification code provided by the MDBs for each project.	Not Applicable
MDB	Abbreviation of multilateral development bank, from which the database entry was retrieved	IBRD = World Bank AfDB = African Development Bank ADB = Asian Development Bank
Project.Name	Name of the project provided by the MDBs for each project.	Not Applicable
Region	Intermediate Region Code name according to the UNSD-Methodology (UN M49 Standard) in which the project is implemented (UN Statistics Division 2022).	Not Applicable
Multi_Country	Indicates if a project is carried out in more than one country	1 = Project is carried out in more than one country 0 = Project is carried out in only one country
Country	Name of the country in which the project was implemented.	Values = Country Names N/A = Multi Country 'TRUE'
ISO.Country.Code	A three-letter country code which may allow a better visual association between the codes and the country names.	For values see: UN M49 Standard. N/A = Multi Country 'TRUE'
City	Name of the city in which the investment project was implemented. MDBs state if the localities are cities, towns or rural areas. If not, the localities were identified in web searches to see whether they qualify as a city or town according to national standards.	City name = project is implemented only in one city or town. MULTI = Investments & activities in multiple cities N/A = only if Context is Rural
Year	Year of investment project approval as provided by the MDBs	1964-2020
Context	Morphological & social context of investment project implementation.	Urban = urban settlement Rural = rural settlement Both = urban and rural settlements are affected. Either national / sectoral programs or projects with activities in urban and rural contexts.
Sector	Distinct range of activities & infrastructures that are different from others.	Sanitation = Only wastewater / sanitation related activities Sanitation + = Sanitation and other activities different to water supply Water = Only water supply related activities. Water + = Water supply and other activities different to sanitation Water & Sanitation = Only water supply and sanitation related activities Water & Sanitation + = Water supply and sanitation and other activities different to both.
Subset	The dataset is divided into three different subsets to structure data collection efficiently and to align with the research focus	1 = Context is Rural 2 = Context is Urban

	on understanding investment behaviour of MDB with regards to urban water and sanitation.	3 = MDB is IBRD, Context is Urban or Both, Sector is Water, Water +, Sanitation, Sanitation +
AmountTotal_2020USD	The total amount that is being invested in the project.	Amount in 2020 USD
AmountMDB_2020USD	The value for the amount committed for the investment project that is provided by the bank identified in the MDB variable.	Amounts in 2020 USD
SponsorX	Name of a sponsor contributing to the investment. -X ranks sponsors according to the amount they provide.	IBRD = World Bank ADB = Asian Development Bank AfDB = African Development Bank Gov = Borrowing governments own contribution Com = Recipient communities own contribution Other Multi-Bi = Any multilateral or bilateral organization contributing to the investment. Privat = Any private source of finance contributing to the investment. N/A = There a fewer sponsors than X
AmountX	Contribution by an SponsorX to the project.	Values = Amounts in original currency. N/A = There a fewer sponsors than X
PPP_Sanitation	The form of the public private partnership (PPP) or private sector participation (PSP) arrangement promoted or implemented. For the distribution of ownership, risks and revenues between public and private actors, refer to Budds and McGranahan (2003). For details on the different PPP categories refer to (World Bank 2017).	Promotion = Either PPPs or PSP are generally promoted, capacity building or institutional reforms explicitly aim to facilitate PPPs or PSP. But no execution of a specific arrangement is planned under the project. Construction = PPP arrangements focusing solely on design, engineering and construction of infrastructure. Service-O&M = PPP arrangements for service delivery and/or O&M without any ownership of infrastructure assets. Lease-Affermage = The infrastructure is leased to a private actor for a distinct period. The government typically remains responsible for capital expenditures. BOT-type = A private actor builds, operates, and then transfers the infrastructure back to a public actor. Concession = A private actor buys the right to invest in a particular sector for a particular time. Divestiture = Assets and the right to pursue business in a basic service are sold to a private entity.
PPP_Water	The form of the public private partnership (PPP) arrangement implemented with regards to water supply.	Same values as for PPP_Sanitation
Amount_Sanitation	The total amount allocated for sanitation related project components.	Values = Amounts in original currency. N/A = sector does not include sanitation NED = available documents did not allow to differentiate between sanitation and other investments.

Amount_Water	The total amount allocated for water supply related project components.	Values = Amounts in original currency. N/A = sector does not include water supply NED = available documents did not allow to differentiate between water and other investments.
PrimaryC	Number of primary cities targeted in a project.	Numbers = the number of primary cities targeted in a project. MULTI = An uncountable number of primary cities are addressed under the project. This is mainly true for regional or national projects that do not explicitly mention all cities.
SecondaryC	Number of secondary cities targeted in a project	Numbers = the number of secondary cities targeted in a project. MULTI = An uncountable number of primary cities are addressed under the project
Towns	Number of towns targeted in a project	Numbers = the number of secondary cities targeted in a project. MULTI = An uncountable number of primary cities are addressed under the project
Network_Infrastructure	Indicates whether sewered sanitation infrastructures are financed under the project.	TRUE = Sewered sanitation infrastructures are financed under the project FALSE = No sewered sanitation infrastructures are financed under the project.
N_Drains_Sewers	Indicates whether sewers or drains are financed under the project	TRUE = Sewers, drains, or other conveyance infrastructures are financed under the project. FALSE = No sewers, drains or conveyance infrastructures are financed under the project.
N_Treatment	Indicates whether wastewater treatment plants are financed under the project	TRUE = Wastewater treatment capacity through a wastewater treatment plant (WWTP) or sewage treatment plant (STP) is financed under the project. FALSE = No Wastewater treatment capacity through a wastewater treatment plant (WWTP) or sewage treatment plant (STP) is financed under the project.
Non_Network_Infrastructure	Indicates whether non-sewered sanitation infrastructures are financed under the project. The classification of infrastructure components into the different functional groups along the sanitation service chain (following 5 variables) is based on (Tilley et al. 2008)	TRUE = non-sewered infrastructures are financed under the project FALSE = no non-sewered infrastructures are financed under the project.
NN_Containment	Indicates whether containment infrastructures (shared & private), such as pit latrines are financed under the project.	TRUE = containment infrastructure is financed. FALSE = no containment infrastructure is financed.
NN_Transport	Indicates whether emptying or transport technologies, such as transfer stations and vacuum trucks are financed under the project.	TRUE = emptying/transport technologies are financed. FALSE = no emptying/transport technologies are financed. NA = for all entries that were not coded under Subset 3. NED = only if on-site hardware is true.
NN_Treatment	Indicates whether faecal sludge treatment plants or other non-sewered treatment infrastructures are financed under the project.	TRUE = treatment infrastructure is financed FALSE = no containment infrastructure is financed.
NN_Disposal	Indicates whether disposal infrastructures are financed under the project.	TRUE = disposal infrastructure is financed. FALSE = no containment infrastructure is financed.
NN_Reuse	Indicates whether reuse infrastructures are financed under the project.	TRUE = reuse infrastructure is financed. FALSE = no containment infrastructure is financed.

UR1	Indicates whether institutional reforms aim to **battle inefficiencies** by reducing leakages, improving metering & billing and introducing efficient technologies. The variables UR1-UR5 are based on the definition and detailed description of the different steps of the 'maturity ladder for the urban water sector' from Goksu et al. (2019).	TRUE = reforms to battle inefficiencies are financed. FALSE = no reforms to battle inefficiencies are financed.
UR2	Indicates whether institutional reforms aim to **build capacity** at the organizations (utilities/departments) responsible for providing access to water supply and sanitation by amongst others institutional strengthening, financial training, training in environmental monitoring, technical assistance for operation and maintenance and training in (integrated) planning.	TRUE = reforms to build capacity are financed. FALSE = no reforms to build capacity are financed.
UR3	Indicates whether institutional reforms aim to **align institutions and incentives** by introducing full cost recovery principles/tariffs and improving customer management. Through promoting institutional, organizational, regulatory, and sector reforms or by increasing the autonomy of utilities through decentralization and corporatization.	TRUE = reforms to align institutions and incentives are financed. FALSE = no reforms to align institutions and incentives are financed.
UR4	Indicates whether institutional reforms aim to **incentivise performance** through performance contracts and performance based financing, by private sector participation and building utilities' creditworthiness.	TRUE = reforms to incentivise performance are financed. FALSE = no reforms to incentivise performance are financed.
UR5	Indicates whether institutional reforms aim to '**go to the market**' through pursuing specific PPP arrangements are financed under the investment project.	TRUE = reforms to increase private partnerships are financed. FALSE = no reforms to increase private partnerships are financed.
ER1	Indicates whether institutional reforms address authorities to improve the enabling environment for non-sewered sanitation & the sanitation economy. The variables ER1-ER3 are based on the suggestions of WSUP (2020) and IWA (2021) for reforming the sanitation sector to scale non-sewered infrastructures.	TRUE = reforms to create an enabling regulatory environment are financed. FALSE = no reforms to create an enabling regulatory environment are financed.
ER2	Indicates whether institutional reforms address private sector service providers and aim to incentivise them to enter the sanitation economy or regulate their activities.	TRUE = reforms to regulate sanitation service providers are financed. FALSE = no reforms to regulate sanitation service providers are financed. NA = for all entries that were not coded under Subset 3.
ER3	Indicates whether institutional reforms address households or communities and aim to increase awareness of and demand for non-sewered sanitation solutions or to set up service co-production arrangements.	TRUE = reforms to create demand and awareness for sanitation are financed. FALSE = no reforms to create demand and awareness for sanitation are financed. NA = for all entries that were not coded under Subset 3.

8.3 Annex 3: Interview coding

Table 3: Overview deductive coding scheme for analyzing KII and policy documents.

Thematic Area	Categories	Subcategories
Bargains	Enterprise	Technology, Organization, Finance
	Utility	Technology, Organization, Finance
Power Cube Framework (PCF)	Spaces	Closed, Invited, Claimed
	Forms	Visible, Hidden, Invisible
	Levels	Local, National, Global
Timeline and Milestones	Inductive indicators of timing	
Actors	Sender	Interviewee
	Receiver	The actor that is being spoken about

8.4 Annex 4: Interviews Dhaka

Table 4: Overview of interviews conducted in Dhaka.

Interview	Interviewee function	Organization
1-3	Professors (different departments)	University
4-8	Mayor, Chief engineer, Project manager	Municipality
9-11	Chief operation officer, Chief engineer	Ministry
12-15	Project lead	Multilateral development bank
16-19	Managing director, Chief engineer, Project lead	Utility
20-24	Director, Operator, Senior staff	Local non-governmental organization
25-28	Country coordinator, Project lead, Sector lead	International non-governmental organization
29-30	CEO, Global impact lead	Private sector

8.5 Annex 5: Overview document analysis Dhaka

Table 5: List of analyzed documents for Dhaka.

Document Title
WASA Act of 1996
World Bank Fourth Dhaka Water Supply-Project Staff Appraisal Report
Fourth-Dhaka-Water-Supply-Project Implementation Completion Report
Fourth-Dhaka-Water-Supply-Project Implementation Completion Report Review
Institutional Regulatory Framework for Fecal Sludge Management for the Megacity of Dhaka
World Bank Project Appraisal Document for Dhaka Sanitation Improvement Project
Dhaka Sewerage Master Plan
World Bank Project Appraisal Document for Dhaka Water Sector Support Program
World Bank Implementation Completion Report for Dhaka Water Sector Support Program
World Bank Implementation Completion Report Review for Dhaka Water Sector Support Program
Asian Development Bank Report and Recommendations from the President for Dhaka Water Supply Sector Development Program
Asian Development Bank Report Completion Report for Dhaka Water Supply Sector Development Program
Annual reports of DSK, amended with the year: 1991-1994, 1997, 2000, 2005, 2009-2020
Annual reports of DWASA, amended with the year: 2013-2020

9 Bibliography

Abeysuriya, K., J. Willetts, N. Carrard, and A. Kome. 2019. 'City Sanitation Planning Through a Political Economy Lens', *Water Alternatives*, 12: 907-29.

Abeysuriya, Kumuduni, Cynthia Mitchell, and Juliet Willetts. 2005. "Cost Recovery for Urban Sanitation in Asian Countries: Insurmountable Barrier or Opportunity for Sustainability?" In *Australia New Zealand Society for Ecological Economics Conference*. Palmerston North, New Zealand: ANZSEE.

Acey, Charisma, Joyce Kisiangani, Patrick Ronoh, Caroline Delaire, Evelyn Makena, Guy Norman, David Levine, Ranjiv Khush, and Rachel Peletz. 2019. 'Cross-subsidies for improved sanitation in low income settlements: Assessing the willingness to pay of water utility customers in Kenyan cities', *World Development*, 115: 160-77.

Adams, Ellis A., Leo Zulu, and Quinn Ouellette-Kray. 2020. 'Community water governance for urban water security in the Global South: Status, lessons, and prospects', *WIREs Water*, 7: 1-21.

ADB. 2007. "Report and Recommendation of the President to the Board of Directors: Proposed Loans and Technical Assistance Grant People's Republic of Bangladesh: Dhaka Water Supply Sector Development Program." In, 92. Asian Development Bank, .

———. 2021a. "Citywide Inclusive Sanitation Guidance Note: What Is Citywide Inclusive Sanitation and Why Is It Needed?" In *Citywide Inclusive Sanitation Guidance Notes*, 4. Manila, Philippines: Asian Development Bank.

———. 2021b. "Completion Report: Dhaka Water Supply Sector Development Program." In, 90. Asian Development Bank, .

Adusei, Peter Kwadwo, Eric Oduro-Ofori, Owusu Amponsah, and Kwasi Osei Agyeman. 2017. 'Participatory incremental slum upgrading towards sustainability: an assessment of slum dwellers' willingness and ability to pay for utility services', *Environment, Development and Sustainability*, 20: 2501-20.

Ahmed, Rokeya 2003. "DSK: a model for securing access to water for the urban poor." In *Water and Poverty Dialogue Initiative at the 3rd World Water Forum, March 2003, Japan*, edited by Geraldine Terry, 6. London, United Kingdom: Water Aid.

Alaerts, Guy. 2019. 'Financing for Water—Water for Financing: A Global Review of Policy and Practice', *Sustainability*, 11.

Andersson, Kim, Sarah Dickin, and Arno Rosemarin. 2016. 'Towards "Sustainable" Sanitation: Challenges and Opportunities in Urban Areas', *Sustainability*, 8.

Andreas, Peter. 2004. 'Illicit international political economy: the clandestine side of globalization', *Review of International Political Economy*, 11: 641-52.

Babb, Sarah. 2013. 'The Washington Consensus as transnational policy paradigm: Its origins, trajectory and likely successor', *Review of International Political Economy*, 20: 268-97.

Babic, Milan, and Sarah E. Sharma. 2023. 'Mobilising Critical International Political Economy for the Age of Climate Breakdown', *New Political Economy*

Bain, R. E., J. A. Wright, E. Christenson, and J. K. Bartram. 2014. 'Rural:urban inequalities in post 2015 targets and indicators for drinking-water', *Sci Total Environ*, 490: 509-13.

Bain, Robert, Richard Johnston, Francesco Mitis, Christie Chatterley, and Tom Slaymaker. 2018. 'Establishing Sustainable Development Goal Baselines for Household Drinking Water, Sanitation and Hygiene Services', *Water*, 10.

Bakker, Karen J. 2013. 'Neoliberal Versus Postneoliberal Water: Geographies of Privatization and Resistance', *Annals of the Association of American Geographers*, 103: 253-60.

———. 2014. 'The business of water: Market environmentalism in the water sector', *Annual Review of Environment and Resources*, 39: 469-94.

Bakker, Karen J. 2003. 'A political ecology of water privatization', *Studies in Political Economy*, 70: 35-58.

Bala, Babul. 2018. 'Assessment of Fecal Sludge Management Practices in Informal Settlements of Dhaka City', BUET (Bangladesh University of Engineering and Technology).

Balmaan, David N., and Bradford Dillman. 2019. *Introduction to International Political Economy* (Routledge: New York).

Barraqué, Bernard. 2020. 'Full cost recovery of water services and the 3 T's of OECD', *Utilities Policy*, 62.

Barrington, D. J., S. Sridharan, K. F. Shields, S. G. Saunders, R. T. Souter, and J. Bartram. 2017. 'Sanitation marketing: A systematic review and theoretical critique using the capability approach', *Soc Sci Med*, 194: 128-34.

Bayliss, Kate, and Terry McKinley. 2007. 'Providing Basic Utilities Africa in Sub-Saharan: Why has Privatization Failed?', *Environment: Science and Policy for Sustainable Development*, 49: 26-32.

Beach, Derek, and Rasmus Brun Pedersen. 2019. *Process-tracing methods: Foundations and guidelines* (University of Michigan Press: Ann Arbor).

Bechtel, Michael M, Thomas Bernauer, and Reto Meyer. 2012. 'The green side of protectionism: Environmental concerns and three facets of trade policy preferences', *Review of International Political Economy*, 19: 837-66.

Berndt, Christian, and Manuel Wirth. 2018. 'Struggling for the Moral Market: Economic Knowledge, Diverse Markets, and Market Borders', *Economic Geography*, 95: 288-309.

Berry, Craig. 2020. 'The sick man of IPE: the British School.' in, *The Routledge Handbook to Global Political Economy* (Routledge: New York).

Beverley, Eric Lewis. 2011. 'Colonial urbanism and South Asian cities', *Social History*, 36: 482-97.

Bhambra, Gurminder K. 2020. 'Colonial global economy: towards a theoretical reorientation of political economy', *Review of International Political Economy*: 1-16.

Bigger, Patrick, and Sophie Webber. 2020. 'Green structural adjustment in the world bank's resilient city', *Annals of the American Association of Geographers*, 111: 36-51.

Binta Samad, Rokshana 2009. 'Strengthening Financial Capability of a Municipality: A Case Study of Dhaka City Corporation', *Journal of Bangladesh Institute of Planners*, 2: 9.

Biswas, Asit K. 2008. 'Integrated Water Resources Management: Is It Working?', *International Journal of Water Resources Development*, 24: 5-22.

Black, Maggie. 1998. "Learning What Works: A 20 Year Retrospective View on International Water and Sanitation Cooperation." In, edited by Gayle Gibbons, 73. Washington, DC: Water and Sanitation Program.

BMGF. 2010. "Water, Sanitation & Hygiene Fact Sheet." In, edited by Bill & Melinda Gates Foundation, 2. Seattle, WA: Bill & Melinda Gates Foundation,.

BORDA. 2019. "Inclusive Citywide Sanitation." In, 40. Bremen, Germany: Bremen Overseas Research and Development Association.

Borras Jr, Saturnino M., Elyse N. Mills, Philip Seufert, Stephan Backes, Daniel Fyfe, Roman Herre, and Laura Michéle. 2019. 'Transnational land investment web: land grabs, TNCs, and the challenge of global governance', *Globalizations*, 17: 608-28.

Brand, Ulrich. 2012. 'Green economy – the next oxymoron? No lessons learned from failures of implementing sustainable development.', *GAIA*, 21: 28-32.

Bridge, Gavin, James McCarthy, and Tom Perreault. 2015. *The Routledge handbook of political ecology* (Routledge: Abingdon and New York, USA).

Briscoe, John, and Harvey A. Garn. 1995. 'Financing water supply and sanitation under Agenda 21', *Natural Resources Forum*, 19: 59-70.

Broad, Robin. 2006. 'Research, knowledge, and the art of 'paradigm maintenance': the World Bank's Development Economics Vice-Presidency (DEC)', *Review of International Political Economy*, 13: 387-419.

Brugger, Andri. 2017. 'Power Relations in the Global Production Network for Orthodox Himalayan Tea: Analyzing Fairtrade Tea Production in East Nepal and Darjeeling Through the Power-as-translation Framework and the Power Cube', Geographisches Institut der Universität Zürich.

———. 2021. 'Unbundling the Urban Sanitation Crisis: A Territorial History of the Development of Urban Sanitation. ', *MAPS Working Paper Series: The Circulation of Wealth*, 2: 1-35.

Budds, Jessica, and Gordon McGranahan. 2003. 'Are the debates on water privatization missing the point? Experiences from Africa, Asia and Latin America', *Environment & Urbanization*, 15: 87-113.

Burkart, Patrick, and Tom McCourt. 2017. 'The international political economy of the hack: A closer look at markets for cybersecurity software', *Popular Communication*, 15: 37-54.

Büthe, Tim, and Helen V Milner. 2008. 'The politics of foreign direct investment into developing countries: increasing FDI through international trade agreements?', *American journal of political science*, 52: 741-62.

Cabannes, Yves. 2004. 'Participatory budgeting: a significant contribution to participatory democracy', *Environment and Urbanization*, 16: 20.

Cafruny, Alan. 2016. 'Introduction.' in Alan Cafruny, Leila Simona Talani and Gonzalo Pozo Martin (eds.), *The Palgrave Handbook of Critical International Political Economy*.

Carlucci, Margherita, Carlotta Ferrara, Kostas Rontos, Ilaria Zambon, and Luca Salvati. 2020. 'The long breadth of cities: revisiting worldwide urbanization patterns, 1950–2030', *Applied Economics*, 52: 4162-74.

Carrard, Naomi, Nilanthi Jayathilake, and Juliet Willetts. 2021. 'Life-cycle costs of a resource-oriented sanitation system and implications for advancing a circular economy approach to sanitation', *Journal of Cleaner Production*, 307: 127135-46.

Castro, Jose Esteban. 2008. 'Neoliberal water and sanitation policies as a failed development strategy: lessons from developing countries', *Progress in Development Studies*, 8: 20.

Chaplin, Susan E. 1999. 'Cities, sewers and poverty: India's politics of sanitation', *Environment & Urbanization*, 11: 145-58.

Cherunya, P. C., H. Ahlborg, and B. Truffer. 2020. 'Anchoring innovations in oscillating domestic spaces: Why sanitation service offerings fail in informal settlements', *Research Policy*, 49.

Christensen, Rasmus Corlin, and Martin Hearson. 2019. 'The new politics of global tax governance: taking stock a decade after the financial crisis', *Review of International Political Economy*, 26: 1068-88.

Chumo, Ivy, Sheillah Simiyu, Hellen Gitau, Isaac Kisiangani, Caroline Kabaria Kanyiva Muindi, and Blessing Mberu. 2021. 'Manual Pit Emptiers and Their Heath: Profiles, Determinants and Interventions', *International Journal of Medical and Health Sciences*, 15: 207-13.

Chwieroth, Jeffrey M. 2008. 'Organizational change 'from within': Exploring the World Bank's early lending practices', *Review of International Political Economy*, 15: 481-505.

Coates, Jessie, and Alexandra Knezovich. 2020. "Make way for the future of sanitation: A review of new enterprise models shaping the development of a transformational sanitation economy." In, 28. Ernst & Young (EY)

The Toilet Board Coalition.

Cocina, C., A. A. Frediani, S. Butcher, C. Levy, and M. Acuto. 2022. 'Editorial: Addressing urban inequalities: co-creating pathways through research and practice', *Environment and Urbanization*, 34: 269-77.

Cohen, Benjamin J. 2008. *International Political Economy*.

———. 2018. *The geography of money* (Cornell university press).

Colven, Emma. 2022. 'A political ecology of speculative urbanism: The role of financial and environmental speculation in Jakarta's water crisis', *Environment and Planning A: Economy and Space*.

Cormier, Ben, and Mark S. Manger. 2021. 'Power, ideas, and World Bank conditionality', *The Review of International Organizations*, 17: 397-425.

Cornea, Natasha, René Véron, and Anna Zimmer. 2016. 'Clean city politics: An urban political ecology of solid waste in West Bengal, India', *Environment and Planning A*, 49: 728-44.

Couder, Louise, and Shelia Kibutu. 2020. 'Unlocking the circular economy potential to tackle the sanitation challenge', *Field Actions Science Reports* 72-77.

Cousins, Joshua J., Joshua Newell, Tim Schwanen, and Ronald van Kempen. 2019. 'Handbook of Urban Geography.' in, *Chapter 5: Urban political ecologies of and in the city* (Edward Elgar Publishing).

Cox, Robert. 1983. 'Gramsci, Hegemony, and International Relations', *Millenium*, 12.

Cox, Robert W. 1981. 'Social forces, states and world orders: beyond international relations theory', *Millennium*, 10: 126-55.

Creswell, John W, and J David Creswell. 2017. *Research design: Qualitative, quantitative, and mixed methods approaches* (SAGE Publications: California).

Crevoisier, Olivier. 2004. 'The innovative milieus approach: Toward a territorialized understanding of the economy?', *Economic Geography*, 80: 367-79.

———. 2011. 'Beyond Territorial Innovation Models: The Pertinence of the Territorial Approach', *Regional Studies*, 48: 551-61.

Crevoisier, Olivier, and Delphine Rime. 2021. 'Anchoring urban development: Globalisation, attractiveness and complexity', *Urban Studies*, 58.

Crow, Ben. 2007. 'Bare knuckle and better technics: Trajectories of access to safe water in history and in the global south', *Journal of International Development*, 19: 83-98.

Cruxên, Isadora Araujo. 2021. 'The limits of insulation: the long-term political dynamics of public-private service delivery', *International Development Planning Review*, ahead-of-print: 1-27.

———. 2022. 'Disordering Capital: The Politics of Business in the Business of Water Provision', MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

Cutler, A. Claire, and David Lark. 2022. 'The hidden costs of law in the governance of global supply chains: the turn to arbitration', *Review of International Political Economy*, 29: 719-48.

Danert, Kerstin, and Guy Hutton. 2020. 'Shining the spotlight on household investments for water, sanitation and hygiene (WASH): let us talk about HI and the three 'T's', *Journal of Water, Sanitation and Hygiene for Development*, 10: 1-4.

Davis, Mike. 2013. 'Planet of slums', *New Perspectives Quarterly*, 30: 11-12.

Davoudi, Simin. 2014. 'Climate change, securitisation of nature, and resilient urbanism', *Environment and Planning C: Government and Policy*, 32: 360-75.

de Jonge, Alice. 2011. 'Transnational corporations and international law: bringing TNCs out of the accountability vacuum', *Critical perspectives on international business*, 7: 66-89.

Deelder, Meret. 2013. 'Down the Drain: A study on the political ecology of wastewater governance affecting slum settlements in rapidly urbanizing Chiang Mai', Utrecht University.

Desai, Vandana, and Alex Loftus. 2013. 'Speculating on Slums: Infrastructural Fixes in Informal Housing in the Global South', *Antipode*, 45: 789-808.

Diener, Stefan, Swaib Semiyaga, Charles B. Niwagaba, Ashley Murray Muspratt, Jean Birane Gning, Mbaye Mbéguéré, Joseph Effah Ennin, Christian Zurbrugg, and Linda Strande. 2014. 'A value proposition: Resource recovery from faecal sludge—Can it be the driver for improved sanitation?', *Resources, Conservation and Recycling*, 88: 32-38.

Dobusch, Leonhard, and Sigrid Quack. 2013. 'Framing standards, mobilizing users: Copyright versus fair use in transnational regulation', *Review of International Political Economy*, 20: 52-88.

Dodane, P. H., M. Mbeguere, O. Sow, and L. Strande. 2012. 'Capital and operating costs of full-scale fecal sludge management and wastewater treatment systems in Dakar, Senegal', *Environmental Science and Technology*, 46: 3705-11.

Dorninger, Christian, Alf Hornborg, David J Abson, Henrik Von Wehrden, Anke Schaffartzik, Stefan Giljum, John-Oliver Engler, Robert L Feller, Klaus Hubacek, and Hanspeter Wieland. 2021. 'Global patterns of ecologically unequal exchange: Implications for sustainability in the 21st century', *Ecological Economics*, 179: 106824.

DSK. 1994. "Annual Report 1991-93." In, 17. Dhaka, Bangladesh: Dushtha Shasthya Kendra (DSK).

———. 1998. "Activity Report December 1997." In.: Dushtha Shasthya Kendra (DSK).

———. 2001. "Activity Report December 2000." In. Dhaka, Bangladesh: Dushtha Shasthya Kendra (DSK).

———. 2011. "DSK Activity Report 2011." In, 66. Dhaka, Bangladesh: Dushtha Shasthya Kendra (DSK).

———. 2019. "DSK Activity Report 2018." In, 114. Dhaka, Bangldesh: Dushtha Shasthya Kendra (DSK).

———. 2021. "Public Toilets in Bangladesh: Experience from DSK in Dhaka, Chattogram and Khulna. ." In, edited by Dibalok Singha, Rita Sen, Bokhtiar Rahman and Faezur Rahman Tareq, 40. Dhaka, Bangladesh: Dushtha Shasthya Kendra (DSK).

DWASA. 2016a. "Dhaka Sewerage Master Plan." In, 129. Dhaka, Bangladesh: Dhaka Water Supply and Sewerage Authority (DWASA).

———. 2016b. "Master Plan Report." In, 262. Dhaka, Bangladesh: Dhaka Water Supply and Sewerage Authority (DWASA).

El Khanji, S. 2021. 'Donors' Interest in Water and Sanitation Subsectors', *The European Journal of Development Research*, 34: 611-54.

Engen, Lars, and Annalisa Prizzon. 2018. "A guide to multilateral development banks." In. London: Overseas Development Institute.

Epstein, Gerald A. 2005. *Financialization and the world economy* (Edward Elgar Publishing).

Estache, Antonio. 2010. 'Infrastructure finance in developing countries: An overview', *EIB Papers*, 15: 60-88.

Evans, Barbara. 2013. 'Cities of the Global South–is decentralized sanitation a solution.' in TA Larsen, KM Udert and J Lienert (eds.), *Source Separation and Decentralization for Wastewater Management* (IWA Publishing: London).

Federer, Lucas. 2015. 'Von Abwassersymptomen und Wassersystemen. Der Einsatz von Abwasser-Reinigungsanlagen im Blickfeld sich verändernder gesellschaftlicher Gewässerschutzrezeptionen in der Schweiz zwischen 1950 und 1980', MSc thesis, University of Zürich.

Ferguson, Dean T. 2014. 'Nightsoil and the 'Great Divergence': Human waste, the urban economy, and economic productivity, 1500–1900', *Journal of Global History*, 9: 379-402.

Finger, Matthias, and Jeremy Allouche. 2002. *Water privatization: Trans-national corporations and the re-regulation of the water industry* (Spon Press: London and New York).

Fitzsimons, Alejandro Luis, and Guido Starosta. 2018. 'Global capital, uneven development and national difference: Critical reflections on the specificity of accumulation in Latin America', *Capital & class*, 42: 109-32.

Florida, Richard, and Charlotta Mellander. 2020. 'Technology, talent and economic segregation in cities', *Applied Geography*, 116.

François, Delphine, Aad F. Correljé, and John P. M. Groenewegen. 2010. 'Cost recovery in the water supply and sanitation sector: A case of competing policy objectives?', *Utilities Policy*, 18: 135-41.

Fuenfschilling, L., and C. Binz. 2018. 'Global socio-technical regimes', *Research Policy*, 47: 735-49.

Furlong, Claire. 2016. "SFD Report Dhaka, Bangladesh, 2016." In *SFD Promotion Initiative*. WEDC/WSP.

Gabor, Daniela. 2021. 'The Wall Street Consensus', *Development and Change*, 52: 429-59.

Gambrill, M., R. J. Gilsdorf, and N. Kotwal. 2020. 'Citywide inclusive sanitation - Business as unusual: Shifting the paradigm by shifting minds', *Frontiers in Environmental Science*, 7: 1-10.

Gandy, M. 2008. 'Landscapes of disaster: water, modernity, and urban fragmentation in Mumbai', *Environment and Planning a-Economy and Space*, 40: 108-30.

Gandy, Matthew. 1998. 'The Paris sewers and the rationalization of urban space', *Transactions of the Institute of British Geographers*, 24: 23-44.

———. 2004. 'Rethinking urban metabolism: water, space and the modern city', *City*, 8: 363-79.

———. 2006a. 'The bacteriological city and its discontents', *Historical Geography*, 34: 14-25.

———. 2006b. "Water, sanitation and the modern city: Colonial and post-colonial experiences in Lagos and Mumbai." In *Human Development Occasional Papers (1992-2007)*, 30. UNDP (United Nations Development Programme).

Gaventa, J. 2006. 'Finding the spaces for change: A power analysis', *IDS bulletin*, 37: 23-33.

Gaventa, John. 2007. 'Levels, Spaces and Forms of Power: Analysing Opportunities for Change.' in F. Berenskoetter and M.J. Williams (eds.), *Power in World Politics* (Routledge: London).

———. 2019. 'Applying Power Analysis: Using the „Powercube“ to explore forms, levels and spaces ' in Rosemary McGee and Jethro Pettit (eds.), *Power, empowerment and social change* (Routledge).

Gereffi, G., J. Humphrey, and T. Sturgeon. 2005. 'The governance of global value chains', *Review of International Political Economy*, 12: 78-104.

Goksu, Amanda, Bakalian Alex, Bill Kingdom, Gustavo Saltiel, Yogita Mumssen, Gerard Soppe, Joel Kolker, and Vicky Delmon. 2019. "Reform and Finance for the Urban Water Supply and Sanitation Sector." In *Water Papers*, 55. Washington, D.C.: World Bank.

Goksu, Amanda, Sophie Trémolet, Joel Kolker, and Bill. Kingdom. 2017. "Easing the transition to commercial finance for sustainable water and sanitation." In, edited by World Bank, 79. Washington, D.C.: World Bank.

Gonzalez, Felipe. 2020. 'Micro-Credit and the financialization of low-income households.' in Philip Mader, Daniel Mertens and Natascha Van der Zwan (eds.), *The Routledge international handbook of financialization* (Routledge).

Government of Bangladesh. 1996. "WASA Act." In, edited by Government of Bangladesh, 29. Dhaka, Bangladesh: Government of Bangladesh.

Grafe, Fritz-Julius. 2020. 'Finance, water infrastructure, and the city: comparing impacts of financialization in London and Mumbai', *Regional Studies, Regional Science*, 7: 214-31.

Graham, Stephen, and Simon Marvin. 2001. *Splintering Urbanism* (Routledge: London).

———. 2022. 'Splintering Urbanism at 20 and the “Infrastructural Turn”', *Journal of Urban Technology*, 29: 169-75.

Gray, David E. 2021. *Doing research in the real world* (SAGE Publications: London).

Grisaffi, Claire, Priscillah Oluoch, Eustakia M. Hamuchenje, Jessica Phiri, Gertrude Salano, Lisa Hawkes, and Alison Parker. 2022. 'Transforming citywide sanitation provision: Utility voices on pit emptying and transport services in Kenya and Zambia', *Frontiers in Water*, 4.

Haas, P. M. 1992. 'Epistemic Communities and International-Policy Coordination - Introduction', *International Organization*, 46: 1-35.

Haas, T. 2019. 'Comparing energy transitions in Germany and Spain using a political economy perspective', *Environmental Innovation and Societal Transitions*, 31: 200-10.

Haftel, Yoram Z. 2010. 'Ratification counts: US investment treaties and FDI flows into developing countries', *Review of International Political Economy*, 17: 348-77.

Haggart, Blayne, Kathryn Henne, and Natasha Tusikov. 2019. 'Introduction.' in, *Information, Technology and Control in a Changing World*.

Hall, David, and Emanuele Lobina. 2006. 'Pipe dreams: the failure of the private sector to invest in water services in developing countries', *PSIRU Reports*.

Hall, David, Emanuele Lobina, and Philipp Terhorst. 2013. 'Re-municipalisation in the early twenty-first century: water in France and energy in Germany', *International Review of Applied Economics*, 27: 193-214.

Halliday, Stephen. 2019. *An underground guide to sewers or: down, through and out in Paris, London, New York &c.* (Thames & Hudson: London, UK).

Hamel, P., and L. Tan. 2022. 'Blue-Green Infrastructure for Flood and Water Quality Management in Southeast Asia: Evidence and Knowledge Gaps', *Environ Manage*, 69: 699-718.

Hamnett, Chris. 2019. "Urban inequality." In *Handbook of Urban Geography*, edited by Tim Schwanen and Ronald van Kempen, 242-54. Cheltenham, UK and Massachusetts USA: Edward Elgar Publishing Limited.

Haque, Sabrina Sharmin, Monica Yanez-Pagans, Yurani Arias-Granada, and George Joseph. 2020. 'Water and sanitation in Dhaka slums: access, quality, and informality in service provision', *Water International*, 45: 791-811.

Harvey, David. 1973. *Social Justice and the City* (Edward Arnold: London).

Hastings, Justin V. 2015. 'The economic geography of North Korean drug trafficking networks', *Review of International Political Economy*, 22: 162-93.

Hayward, Clarissa, and Steven Lukes. 2008. 'Nobody to shoot? Power, structure, and agency: A dialogue', *Journal of Power*, 1: 5-20.

Heidler, Andri, Sharmin Khan Louis, Abul Kamal, Mahbub Ul Alam, Christoph Lüthi, and Olivier Crevoisier. 2023. 'On whose terms: utilities, enterprises or communities? The territorial political economy of water and sanitation sector reforms in Dhaka', *Environment & Urbanization*

Heidler, Andri, Muhil Nesi, Josiane Nikiema, and Christoph Lüthi. 2023. 'Multilateral development banks investment behaviour in water and sanitation: Findings and lessons from 60 years of investment projects in Africa and Asia', *International Journal of Water, Sanitation & Hygiene for Development*, (forthcoming).

Henderson, J., P. Dicken, M. Hess, N. Coe, and H. W. C. Yeung. 2002. 'Global production networks and the analysis of economic development', *Review of International Political Economy*, 9: 436-64.

Herrera, Veronica. 2019. 'Reconciling global aspirations and local realities: Challenges facing the Sustainable Development Goals for water and sanitation', *World Development*, 118: 106-17.

Heynen, Nik, Maria Kaika, and Erik Swyngedouw. 2006. *In the nature of cities* (Routledge: London, New York).

Hickel, Jason, Christian Dorninger, Hanspeter Wieland, and Intan Suwandi. 2022. 'Imperialist appropriation in the world economy: Drain from the global South through unequal exchange, 1990–2015', *Global Environmental Change*, 73: 102467.

Hoffmann, S., U. Feldmann, P. M. Bach, C. Binz, M. Farrelly, N. Frantzeskaki, H. Hiessl, J. Inauen, T. A. Larsen, J. Lienert, J. Londong, C. Luthi, M. Maurer, C. Mitchell, E. Morgenroth, K. L. Nelson, L. Scholten, B. Truffer, and K. M. Udert. 2020. 'A research agenda for the future of urban water management: Exploring the potential of nongrid, small-grid, and hybrid solutions', *Environmental Science and Technology*, 54: 5312-22.

Hopkin, Jonathan, and Ben Rosamond. 2018. 'Post-truth politics, bullshit and bad ideas:‘Deficit Fetishism’in the UK', *New Political Economy*, 23: 641-55.

Hossain, Mohammad. 2013. 'Poor Municipal Spending for Infrastructure Development and Gap for Investment: A Case of Bangladesh', *International Journal of Business and Management*, 8.

Huang, Hao, and Yehua Dennis Wei. 2011. 'Spatial-temporal patterns and determinants of foreign direct investment in China', *Erdkunde*, 65: 7-23.

Humphrey, C., and K. Michaelowa. 2013. 'Shopping for Development: Multilateral Lending, Shareholder Composition and Borrower Preferences', *World Development*, 44: 142-55.

Humphrey, Chris. 2022. *Financing the Future: Multilateral Development Banks in the Changing World Order of the 21st Century* (Oxford University Press).

Hutchings, P., M. Johns, D. Jornet, C. Scott, and Z. Van den Bossche. 2018. 'A systematic assessment of the pro-poor reach of development bank investments in urban sanitation', *Journal of Water Sanitation and Hygiene for Development*, 8: 402-14.

Hutton, G., L. Haller, and J. Bartram. 2007. 'Global cost-benefit analysis of water supply and sanitation interventions', *J Water Health*, 5: 481-502.

Hutton, Guy, and Mili Varughese. 2016. "The Costs of Meeting the 2030 Sustainable Development Goal Targets on Drinking Water, Sanitation, and Hygiene." In *Water and Sanitation Program: Technical Paper*. Washington: World Bank Group.

Illi, Martin. 1992. *Von der Schîssgruob zur modernen Stadtentwässerung* (Verlag Neue Zürcher Zeitung: Zürich, Schweiz).

Ioris, A. A. R. 2012. 'The geography of multiple scarcities: Urban development and water problems in Lima, Peru', *Geoforum*, 43: 612-22.

IWA. 2021. "A Call to Action: Regulating for Citywide Inclusive Sanitation." In, 11. London, UK: International Water Association (IWA).

Jäger, Johannes. 2020. 'From Marx to critical international political economy.' in, *The Routledge Handbook to Global Political Economy* (Routledge: New York).

Jäger, Johannes, Laura Horn, and Joachim Becker. 2016. 'Critical International Political Economy and Method.' in Alan Cafruny, Leila Simona Talani and Gonzalo Pozo Martin (eds.), *The Palgrave Handbook of Critical International Political Economy*.

Jenkins, M. W., O. Cumming, and S. Cairncross. 2015. 'Pit latrine emptying behavior and demand for sanitation services in Dar Es Salaam, Tanzania', *Int J Environ Res Public Health*, 12: 2588-611.

JMP. 2019. *Progress on household drinking water, sanitation and hygiene 2000-2017. Special focus on inequalities.* (JMP (Joint Monitoring Program): Geneva, Switzerland).

Kaika, Maria, and Erik Swyngedouw. 2000. 'Fetishizing the modern city: the phantasmagoria of urban technological networks', *International Journal of Urban and Regional Research*, 24: 120-38.

Kalbermatten, John M. 1991. 'Water and Sanitation for All, Will It Become Reality or Remain a Dream?', *Water International*, 16: 121-26.

Kalbermatten, John M., Julius S. DeAnne, Charles G. Gunnerson, and Duncan D. Mara. 1982. "Appropriate Sanitation Alternatives: A Planning and Design Manual." In *World Bank Studies in Water and Sanitation* London: World Bank.

Karpouzoglou, Timothy, and Anna Zimmer. 2016. 'Ways of knowing the wastewaterscape: Urban political ecology and the politics of wastewater in Delhi, India', *Habitat International*, 54: 150-60.

Kennedy-Walker, R., B. Evans, J. Amezaga, and C. Paterson. 2014. 'Challenges for the future of urban sanitation planning: critical analysis of John Kalbermatten's influence', *Journal of Water Sanitation and Hygiene for Development*, 4: 1-14.

Kennedy-Walker, Ruth, N Mehta, S Thomas, and Martin Gambrill. 2020. "Connecting the Unconnected." In.: World Bank.

Kerr, Pauline. 2008. 'Human security', *Strategic Studies Quarterly*, 11: 601-26.

Khan, A. I., A. Levin, D. L. Chao, D. DeRoeck, D. T. Dimitrov, J. A. M. Khan, M. S. Islam, M. Ali, M. T. Islam, A. R. Sarker, J. D. Clemens, and F. Qadri. 2018. 'The impact and cost-effectiveness of controlling cholera through the use of oral cholera vaccines in urban Bangladesh: A disease modeling and economic analysis', *Neglected Tropical Diseases*, 12: e0006652.

Kirshner, Jonathan. 2008. 'Dollar primacy and American power: What's at stake?', *Review of International Political Economy*, 15: 418-38.

Kline, Benjamin. 2011. *First along the river: A brief history of the U.S. environmental movement* (Rowman & Littlefield Publishers: Lanham, USA).

Kolker, Joel, Bill Kingdom, and Sophie Trémolet. 2016. "Financing Options for the 2030 Water Agenda." In *Knowledge Brief*, 12. Washington, DC: World Bank.

Kooy, Michelle, and Carolin Walter. 2019. 'Towards A Situated Urban Political Ecology Analysis of Packaged Drinking Water Supply', *Water*, 11.

Kotsila, Panagiota, and V. Subramanian Saravanan. 2017. 'Biopolitics Gone to Shit? State Narratives versus Everyday Realities of Water and Sanitation in the Mekong Delta', *World Development*, 93: 374-88.

Kramarz, Teresa, and Bessma Momani. 2013a. 'The W orld B ank as K nowledge B ank: Analyzing the Limits of a Legitimate Global Knowledge Actor', *Review of Policy Research*, 30: 409-31.

———. 2013b. 'The World Bank as Knowledge Bank: Analyzing the Limits of a Legitimate Global Knowledge Actor', *Review of Policy Research*, 30.

Kubota, Ryuko. 2016. 'Studying up, down, or across?: Selecting who to research.' in, *Doing Research in Applied Linguistics* (Routledge).

Larsen, T. A., S. Hoffmann, C. Luthi, B. Truffer, and M. Maurer. 2016. 'Emerging solutions to the water challenges of an urbanizing world', *Science*, 352: 928-33.

Lawhon, Mary, Gloria Nsangi Nakyagaba, and Timos Karpouzoglou. 2023. 'Towards a modest imaginary? Sanitation in Kampala beyond the modern infrastructure ideal', *Urban Studies*, 60: 146-65.

Leander, A. 2001. 'Dependency today - finance, firms, mafias and the state: a review of Susan Strange's work from a developing country perspective', *Third World Quarterly*, 22: 115-28.

Leopold, Ellen, and David A. McDonald. 2012. 'Municipal Socialism Then and Now: some lessons for the Global South', *Third World Quarterly*, 33: 1837-53.

Littoz-Monnet, Elisabeth (ed.)^(eds.). 2017. *The Politics of Expertise in International Organizations* (Routledge: New York).

Loftus, Alex, Hug March, and Fiona Nash. 2016. 'Water Infrastructure and the Making of Financial Subjects in the South East of England'.

Lonholdt, Jens. 2005. *Water and Wastewater Management in the Tropics* (IWA Publishing: London).

Luptan. 2022. "Simplified Sewer Systems Standard Details Drawing." In, 2. Dar es Salaam, Tanzania: Luptan Consultants Limited.

Lüthi, Christoph, Jennifer McConville, and Elisabeth Kvarnström. 2010. 'Community-based approaches for addressing the urban sanitation challenges', *International Journal of Urban Sustainable Development*, 1: 49-63.

Lüthi, Christoph, Juliet Willetts, and Sabine Hoffmann. 2020. 'Editorial: City-Wide Sanitation: The Urban Sustainability Challenge', *Frontiers in Environmental Science*, 8: 1-4.

Luthra, Aman. 2018. ''Old habits die hard': discourses of urban filth in Swachh Bharat Mission and The Ugly Indian', *Journal of Multicultural Discourses*, 13: 120-38.

Mader, Philip, Daniel Mertens, and Natascha Van der Zwan. 2020. *The Routledge international handbook of financialization* (Routledge).

Magawa, Yvonne. 2021. 'Legal, Regulatory, and Institutional Framework of Water and Sanitation Services in the Eastern and Southern Africa Region.' in, *Oxford Research Encyclopedia of Global Public Health*.

Makina, Anesu, and Mary Lawhon. 2022. 'Permission to appropriate: Waste pickers' 'guidelines' for contesting and consolidating claims to waste on the streets of Tshwane, South Africa', *Geoforum*, 137: 52-60.

Mallory, A., D. Akrofi, J. Dizon, S. Mohanty, A. Parker, D. Rey Vicario, S. Prasad, I. Welivita, T. Brewer, S. Mekala, D. Bundhoo, K. Lynch, P. Mishra, S. Willcock, and P. Hutchings. 2020. 'Evaluating the circular economy for sanitation: Findings from a multi-case approach', *Science of the Total Environment*, 744: 1-10.

Mallory, Adrian, Lilian Omoga, Domenic Kiogora, Joy Riungu, Dorothy Kagendi, and Alison Parker. 2021. 'Understanding the role of informal pit emptiers in sanitation in Nairobi through case studies in Mukuru and Kibera settlements', *Journal of Water, Sanitation and Hygiene for Development*, 11: 51-59.

Mannan, Iffat Yesmin. 2009. 'Corporatizing Dhaka's Water Supply and Sewerage Authority, Bangladesh', Master Thesis, Queen's University.

Mara, D., J. Lane, B. Scott, and D. Trouba. 2010. 'Sanitation and health', *PLoS Medicine*, 7: 1-7.

Marin, Philippe. 2009. *Public-Private Partnerships for Urban Water Utilities: A Review of Experiences in Developing Countries* (World Bank: Washington, DC).

Marques, Rui Cunha. 2016. 'PPP arrangements in the Brazilian water sector: a double-edged sword', *Water Policy*, 18: 463-79.

Massey, Doreen. 2013. *Space, place and gender* (John Wiley & Sons).

May, Christopher. 1996. 'Strange fruit: Susan Strange's theory of structural power in the international political economy', *Global Society*, 10: 167-89.

Mbembé, J A. 2003. 'Necropolitics', *Public culture*, 15: 11-40.

McDonald, David A. 2019. 'Will the Empire Strike Back? Powerbrokers and Remunicipalisation in the Water Sector', *Water Alternatives*, 12.

McDonald, David A, Thomas Marois, and Susan Spronk. 2021. 'Public Banks + Public Water = SDG 6?', *Water Alternatives*, 14: 17.

McDonald, David A. 2018. 'Remunicipalization: The future of water services?', *Geoforum*, 91: 47-56.

McFarlane, Colin. 2019. 'The Urbanization of the Sanitation Crisis: Placing Waste in the City', *Development and Change*, 50: 1239-62.

McFarlane, Colin, and Jonathan Silver. 2017. 'The Poolitical City: "Seeing Sanitation" and Making the Urban Political in Cape Town', *Antipode*, 49: 125-48.

McFarlane, Colin, Jonathan Silver, and Yaffa Truelove. 2016. 'Cities within cities: intra-urban comparison of infrastructure in Mumbai, Delhi and Cape Town', *Urban Geography*, 38: 1393-417.

McGranahan, G., and D. Mitlin. 2016. 'Learning from Sustained Success: How Community-Driven Initiatives to Improve Urban Sanitation Can Meet the Challenges', *World Development*, 87: 307-17.

Mehta, Meera. 2018. 'Public finance at scale for rural sanitation – a case of Swachh Bharat Mission, India', *Journal of Water, Sanitation and Hygiene for Development*, 8: 359-73.

Mehta, Meera, Dinesh Mehta, and Upasana Yadav. 2019. 'Citywide Inclusive Sanitation Through Scheduled Desludging Services: Emerging Experience From India', *Frontiers in Environmental Science*, 7.

Menegat, Rualdo. 2002. 'Participatory democracy and sustainable development: integrated urban environmental management in Porto Alegre, Brazil', *Environment and Urbanization*, 14: 26.

Mengist, Wondimagegn. 2020. 'Historical development of environmental management tools and techniques: A review paper on its driving forces', *International Journal of Energy and Environmental Science*, 5: 90-100.

Millington, Nate, and Mary Lawhon. 2018. 'Geographies of waste: Conceptual vectors from the Global South', *Progress in Human Geography*, 43: 1044-63.

Miörner, Johan, and Christian Binz. 2021. 'Towards a multi-scalar perspective on transition trajectories', *Environmental Innovation and Societal Transitions*, 40: 172-88.

Moe, C. L., and R. D. Rheingans. 2006. 'Global challenges in water, sanitation and health', *J Water Health*, 4 Suppl 1: 41-57.

Mohan, Giles, and Emma Mawdsley. 2007. 'The war on terror, American hegemony and international development', *Review of International Political Economy*, 14: 439-43.

Molle, Francois. 2008. 'Nirvana Concepts, Narratives and Policy Models: Insights from the Water Sector', *Water Alternatives*, 1: 25.

Monstadt, Jochen, and Sophie Schramm. 2017. 'Toward The Networked City? Translating Technological ideals and Planning Models in Water and Sanitation Systems in Dar es Salaam', *International Journal of Urban and Regional Research*, 41: 104-25.

Monteiro, Tanya S., and R. Nalini. 2021. 'Mental health at the intersections of marginalization: A conceptual model to explore the mental health concerns of women sanitation workers in India', *Asian Social Work and Policy Review*, 15: 102-11.

Morales, Margaret del Carmen, Leila Harris, and Gunilla Öberg. 2014. 'Citizenshit: The Right to Flush and the Urban Sanitation Imaginary', *Environment and Planning A: Economy and Space*, 46: 2816-33.

Mpanang'ombe, Wrixon, Billy Bray, and Elizabeth Tilley. 2021. 'Pit emptying subsidy vouchers: a two-phased targeting and structuring experiment in Blantyre, Malawi', *International Journal of Urban Sustainable Development*, 13: 448-63.

Mumssen, Yogita , Gustavo Saltiel, and Bill Kingdom. 2018. "Aligning Institutions and Incentives for Sustainable Water Supply and Sanitation Services." In, 199. Washington, DC.

Najlis, Pierre, and Anthony Edwards. 1991. 'The International Drinking Water Supply and Sanitation Decade in retrospect and implications for the future', *Natural Resources Forum*, 15: 110-17.

Nakyagaba, Gloria Nsangi, Mary Lawhon, Shuaib Lwasa, Jonathan Silver, and Fredrick Tumwine. 2021. 'Power, politics and a poo pump: Contestation over legitimacy, access and benefits of sanitation technology in Kampala', *Singapore Journal of Tropical Geography*, 42: 415-30.

Narayan, Abishek. 2022. 'Planning Citywide Inclusive Sanitation', Doctoral Thesis, ETH Zürich.

Narayan, Abishek, and Christoph Lüthi. 2020. 'Solving urban sanitation – sustainably and equitably', *World Water*, 43: 18-21.

Nem Singh, Jewellord T. 2023. 'Recentring industrial policy paradigm within IPE and development studies', *Third World Quarterly*, 44: 2015-30.

Nijman, J., and Y. D. Wei. 2020. 'Urban inequalities in the 21st century economy', *Appl Geogr*, 117: 102188.

Nilsson, D. 2016. 'The unseeing state: How ideals of modernity have undermined innovation in Africa's urban water systems', *NTM*, 24: 481-510.

Njoh, Ambe J. 2009. 'Urban planning as a tool of power and social control in colonial Africa', *Planning Perspectives*, 24: 301-17.

Novy, Andreas, and Bernhard Leubolt. 2005. 'Participatory Budgeting in Porto Alegre: Social Innovation and the Dialectical Relationship of State and Civil Society', *Urban Studies*, 42: 14.

OECD. 2019. "Making blended finance work for water and sanitation: Unlocking commercial finance for SDG6." In *OECD Studies on Water*, 141. Paris: OECD Publishing.

———. 2022. "Detailed aid statistics: ODA Official development assistance: disbursements", OECD International Development Statistics (database)." In, edited by OECD. Paris.

Opel, Aftab, and M. Khairul Bashar. 2013. 'Inefficient technology or misperceived demand: the failure of Vacutug-based pit-emptying services in Bangladesh', *Waterlines*, 32: 213-20.

Ormerod, Kerri Jean, and Christopher A. Scott. 2012. 'Drinking Wastewater', *Science, Technology, & Human Values*, 38: 351-73.

Orner, K. D., and J. R. Mihelcic. 2018. 'A review of sanitation technologies to achieve multiple sustainable development goals that promote resource recovery', *Environmental Science-Water Research & Technology*, 4: 16-32.

Otoo, Miriam, and Pay Drechsel. 2018. *Resource Recovery from Waste: business models for energy, nutrient and water reuse in low- and middle-income countries* (Routledge: New York).

Pahl-Wostl, Claudia, Paul Jeffrey, Nicola Isendahl, and Marcela Brugnach. 2010. 'Maturing the New Water Management Paradigm: Progressing from Aspiration to Practice', *Water Resources Management*, 25: 837-56.

Panesar, Arne, Arno Rosemarin, Soren Rud, and Roland Schertenleib. 2009. 'SuSanA's road map towards more sustainable sanitation practices'.

Parkinson, J, Christoph Lüthi, and D Walther. 2014. *Sanitation 21: A Planning Framework for Improving City-wide Sanitation Services* (IWA, Eawag-Sandec, GIZ: London, United Kingdom and Eschborn, Germany and Dübendorf, Switzerland).

Pauli, Benjamin J. 2020. 'The Flint water crisis', *WIREs Water*, 7: Article e1420.

Philippe, Sterenn, Andrés Hueso, Gloria Kafuria, Jules Sow, Hermann B. Kambou, Wandoo Akosu, and Lloyd Beensi. 2022. 'Challenges Facing Sanitation Workers in Africa: A Four-Country Study', *Water*, 14.

Pierce, Gregory. 2017. 'Why is basic service access worse in slums? A synthesis of obstacles', *Development in Practice*, 27: 288-300.

PSB. 2017. "Institutional and Regulatory Framework for Faecal Sludge Management (IRF-FSM): Megacity Dhaka." In, 24. Dhaka, Bangladesh: Policy Support Branch (PSB), Local Government Division, Ministry of Local Government, Rural Development and Co-operatives, Government af the People's Republic of Bangladesh.

Public Citizen. 2004. "Suez: A Corporate Profile." In, 23. Public Citizen.

Raghavendra, R. H., and R. Anil Kumar. 2022. 'Sanitation Workers: A Neglected Community of Indian Civilized Society', *Contemporary Voice of Dalit*.

Rana, Md Masud Parves, and Awais Piracha. 2020. 'Supplying water to the urban poor: Government's roles and challenges of participatory water governance', *Cities*, 106: 102881-90.

Rao, Krishna C, Miriam Otoo, Pay Drechsel, and Munir A Hanjra. 2017. 'Resource Recovery and Reuse as an Incentive for a More Viable Sanitation Service Chain', *Water Alternatives*, 10: 493-512.

Ravenhill, J. 2014. 'Global value chains and development', *Review of International Political Economy*, 21: 264-74.

Reymond, Philippe, Samuel Renggli, and Christoph Lüthi. 2016. 'Towards Sustainable Sanitation in an Urbanising World.' in Mustafa Ergen (ed.), *Sustainable Urbanization* (InTech: Rijeka, Croatia).

Ritchie, Hannah, and Max Roser. 2018. 'Urbanization', *Our World in Data*.

Rojas-Ortuste, Franz, and Waled Mahmud. 2015. "Organizational Evaluation of Dushtha Shasthya Kendra, DSK Health Center for the Poor." In *Water for Life Assessment*, 134. Water1st International.

Rosenboom, Jan Willem, Barbara Evans, Christine Moe, Eduardo Perez, Sophie Trémolet, Valérie Sturm, Clémentine Stip, Andrés Hueso, and Darren Saywell. 2016. "Addressing the urban sanitation crisis: Time for a radical shift." In *The Water Blog*. World Bank.

Rosner, David. 2020. 'Moral virtue in the time of cholera', *Foreign Affairs*.

Ruiz Lopez, Daniel. 2016. 'TRANSNATIONAL ORGANIZED CRIME: ITS NATURE AND THREATS TO PEACE'.

Rusca, Maria, Cecilia Alda-Vidal, and Michelle Kooy. 2017. 'Sanitation justice?: The multiple dimensions of urban sanitation inequalities.' in Rutgerd Boelens, Tom Perreault and Jeroen Vos (eds.), *Water Justice* (Cambridge University Press, Cambridge).

Saker, A., A. Bernal Pedraza, and A. S. Narayan. 2022. 'Regulating Citywide Inclusive Sanitation (CWIS) in Colombia', *International Journal of Environmental Research and Public Health*, 19: 1-21.

Sanchez, Jérémie. 2019. 'Urban development falling into the gutter: Sanitation planning and 'anti-politics' in Myanmar', *Third World Quarterly*, 40: 2228-45.

———. 2020. 'Blinded like a state? Urban sanitation, improvement and high modernism in contemporary Myanmar', *Political Geography*, 82: 102255-63.

Satterthwaite, David, Diana Mitlin, and Sheridan Bartlett. 2015. 'Is it possible to reach low-income urban dwellers with good-quality sanitation?', *Environment and Urbanization*, 27: 3-18.

Schaub-Jones, David. 2011. 'Market-based approaches in water and sanitation: The role of entrepreneurship', *Waterlines*, 30: 5-20.

Schertenleib, Roland, Christoph Lüthi, Arne Panesar, Mintje Büürma, Depinder Kapur, Abishek Narayan, Alexandra Pres, Prit Salian, Dorothee Spuhler, and Annakathrin Tempel. 2021. "A Sanitation Journey - Principles, Tools & Approaches for Urban Sanitation." In, 80. Bonn, Germany & Dübendorf, Switzerland: Sustainable Sanitation Alliance (SuSanA).

Schiffler, Manuel. 2015. 'France: An Improved Partnership in the Motherland of Multinational Water Companies.' in, *Water, Politics and Money*.

Scholvin, Sören. 2020. 'Global commodity chains, global value chains and global production networks.' in Ernesto Vivares (ed.), *The Routledge Handbook to Global Political Economy* (Routledge: New York).

Schrecongost, A., D. Pedi, J. W. Rosenboom, R. Shrestha, and R. Ban. 2020. 'Citywide Inclusive Sanitation: A Public Service Approach for Reaching the Urban Sanitation SDGs', *Frontiers in Environmental Science*, 8: 1-8.

Sedlak, D. L. 2014. *Water 4.0: The past, present, and future of the World's most vital resource* (New Haven, CT: Yale University Press).

Seoane, Maximiliano Vila, and Marcelo Saguier. 2020. 'Cyberpolitics and IPE: Towards a research agenda in the Global South', *The Routledge Handbook to Global Political Economy*: 702-18.

Shadlen, Kenneth C. 2005. 'Exchanging development for market access? Deep integration and industrial policy under multilateral and regional-bilateral trade agreements', *Review of International Political Economy*, 12: 750-75.

Shadlen, Kenneth C, Bhaven N Sampat, and Amy Kapczynski. 2020. 'Patents, trade and medicines: past, present and future', *Review of International Political Economy*, 27: 75-97.

Sharma, Manoj, and Melissa Alipalo. 2017. "The Dhaka Water Services Turnaround: How Dhaka is connecting slums, saving water, raising revenues, and becoming one of South Asia's best public water utilities." In, 70. Manila, Philipines: Asian Development Bank (ADB).

Sharma, Sarah E. 2021. 'Down and out in Dhaka: understanding land financialization and displacement in austerity urbanism', *Urban Geography*, 42: 681-700.

Silina, Everita. 2016. 'Being Critical About Security: What Critical Political Economy Says About Security and Identity.' in Alan Cafruny, Leila Simona Talani and Gonzalo Pozo Martin (eds.), *The Palgrave Handbook of Critical International Political Economy*.

Silver, Jonathan. 2019. 'Decaying infrastructures in the post-industrial city: An urban political ecology of the US pipeline crisis', *Environment and Planning E: Nature and Space*.

Singha, Dibalok. 1996. 'Can pay, will pay - securing a slum water supply for squatters', *Waterlines*, 15.

Sinharoy, S. S., R. Pittluck, and T. Clasen. 2019. 'Review of drivers and barriers of water and sanitation policies for urban informal settlements in low-income and middle-income countries', *Utilities Policy*, 60: 100957-65.

Spilker, Gabriele, Vally Koubi, and Thomas Bernauer. 2017. 'International Political Economy and the Environment.' in, *Oxford Research Encyclopedia of Politics*.

Spuhler, Dorothee, and Christoph Lüthi. 2020. 'Review of frameworks and tools for urban strategic sanitation planning: considering technology innovations and sustainability', *Journal of Water, Sanitation and Hygiene for Development*, 10: 768-85.

Stock, Robert. 1988. 'Environmental Sanitation in Nigeria: Colonial and Contemporary', *Review of African Political Economy*, 42.

Stokes, Kathleen, and Mary Lawhon. 2022. 'What counts as infrastructural labour? Community action as waste work in South Africa', *Area Development and Policy*: 1-21.

Stolz, Dennis, and Karen P. Y. Lai. 2020. 'Impact investing, social enterprise and global development.' in Philip Mader, Daniel Mertens and Natascha Van der Zwan (eds.), *The Routledge international handbook of financialization* (Routledge).

Strange, Susan. 1988. *States and Markets* (Bloomsbury: London, UK).

Swyngedouw, Erik, and Nikolas C. Heynen. 2003. 'Urban Political Ecology, Justice and the Politics of Scale', *Antipode*, 35: 898-918.

Swyngedouw, Erik, Maria Kaika, and E Castro. 2002. 'Urban water: A political-ecology perspective', *Built Environment*, 28: 14.

Szreter, Simon. 2002. "A central role for local government? The example of late Victorian Britain." In *History & Policy*.

Talani, Leila Simona. 2016. 'Neo-Gramscians and IPE: A Socio-Economic Understanding

of Transnationalism, Hegemony and Civil Society.' in, *The Palgrave Handbook of Critical International Political Economy*.

Taylor, Marcus. 2007. 'Rethinking the global production of uneven development', *Globalizations*, 4: 529-42.

Thieme, Tatiana. 2010. 'Youth, waste and work in Mathare: whose business and whose politics?', *Environment and Urbanization*, 22: 333-52.

Thieme, Tatiana A. 2015. 'Turning hustlers into entrepreneurs, and social needs into market demands: Corporate–community encounters in Nairobi, Kenya', *Geoforum*, 59: 228-39.

Tilley, Elizabeth, Lukas Ulrich, Christoph Lüthi, Christian Zurbrügg, and Roland Schertenleib. 2008. *Compendium of sanitation systems and technologies 1st edition* (Swiss Federal Institute of Aquatic Science and Technology (Eawag): Dübendorf, Switzerland).

Tonkiss, Fran. 2020. 'City government and urban inequalities', *City*, 24: 286-301.

Trémolet, Sophie, Barbara Evans, and David Schaub-Jones. 2010. "Output-Based Aid for Sustainable Sanitation." In *OBA Working Paper Series*, 40. Washington, D.C.: World Bank.

Truelove, Yaffa. 2011. '(Re-)conceptualizing water inequality in Delhi, India through a feminist political ecology framework', *Geoforum*, 42: 143-52.

Truelove, Yaffa, and Kathleen O'Reilly. 2020. 'Making India's cleanest city: Sanitation, intersectionality, and infrastructural violence', *Environment and Planning E: Nature and Space*.

Tsinda, Aime, Pamela Abbott, Jonathan Chenoweth, and Sylvie Mucyo. 2021. 'Understanding the political economy dynamics of the water, sanitation and hygiene (WaSH) sector in Rwanda', *International Journal of Urban Sustainable Development*, 13: 265-78.

Uddin, Muhammad Salah, and Zobayer Ahmed. 2021. 'Privatization policy, entrepreneurship, and economic development: the dynamics in Bangladesh economy', *Journal of Global Entrepreneurship Research*: 1-8.

Ulrich, Andreas, Stefan Reuter, and Bernd Gutterer. 2009. *Decentralised Wastewater Treatment Systems (DEWATS) and Sanitation in Developing Countries: A Practical Guide* (Water, Engineering and Development Centre (WEDC): Loughborough).

UN. 2019. "World Urbanization Prospects 2018: Highlights." In. New York: United Nations.

UN Habitat. 2022. "Envisaging the future of cities." In, 422. Nairobi, Kenya: United Nations Human Settlements Programme (UN-Habitat).

UN Statistics Division. 2022. 'Standard country or area codes for statistical use (M49) ', United Nations, , Accessed 20 December 2022. https://unstats.un.org/unsd/methodology/m49/overview/.

UN Water. 2013. "What is Water Security? Infographic." In. Geneva, Switzerland.

———. 2019. "National systems to support drinking-water, sanitation and hygiene: global status report 2019. ." In *UN-Water global analysis and assessment of sanitation and drinking-water (GLAAS) 2019 report*, 144. World Health Organization (WHO).

UNICEF and WHO. 2020. "State of the World's Sanitation: An urgent call to transform sanitation for better health, environments, economies and societies." In, 48. New York.

United Nations. 2021. "The Sustainable Development Goals Report." In. New York: United Nations.

Van Treeck, Till. 2009. 'The political economy debate on 'financialization'–a macroeconomic perspective', *Review of International Political Economy*, 16: 907-44.

van Welie, Mara J. 2019. 'TRANSITION PATHWAYS OF SPLINTERED REGIMES: Addressing sanitation provision challenges in informal settlements', Ph.D, Utrecht University.

van Welie, Mara J., Pauline C. Cherunya, Bernhard Truffer, and James T. Murphy. 2018. 'Analysing transition pathways in developing cities: The case of Nairobi's splintered sanitation regime', *Technological Forecasting and Social Change*, 137: 259-71.

van Welie, Mara J., and Henny A. Romijn. 2018. 'NGOs fostering transitions towards sustainable urban sanitation in low-income countries: Insights from transition management and development studies', *Environmental Science & Policy*, 84: 250-60.

van Welie, Mara J., Bernhard Truffer, and Xiao-Shan Yap. 2019. 'Towards sustainable urban basic services in low-income countries: A Technological Innovation System analysis of sanitation value chains in Nairobi', *Environmental Innovation and Societal Transitions*, 33: 196-214.

Véron, René. 2006. 'Remaking urban environments: The political ecology of air pollution in Delhi', *Environment and Planning A: Economy and Space*, 38: 2093-109.

Vivares, Ernesto. 2020. 'Introduction.' in, *The Routledge Handbook to Global Political Economy* (Routledge: New York).

Vukov, Visnja. 2020. 'European integration and weak states: Romania's road to exclusionary development', *Review of International Political Economy*, 27: 1041-62.

Wade, Robert Hunter. 2003. 'What strategies are viable for developing countries today? The World Trade Organization and the shrinking of 'development space'', *Review of International Political Economy*, 10: 621-44.

Wald, Chelsea. 2022. 'How recycling urine could help save the world', *Nature*, 602: 202-06.

WaterAid. 2021. "Implementing polotical will - Effective leadership in delivering WASH for all." In.

WHO. 2007. "The World Health Report 2007: A safer future: global public health security in the 21st centruy." In. Geneva, Switzerland: World Health Organization.

Wilbard, K., A. G. Kyessi, and T. M. Limbumba. 2022. 'How co-production contributes to urban equality: retrospective lessons from Dar es Salaam', *Environment and Urbanization*, 34: 278-93.

Willetts, Juliet, Janina Murta, Naomi Carrard, and Anna Gero. 2014. 'Private and social enterprise roles in water, sanitation and hygiene for the poor: a systematic review', *Journal of Water, Sanitation and Hygiene for Development*, 4: 331-45.

Winpenny, James, Sophie Trémolet, Rachel Cardone, Joel Kolker, Bill Kingdom, and Lyndsay Mountford. 2016. "Aid Flows to the Water Sector." In, 77. Washington, DC: World Bank.

Wood, David Murakami. 2013. 'What is global surveillance? Towards a relational political economy of the global surveillant assemblage', *Geoforum*, 49: 317-26.

World Bank. 2002. "Implementation Completion Report (IDA29260)." In, 72. Washington, D.C.: World Bank, .

———. 2003. "Implementation Completion Report (ICR) Review." In, 2. Washington, D.C.: World Bank, .

———. 2008. "Dhaka Water Supply and Sanitation Project." In, 155. Washington, D.C.: World Bank, .

———. 2016. "Implementation Completion and Results Report (IDA-45060)." In, 67. Washington, D.C.: World Bank, .

———. 2017. "Public-Private Partnerships Reference Guide." In, 238. Washington DC: World Bank, .

———. 2019. "Doing More with Less: Smarter Subsidies for Water Supply and Sanitation." In, 135. Washington, D.C.: World Bank.

———. 2020. "Dhaka Sanitation Improvement Project (P161432)." In, 83. Washington, D.C.: World Bank, .

WSUP. 2020. "Referee! Responsibilities, regulations and regulating for urban sanitation." In, 36. London, UK: Water and Sanitation for the Urban Poor (WSUP).

WSUP, and EY. 2017. "The world can't wait for sewers: Advancing container-based sanitation businesses as a viable answer to the global sanitation crisis." In, 11. London, UK: WSUP (Water & Sanitation for the Urban Poor) and EY (Ernst & Young).

Yeung, H. W. C., and N. M. Coe. 2015. 'Toward a Dynamic Theory of Global Production Networks', *Economic Geography*, 91: 29-58.

Yin, Hailong, Md Sahidul Islam, and Mengdie Ju. 2021. 'Urban river pollution in the densely populated city of Dhaka, Bangladesh: Big picture and rehabilitation experience from other developing countries', *Journal of Cleaner Production*, 321: 129040-51.

Young, Alasdair R. 2016. 'Not your parents' trade politics: the Transatlantic Trade and Investment Partnership negotiations', *Review of International Political Economy*, 23: 345-78.

Zaqout, Mariam, Sally Cawood, Barbara E. Evans, and Dani J. Barrington. 2020. 'Sustainable sanitation jobs: prospects for enhancing the livelihoods of pit-emptiers in Bangladesh', *Third World Quarterly*, 42: 329-47.