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Adaptation of informal spatial dynamics: A case of Kilungule “A” settlement in Dar es Salaam

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Abstract

Using a case study of the Kilungule “A” district in the rapidly urbanizing city of Dar es Salaam, this work examines how informal spatial dynamics are adapted and what effects these attempts have on urban forms. Modern global inclusion policies are pushing governments to adopt certain unofficial traditions of urban space production without compromising their resilience. Unfortunately, informal activities challenge formal traditions, which are static because they are dynamic and uncertain. While research on adaptation to informality has produced valuable insights, the impact of adaptation efforts on urban forms, which is the focus of this study, has not often been addressed. This study used a mixed methods approach with questionnaires, interviews, document analysis, and map reading as data collection tools. It found that the government involuntarily adapts the informal spatial dynamics by tolerating the informal activities of spatial production and regulating the informal settlements. Adaptation resulted in the persistence of the informal norms of space production, the emergence of plots of varying shapes and sizes, locally customised settlement layout configurations, frustrated circulation paths, and re - infiltration of improved road reserve spaces with informal activities. It was also observed that the adaptation system is relatively efficient and effective, as its results do not match the invested resources and the set goals respectively. This study therefore recommends the government use planning systems that take on board the creation of an adaptation model to enhance the adaptive capacity of cities.

Keywords: Adaption; Embracing informality; Resilience; Spatial dynamics; Urban complexity

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1. Introduction

The history of the evolution of the city supports the city as a result of spontaneous and natural social processes through adaptation of various social, geographical, economic, cultural, and other conditions. Yet, along the same evolution, the city has developed into a spatial entity that is controlled by humans through structuring the city form to meet human spatial requirements. The city planning and design are relatively supported by the pre-industrial city and strengthened by the reaction to the weaknesses of the industrial city. Today, the city is understood from the perspective of designed and planned settings which lead to a well-structured and defined city form that can meet the city's operational efficiency and today's environmental concerns. However, the rise of informality in the 21st century became a challenge to the formal traditions of creation and managing urban forms due to their dynamic nature. The 'formal' city and 'informal' city are equal and opposite entities that do not share their conditions of creation. While the condition creation of a 'formal' city is rigidity, conditional, defined, regular, rule-based, authoritarian, and the like, the 'informal' city conditions are flexibility, non-conditional, undefined, irregular, cultural norms-based, and communal. It is through such contradiction that an 'informal' city may not be viewed as a problem but as a platform through which opportunities for adaptation are sought. Adaptation is also considered by scholars as a means of overcoming limitations of completely disordered or ordered spaces because complete orderliness and complete lack of it cannot take us very far, but are only good at stagnancy (Dovey, 2019; Mehaffy and Haas, 2018; Rapoport, 2016). With adaptation, the formal and informal practices and spaces are allowed to co-exist and interact in a beneficial manner (Dovey, 2013; Inam, 2019; Lutzoni, 2016) as presented in Figure 1.

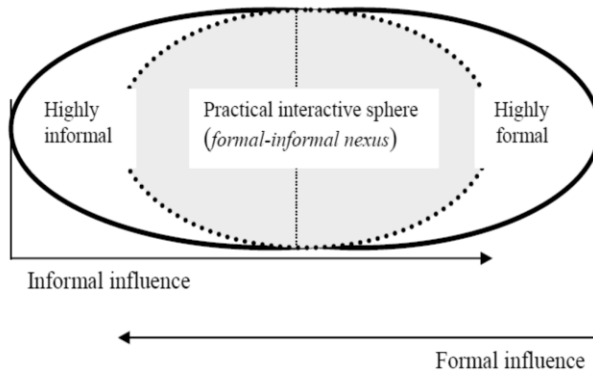


Figure 1. Conceptualization of Formal- Informal elements in a process (Source: Mushumbusi, 2011)

Studies on the area of adaptation of informality have also taken place. However, though the researches have generated important understandings on informality adaptation, they have seldom delved into the repercussions of the adaptation attempts on resulting urban forms particularly on their inclusive and adaptive capacities. This study therefore sheds some light on the impacts that occur on urban forms as a result of adapting the informal spatial dynamics. Knowledge of the impacts will inform the governments on the suitability of their adaptation attempts in producing resilient/adaptable urban forms and hence guide policy decisions in respective countries particularly the developing world, especially in Africa, where unprecedented urbanization has led to the growth of uncontrolled cities. The informal city is viewed as a great challenge to these countries and the solution is mostly considered to transform them to formal. In Tanzania, informality

plays a greater part in space production in urban areas. Most studies, including Bahendwa (Bahendwa, 2013) and Kalugila (Kalugila, 2013), have discussed the favorable elements of informal procedures in creating urban environments and their impact on established formal practices. However, less emphasis is put on how the adaptation of the informal spatial dynamics affects the urban forms' inclusive and adaptive capacities.

2. Theoretical and conceptual frameworks

2.1. Overview of informal spatial dynamics

An understanding of the concept of informal spatial dynamics calls for an understanding of the concept of urban informality first. Urban informality is a form of producing the built environment and space appropriation in a different way from the established norms (López et al., 2019). Urban informality is an organising logic, a system of norms that governs the process operating outside the control of the state (Banks et al., 2020; Dovey, 2012). The concept of informality includes a very wide range of situations such as spontaneous processes of occupation of the territory, absence of property titles, self-building of houses, illegal inhabiting in contexts with rapid urbanisation, temporary uses of space, forms of self-organisation and development of urban areas at city edges (Lutzoni, 2016). Informal processes of production of space include structure extensions and renovation at micro-spatial scales involving typical increments like 'extend', 'attach', 'replace', 'divide', 'connect', and 'infill' in response to various social, economic, and political factors. Informality is defined by the needs of the people and therefore it adapts when the people's needs change. Such dynamic processes and activities are what scholars refer to as spatial dynamics (McCartney and Krishnamurthy, 2018; Pojani, 2019). The processes are claimed for their ability to produce complex urban environments which are lively, enjoyable, walkable, healthy, and vital neighbourhoods (Boeing, 2018; Rauws, 2017). However, dealing with informal spatial dynamics has been a challenge to planners and administrators and thus in many cases, the formal traditions ignore them (Jones and Jones, 2019; Rauws, 2017). This study considers informal spatial dynamics as the variety of informal processes and activities that influence the production of space. They include the informal activities of land parceling and transactions, dwelling construction, and space utilisations that take into consideration the socio-economic realities facing the developers.

2.2. The meaning of adapting the informal spatial dynamics

Adaptation refers to the process or state of adjusting or changing to become more suited to an environment, or the trait as a result of the process. It is the act of changing something to make it suitable for a new purpose or situation. In urban planning and design terms, spaces can adapt to changing conditions and needs (Yiannoudes, 2016). Adaptation can be planned or autonomous. Planned adaptations are deliberate policy decisions on the part of public agencies whereas autonomous adaptations are initiatives that occur naturally by private actors without the intervention of public agencies (Tuihedur Rahman et al., 2021). Figure 2 shows an example of autonomous adaptation whereby users of space created a desire line. Figure 3 shows an example of control by local authorities by blocking the space users' desire line. Figure 4 shows an example of a planned adaptation by local authorities paved the desire lines created by space users. Planned adaptations can be done by ignoring the informal dynamics; integrating informality "*without losing its face*" through "*planning games*" like temporary legalizations and formalization with some restrictions; and planning systems to interact with

informality and from that interaction learn how to improve planning rules while they promote an upgrade of informal interventions (Silva, 2018). Sometimes formal institutions juggle between formal and informal performances – acting formally when the provisions of the legal system serve their interest, and informally when not (Chiodelli and Tzfadia, 2016). In this study, the adaptation of informal spatial dynamics refers to ignoring or embracing some informal traditions of the production of space.



Figure 1. The Desire lines created
(Source: www.pleated-jeans.com)



Figure 2. Control by blocking
desire lines (Source: Novikov,
2014)



Figure 3. Adapting the Desire lines by
paving (Source: www.pleated-jeans.com)

2.3. The essence and impacts of adapting the informal spatial dynamics

Urban planners and designers are urged to focus their efforts on carrying out adaptations in order to strengthen the adaptive capacity of cities (Boeing, 2018; Rauws, 2017). Adaptive neighborhoods are those that can adjust to new conditions, learn from experience, and have the capacity to be modified for new purposes. Striking a balance between informality and formality is crucial to avoid chaos. For example, though mixed land uses are praised for advantages like offering housing variety and density, if the mixing is beyond a suitable proportion, it can bring unwanted conditions like traffic congestion, encroachments, chaos, and noise (Raman and Roy, 2019). Poorly managed incremental constructions result in compromised designs with poor orientation, safety and health issues, and poor-quality materials (NUSP, 2015). An unbalanced mixing of grid layout structures and organic ones may lead to spatial chaos (Yoo and Lee, 2017). Unbalanced improved road infrastructure may lead to a rise in housing rents, and land prices and render peri-urban communities along them attractive for real estate developers (Khanani et al., 2021). Tenure insecurity may prevent families from upgrading their houses, as it is not worth investing such effort in something that can be taken away at any moment (Salingaros, 2021). However, unguided tenure regularisation or formalisation often subjects informal dwellers to risks of eviction, gentrification (John et al., 2020; Lupala and Bhayo, 2014; McCartney and Krishnamurthy, 2018; Owusu, 2021) and rising gated communities (Bandauko et al., 2022; Owusu, 2021; Qureshi, 2023).

2.4. Urban form

Urban form can be defined in a variety of ways depending on the author's perspective. However, most scholars concur that urban form refers to physical characteristics that make up built-up areas, including the shape, size,

density, and configuration of settlements (Shukla, 2023; Williams, 2014; Živković, 2020). Nevertheless, there are other scholars who associate the physical characteristics of the built environment with their users. To them, the urban form is not merely a neutral container for social life, but it is a meaningful register of the diverse movements (personal, familial, communal) that have shaped it (Purcell, 2014). Among them is Kelvin Lynch who understands urban form as the totality of relationships between material space and social activities in the city. Urban form is established through social activities and structures at the same time (Kiss and Kretz, 2016). This humanistic perspective of understanding urban form has been central to the place theory which understands urban form from paying attention to the social and cultural values of the physical spaces. In place theory, social and cultural values, visual perceptions of users, and individual control over the immediate public environment are important principles. A humanistic perspective leads to inclusive and adaptive urban forms of cities. An Inclusive city shall provide a conducive environment ensuring equal opportunities and scope for dignified, independent and productive participation in various aspects of urban life for all citizens including the vulnerable groups. The urban spaces, services and systems will be equitable, accessible, safe, affordable, and culturally acceptable to all residents irrespective of their physical, sensory and cognitive abilities (NIUA and IIT Kharagpur, 2021). Adaptive urban forms allow their users to change the physical characteristics of their built environment according to their evolving needs (Cozzolino, 2020). Residents can shape their own environment to meet their own needs through their direct involvement (Zhao et al., 2023). This study considers urban form as the built environment's physical characteristics such as the plots, buildings, and streets that respond to the changing socio-economic realities of its users. It believes that the socio-economic activities and influences are capable of changing the physical characteristics of the built environment in question.

2.5. Understanding 'Adaptation' as a complex adaptive system

For the sake of acquiring an adequate understanding of the reality of adaptation of the informal spatial dynamics and its impacts on urban form (Wrigley, 2019), 'adaptation activity' is considered a complex system. A system is a regularly interacting or interdependent group of items forming a unified whole (Tagliacozzo et al., 2024). An *ant colony*, a family, a marriage, and a football team are examples of systems. Complex systems are those systems whose agents' interactions lead to emergent outcomes that are often impossible to predict simply by looking at the individual interactions. *Imagine you were throwing a rock. Where the rock ends up will pretty much depend on you – your strength, aim, and coordination. You could easily predict where the rock will go. Now imagine throwing a live bird. There is no way for you to know for sure where it will end up* (Schuster, 2005). The tendency to consider an activity as a system is called 'Systems thinking'. It helps understand the system in a collective manner such as team spirit, group culture, and working for an organization as a whole. In Systems thinking, the whole is not the sum of its parts but rather is a product of the parts' interactions. For example, *in an ant colony, each individual ant has a decision role and locally interacts with the other ants. What emerges from their behaviour is an ant colony. The individual ant is working with local information and local interaction. It has no sense of the global system. And you can't understand the system by looking at the behaviour of individual ants.* In this study, 'adaptation activity' is considered a complex system as it is unplanned and self-organising as there is no one who initiates, leads, guides or controls it. In adaptation, various stakeholders (agents) interact in a variety of ways to achieve the adaptation goals and outcomes like adaptation to achieve inclusive and adaptive urban forms.

2.6. Theory used in evaluating complex systems

To ensure systematic assessment and analysis of complex systems, evaluation theories are involved. Systems Evaluation Theory (SET) is the only theory available for systematic evaluation of complex systems (Renger et al., 2017). SET consists of three steps: defining the system, evaluating system efficiency, and evaluating system effectiveness (Renger, 2015). Defining the system entails defining the system boundaries, subsystems, processes (within and between) subsystem processes, relationships, feedback mechanisms, attributes, inputs, and common goal(s). A system boundary is a conceptual line that divides the system that you want to study from ‘everything else’.

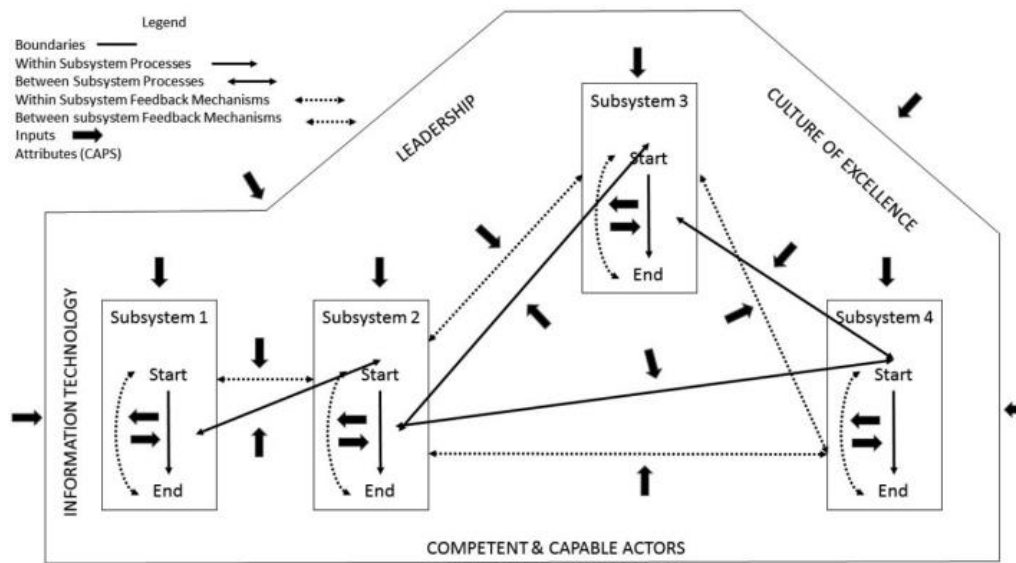


Figure 5. Defining key system elements for the system evaluation plan (Source: Renger et al., 2017)

Figure 1 shows the subsystem boundaries as a solid line surrounding each subsystem and is defined by the start and end points of the subsystem processes. The operational steps within subsystem processes are defined and denoted as ‘start’ and ‘end’ and are connected by a solid arrow indicating many operational steps and decision points between the start and end boundary. Next is to define how subsystems relate or communicate with each other. Next is to determine whether the feedback mechanisms exist and if so, how well they are functioning. Feedback enables a system to make timely adjustments and ensure responsiveness to changing needs and contexts. Figure 1 shows two types of feedback mechanisms within and between subsystems as dotted dual arrows. System attributes are the characteristics or properties of a system that describe its quality, functionality, and behaviour. SET defines four core attributes that affect system efficiency namely: Leadership; competent and capable system actors; a functional ICT infrastructure; and a cohesive commitment by all to the system goals (see capitalized in Figure 1). If any of these system attributes are not in place, then system inefficiencies occur. Inputs include any resources or assets needed to ensure the system operates efficiently

System efficiency analysis evaluates the performance of decision-making units, accounting for their ability to transform input into output (Mergoni and De Witte, 2022). System effectiveness study measures the performance of decision-making units with respect to given goals (Mergoni and De Witte, 2022). In case a

system or its sub-system (s) is goal-free, Goal-free evaluations are involved in determining their efficiency and effectiveness (Youker and Ingraham, 2014).

3. Research methodology

3.1. Study design

Data collection activity in this study adopted a mixed-method approach. This study sought to answer two research questions namely: 1. *“How does adaptation of informal spatial dynamics take place?”* and 2. *What were the impacts of informal spatial dynamics adaptation on urban form?* Systems evaluation theory (SET) was involved in answering the first question on the way adaptation takes place. SET was selected to guide this study as it allowed this study to gain a deeper understanding of adaptation as a complex system that takes into account its dynamic and interconnected nature. Research question 2 was addressed by the process-typological approach to the analysis of urban forms.

3.2. About the Kilungule "A" study area

Kimara ward, specifically Kilungule “A” sub-ward in Ubungo Municipality of Dar es Salaam city (Figure 3) was chosen as a case study site. The interview conducted with one of the long-lived dwellers of this settlement revealed that, since the year 1939 this was once a large forest inhabited by the Zaramo people. Halfani Mohamed Nkyemae, a farmer from the Matumbi tribe and father of Mr. Puluku, came to this area before 1905 and set up farms. He owned a sizeable farm. Eventually, more and more people flocked to this region in search of inexpensive land for agriculture. After inheriting this land from Mr Nkyemae, Mr Puluku began dividing it up and giving some of it away to strangers to entice them to visit the isolated local population. This area became urban as more and more people moved there, and people began to live here and engage in urban agriculture. However, this was not planned, and a sizeable informal settlement emerged there. Kilungule “A” was placed under the control of Kinondoni Municipality in 2000. After the adoption of the National Land Policy in 1995, the government began to tolerate the informal space production activities in this region. In 2016, the Certificate of Right of Occupancy (CROs) was selected for this area. The formalization ended in 2018. The area is currently being physically legalized, but the program is running into trouble because landowners are experiencing financial difficulties.

Kimara ward was chosen due to being the first ward in Dar es Salaam where the government demonstrated a high level of adaptation of the informal spatial dynamics through regularisation of the area and issuance of Certificates of Right of Occupancy (CRO) to its dwellers. According to Dovey, (2012), time is essential in beginning to notice changes in urban forms. Due to this point, the study believed that a settlement where adaptation attempts are old could be of help in easily identifying the physical impacts that have happened on its urban form due to adaptation of the informal spatial dynamics. However, due to the limitation of resources to conduct this study on a larger area, this study went further reducing the case area to the subward level as Kimara Ward has 6 sub wards as shown in Table 2. The letters A, B, C, and D in Table 3 are the criteria set for the selection of a case site and are explained in Table 2. Based on scores in Table 3, Kilungule ‘A’ was selected out of the six sub-wards as it scored a total of 29 points which was the highest score in Table 3. Based on Table 2, Kilungule ‘A’ scored 15 points as the first sub-ward to be regularised with the issuance of certificates of the

right of occupancy in Kimara based on reports by Ubungo Municipal planning officials, Omar, (2018) and (Manara, 2020). Kilungule ‘A’ also scored 7 points as a regularised sub-ward in which the government tolerates the informal activities of production of space, 4 points as a sub-ward in Kimara where some studies took place in the past that can also be used as sources of evidence, and 3 points as a sub – ward where the researcher is more familiar with and hence could easily acquire the required information without using much energy and resources.

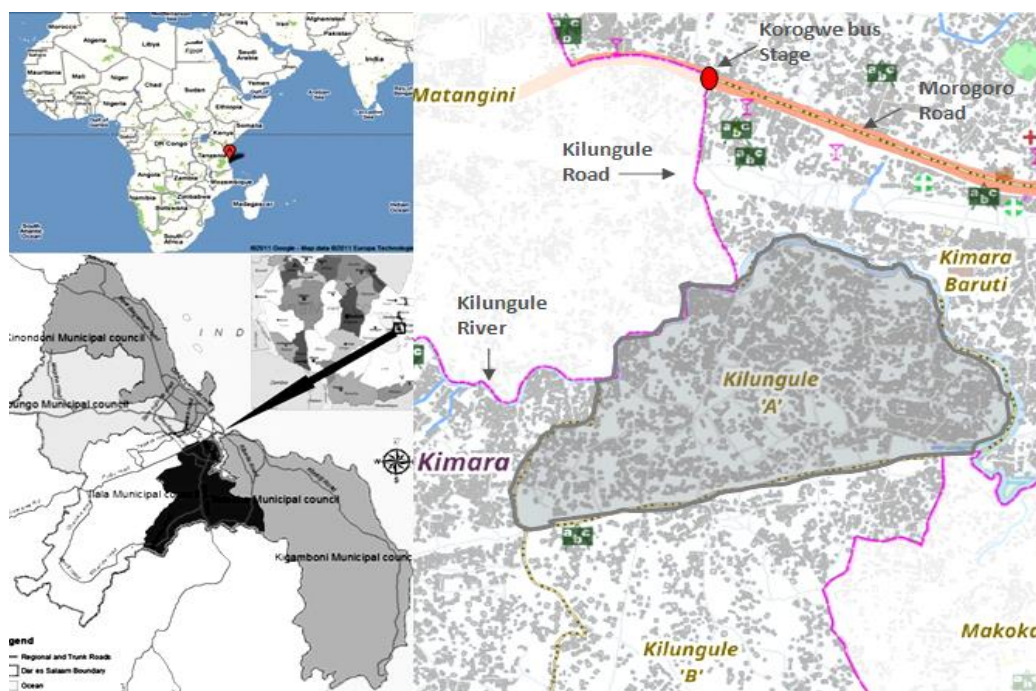


Figure 6. Location of Kilungule “A” residential urban neighbourhood

Table 1. Criteria set for the selection of a case site

No.	Criteria	Points
A	The first sub-ward to be regularised with CROs in Kimara ward	15
B	A regularised sub-ward in which the government tolerates the informal activities of production of space.	12
C	A regularised sub-ward in which the government tolerates the informal activities of production of space.	5
D	A regularised sub-ward in which the government tolerates the informal activities of production of space.	3
Total		35

Table 2. Weighing the six (6) Kimara's sub-wards

No.	Subwards	A	B	C	D	Total Score
1	Kilungule 'A	15	7	4	3	29
2	Kilungule 'B	14	7	1	1	23
3	Kimara Baruti	10	7	3	2	22
4	Mavurunza	10	7	1	1	19
5	Baruti	10	7	1	1	19
6	Golani	10	7	1	1	19
Total						131

3.3. Sampling

The interviews involved eighty-six (86) respondents. The selection of interviewees was based on the approach by Hasgül, (2016) whereby three categories of actors involved in the production of space namely, individual dwelling owners, public sector urban planning officials, and private sector practitioners, were selected (Table 3). Snowball sampling strategy was involved in selecting the individual dwelling owners, and the private practitioners. Purposive sampling was used to select public sector officials as their offices are known. Individual dwelling owners were people owning dwellings in Kilungule "A". Public sector officials were government officials at Ubungo municipality and Kilungule "A" sub-ward levels. At the municipal level, these included municipal urban planners, architects, and engineers. The public officials at the sub-ward level were local leaders like the Mtaa Chairperson, Mtaa Executive Officer, and Tencell leader. Private sector practitioners were professionals and unprofessional practitioners engaging with the informal processes of land acquisition and dwelling constructions. The professional private practitioners were privately employed architects, engineers, and planners, whereas the local masons and brokers represented the unprofessional private practitioners.

The decision on the number of respondents was based on qualitative sampling traditions whereby the cases were selected gradually in three rounds until the saturation point was reached. Thirty-nine, twenty-eight, and nineteen (39, 28, and 19) respondents, were selected in the first, second, and third rounds respectively in Kilungule "A". Individual dwelling owners are the ones directly performing the informal activities of the production of space. They provided information on informal activities of production of space which the government tolerates and the way it tolerates. Public sector officials were the ones concerned with the informal activities. These were asked how they tolerate the informal activities and regularize the informal settlements. The professional and unprofessional private practitioners were playing a mediating role between the actors. They were asked about the services they offer to their clients in informal areas which are tolerated by the government.

Table 3. Demographic characteristics of respondents in Kilungule “A” and Ubungo municipality urban planning officials

	Respondents	Age				Gender		Employment		Occupation							
		20-30	31-40	41-60	Over 60	M	F	EM	PE	CP	MEO	TL	LM	LB	A	P	E
1	Individuals dwelling owners	2	2	10	16	22	8	-	30	-	-	-	-	-	-	-	-
2	Public sector officials	2	7	6	-	14	1	7	8	1	1	6	-	-	2	3	2
3	Professional Private practitioner	2	9	7	-	16	2	-	18	-	-	-	-	-	10	5	3
4	Unprofessional Private practitioners	6	14	3	-	22	1	-	23	-	-	-	12	11	-	-	-
	TOTAL	12	32	26	16	74	12	7	79	1	1	6	12	11	12	8	5
	GRAND TOTAL	86				86		86		N/A							

KEY: M – Male; F – Female; EM-Employed; PE –Private employment; CP – Chairperson; MEO – Mtaa Executive Officer; TL – Tencell leader; LM – Local mason; LB – Land property broker, A – Architect; P – Planner; and E – Engineer.

3.4. Data collection

The evaluation of the informal spatial dynamics adaptation system using the Systems Evaluation Theory (SET) was done to acquire information on the activities of production of space that were being tolerated by the government, the way the government tolerated the activities, together with the impacts such adaptation attempts posed on Kilungule “A”’s urban form. Step 1 involved defining the system used in adapting the informal spatial dynamics in Kilungule “A” by defining the adaptation system’s boundaries, subsystems with their processes, relationships, feedback mechanisms, attributes, inputs, and common goal(s). The adaptation system’s processes, involved knowing the activities of production of space that were being tolerated by the government and the way the government was tolerating such activities. Interviews were involved to acquire information on the tolerated activities and measures the authorities were taking to tolerate them. Multi-select questionnaires were involved in collecting information.

Further, policy documents such as the Kimara Regularisation Scheme 2016 were also involved at this stage to supplement the interviews with information like budgets for the projects and actors involved. The impacts of the adaptation attempt on Kilungule “A”’s urban form, were availed in steps 2 and 3 which involved

evaluating the adaptation system's efficiency and effectiveness respectively. The impacts on urban form were presented as among the adaptation system's outputs. They were compared with the system's inputs such as the resources incurred in tolerating the informal spatial dynamics and the goals of the adaptation attempts, to understand the adaptation system's efficiency and effectiveness respectively. The impacts on the urban form were acquired by analysing the spatial and non-spatial aspects of urban form that were affected by the adaptation attempts. On-site physical observations and Google imagery were involved to assess the spatial impacts though they were supplemented with informal interviews with the dwelling owners.

3.5. Data analysis

Data was collected through texts, narratives, maps, images, and photos. Text information was analysed using thematic analysis with the assistance of NVIVO version 12 qualitative data analysis software. Due to the questionnaires used in this study being in Swahili and hard copies, the analysis process began with the translation of the scripts to English and in PDF – a format that is compatible with NVIVO 12. The transcripts, video, pdf, or pictures were then imported into an NVIVO-12 file. The data were then explored to identify the keywords from participants or documents. The keywords were then coded by creating nodes. The keywords were then searched through queries and displayed in the forms of visualisations like tables, graphs, and charts.

4. Results

This study sought to examine the processes through which adaptation of informal spatial dynamics takes place and the impact of such adaptation attempts on Kilungule "A"'s urban form. The results in this section are organised into five sub-sections. The sub-sections provide context and background information about Kilungule "A", avail information on the way adaptation takes place by defining the system of adaptation of informal spatial dynamics in Kilungule "A", discuss the adaptation system's efficiency and the adaptation system's effectiveness in achieving its goals. The last sub-section is devoted to presenting the effects and outcomes of adapting the informal spatial dynamics on Kilungule "A"'s urban form.

4.1. Defining the system used in adapting the informal spatial dynamics in Kilungule "A"

This subsection concentrated on explaining the way adaptation of spatial dynamics was taking place in Kilungule "A" under the systems evaluation theory tradition which requires defining the adaptation system's boundaries, sub-systems, sub-systems processes, relationships, feedback mechanisms, attributes, inputs, and common goal(s) as follows.

4.1.1. Boundaries of the informal spatial dynamics' adaptation

This study focused on the informal land acquisition and spatial organization processes in Kilungule "A" and examined how the Ubungo Municipal Town Planning Authority and the Kilungule "A" Sub-ward Government adapt to these processes. The informal spatial dynamics adjustment of Kilungule "A" was assessed only in terms of settlement regularization and toleration of informal spatial production activities. Construction of houses, land acquisition, and use of vacant spaces were the specific informal space production activities

included in the assessment. Although Kilungule “A” has adapted by tolerating informal space production since 1995 when the National Land Policy was enacted in 1995, this study focused on adaptation activities that took place between 2016 and 2020 as 2016 marked the beginning of Kilungule “A”. The formalization of the settlement through the issuance of certificates of right of residence took place in 2020, and the year 2020 marked the beginning of this empirical study. However, this research was limited to government adaptation and tolerance initiatives that impact urban forms. The spatial dynamics under adaptation were those resulting from the informal processes of production of dwelling spaces.

4.1.2. The subsystems of the informal spatial dynamics' adaptation system

It was noted that, informal spatial dynamics adaptation in Kilungule “A”, takes place by Tolerating or leaving the informal activities of production of space to freely persist and by settlement regularisation. Settlement regularization involved two processes, tenure and settlement physical regularisation. It concentrated on offering formal recognition to informal land properties through the issuance of certificates of right of occupancy to the informal landowners. During interviews with Ubungo municipal planner, it was noted that formalisation took place from 2016 to 2018. Physical regularization entailed upgrading of road infrastructure to strengthen accessibility and connectivity of this neighbourhood with the larger city fabric and within the area itself. It also involved the widening of major access roads and the interior circulation paths. Maji Chumvi-Kilungule road is the major access road to this area which was widened, improved, and tarmacked under the Dar es Salaam Metropolitan Development Projects (DMDP).

4.1.3. Processes involved in adapting the informal spatial dynamics

Toleration of the informal activities of production of space was done by ignoring the activities. During the interviews with the dwelling owners, it was revealed that only 1 out of the 30 reached the stage of her building permit application form signed and was also allowed to continue building without acquiring the formal permit. All 15 public sector officials concurred that they allow the dwelling construction to take place without having permits so long there are no conflicts relating to plot boundaries. All the practitioners agreed that they are not restricted to practice in informal areas. The practitioners offer their services to clients in informal areas including Kilungule “A”. Further, during interviews with the Ubungo municipal planning officials, it was also revealed that the formalisation process in Kilungule “A” involves five major steps namely, the land parcel identification and registration, surveying, titling, and provision of basic services. The on-ground activities entailed the recognition of existing plot boundaries; map familiarisation; planting of beacons, review of regularization plans; and custodianship of regularization and survey plans. Physical regularisation dwelt on the spatial reorganisation of the settlement. The process usually starts with the acquisition of land which will be used for infrastructure provision. The Urban planners had to negotiate with some dwellers to get land for social facilities and services implementation.

4.1.4. Existing relationships between the adaptation system's activities

There was a connection between the tenure regularization and physical upgrading processes. First, as per the interviews with Ubungo municipal planning officials, the activities are carried out in a sequential manner, with formalization taking place before actual regularization can start. This indicates that prior to formalization, no

physical regularization was permitted. Furthermore, the process of formalizing informal land property rights and regularizing physical infrastructure required physical improvements to be made in Kilungule "A" urban space.

4.1.5. The feedback mechanism is involved when adapting the informal spatial dynamics

In the pilot regularisation project in Kimara, there were no feedback mechanisms to see whether the project performed as per plan or not. During interviews, the Ubungo municipal planning officials stated that they haven't set a formal mechanism of seeking feedback from the project after the settlement was regularized. For example, they do not often pay formal visits to the field to determine whether regularization was successful or not. That is, whether the landowners whose parcels of land were formalized have received their certificates of right of occupancy, or whether the landowners whose parcels were volunteered have removed the obstacles. According to the municipal planner of Ubungo, for instance, no monitoring had been done to ascertain the effectiveness or inadequacy of the methods employed to adapt the informal spatial dynamics during the regularization process. By the time it took to reach the current goal, it became evident that, among other things, the tenure and physical regularization processes lacked an adequate feedback mechanism.

However, there have been some informal reports from individual officials, dwellers of Kilungule "A", and scholars such as Manara, 2022 and Omar, 2018 who generally noted the project was not performing well – a situation that was contributed by culture and the financial ability of the dwellers which resulted to slow payment for certificates of occupancy. For example, Omar (2018) noted that, after more than 18 months only 1.4% of the 6000 title deeds targeted for 3 months were issued. The informal feedback noted that most of the landowners whose land parcels were formalized are still facing difficulty obtaining their certificates of right of occupancy, and others are finding it difficult to pay the fees associated with the exercise.

4.1.6. Attributes of the informal spatial dynamics' adaptation

The adaptive system was found to include both goal-free and goal-based activities. The goal – free activity – was to tolerate the informal activities of space production. This activity has developed on its own and takes place without leadership, actors, or ICT infrastructures. The goal-oriented activities were those of employment and physical regularization. These took place under the leadership of the Ubungo Municipal Town Planning Department in collaboration with officials from Kilungule Sub-ward "A". Ubungo town planners were experts in planning areas and using ICT technology, while Kilungule "A" sub-county officials were responsible for organizing and representing their community. Local government authorities were responsible for identifying, planning, and studying unplanned settlements within their jurisdiction as part of the regularization process activities.

The regularization teams' plans were finalized with input from the Ministry of Lands, Housing, and Human Settlements Development (MLHSD). Both the tenure and physical regularization processes involved ICT infrastructure. One Ubungo Municipal official interviewed revealed that the municipal offices have an ICT Unit staffed by knowledgeable individuals and an ICT infrastructure made up of PCs, local area networks, user identification and authorization systems, and basic software. When questioned, the municipal urban planners acknowledged that the facilities were sufficient and in good condition. The Municipal offices are currently

equipped with a router that distributes the Tanzanian Telecommunications Limited (TTCL's) 4Mbps internet service, which is claimed to be the best available. The Sub-ward officials and Municipal urban planners were observed leading the charge to accomplish the settlement regularization objectives.

4.1.7. Resources that were incurred in adapting the informal spatial dynamics

While adapting the informal spatial dynamics in Kilungule "A," the government expended some financial, material, and human resources. Nothing was invested by the government to tolerate unofficial space production activities. The formalisation of land properties and physical regularisation programs received substantial funding, according to interviews conducted with Ubungu municipal planning officials. The government had to invest money, materials, and labour at a cost when formalisation occurred. Awareness campaigns were conducted, teams were trained, regularisation schemes and plans were prepared, beacons were planted, roads were improved and tarmacked. These were the actual activities that incurred expenses. The entire cost of formalization of Kilungule "A", including plot identification, mapping (deed plans), and Certificate of Right of Occupancy issuance of 6,000 plots, was TZS 531 million (USD 230,000). Residents were paying a total of 250,000/=shillings (USD 93.43) each to facilitate the property identification process and 375,000/= (USD 140.15) as a CRO processing fee. The government spent Tshs 7,777,000,000/- or USD 3,059,860, for the physical regularisation, namely the widening, improving, and tarmacking of the Korogwe - Maji Chumvi road, which is approximately 3.5 kilometers long. Additionally, it was noted that 30% of landowners donated a portion of their properties to support social service infrastructure.

4.1.8. Common goals of adapting the informal spatial dynamics

The adaptation of informal spatial dynamics was intended to fulfill the ban on the demolition of informal settlements, in accordance with the 1995 National Land Policy. When the government lacks the resources to carry out settlement regulations, it is decided to tolerate unofficial space production activities. The aim of formalization was to create inclusive urban forms and increase the security of tenure, which would help the impoverished to live in cities. The physical regulation of this area, particularly the rehabilitation of the main access roads, is intended to improve the integration and connectivity of the area to the larger urban fabric. The internal access roads have been widened to increase permeability and therefore accessibility to every part of this settlement.

4.2. Efficiency of adaptation system in achieving its goal (s)

Inputs in tolerating the informal activities of production of space were seen as negligible almost approaching zero cost. However, the outputs of toleration were seen as relatively positive as they were contributing to making Kilungule "A"'s urban form resilient or adaptive in the meantime though if continue to be left unguided, they will in future contribute to making this area chaotic. Due to lacking guidance unguided incremental construction may lead to unwanted conditions like chaos and noise which may cause people to live in unbearable conditions and hence fail to achieve the inclusive and adaptable urban forms. Further, despite the government's heavy investment in regularization and formalization, the 6,000 plots ended up with the majority of landowners failing to pay for their certificates of rights of occupancy hence continuing to exercise informal status of their land parcels. Only 4 out of 30 interviewed landowners succeeded in acquiring them.

The physical regularisation exercise, specifically the widening, improving, and tarmacking of the *Maji ya Chumvi* - Kilungule road exercise displays a mixed feeling on whether it was efficient or not in making Kilungule “A” urban space adaptive and inclusive while recognising its contribution to improving connectivity and integration of this urban space to the larger city fabric.

While increased informal activities may be viewed as inefficient in the formal urban ordering domain, they can be viewed as efficient in the informal urban ordering system as they open extensive opportunities to a variety of income groups to access urban goods and services which contribute significantly to growth and enhanced urban form. Further, physical regularisation used in widening the interior circulation paths was seen as inefficient as the landowners who received compensation failed to demolish or remove the obstacles along the roads making them impassable to date. It was therefore realised that adaptation approaches used by the government are relatively efficient, as their results influence the informal actors to adapt some formal values, mobilise the formal and informal resources in harmonising the alternative production of urban space, and facilitate inclusive access to urban goods and services which ought to match the amount of resources invested in but also contribute significantly to social investment.

4.3. Effectiveness of adaptation system in achieving its goal(s)

The approaches taken to adapt the informal spatial dynamics in Kilungule “A” can be viewed as not entirely effective in achieving the universal goal of making urban settlements adaptive and inclusive. The government approach of intervention with less interruption to the informal spatial organising system has made Kilungule “A” urban space show signs of spatial disorder like unguided variations of plot sizes, consolidation and persistence of unintended very high-density zones, difficulties on vehicular access to the inner parts of the settlement, the existence of unguided building use, a mixture of building functions, and the informal constructions that were piling up again on new road reserves. These signs reflect the challenges resulting from the government's actions to allow the informal activities to continue while attempting to enforce formal spatial organising mechanisms in an incremental manner. Formalisation was seen as ineffective at improving tenure security to enable the low-income groups to survive in urban areas and hence achieve inclusive urban forms. 26 out of 30 interviewed dwelling owners in the area, almost 86.67% have failed to pay for and acquire their certificates of the right of occupancy from the government. Dwellers, particularly those staying in prohibited areas are being subjected to risks of eviction – a situation that compromises hopes of making this area inclusive. The physical regularisation was effective at improving its connectivity and integration of the settlement into the larger city fabric but ineffective at improving the permeability and accessibility of all areas of the settlement.

The persistence of informal activities and spatial organising methods may not be viewed as a lack of effectiveness entirely by the government intervention effort since the method adopted to achieve a relatively urban form orderliness is incrementally using the merger of both formal and informal space production mechanisms. Such an approach reduces the restrictive formal planning requirements from hindering the residents from engaging in spatial development activities commensurate to their socio-economic conditions. Building on this background, it became apparent that adaptation approaches used by the government to adapt the informal spatial dynamics are relatively effective, as their results match a certain level of the set goals. It was also noted that the measure of effectiveness may lie in the promising incremental nature of the formal-

informal spatial production mechanism which depends on time for the government and informal actors to adapt resulting in enhanced urban form.

4.4. Effects of adaptation on Kilungule “A”’s urban form

The Toleration of the informal activities of production of space to freely persist and the settlement regularisation posed some impacts on Kilungule “A” urban form as follows.

4.4.1. Effects of Toleration of the informal activities of production of space

It was first noted that toleration of the informal activities of production of space was observed offering room for consolidation and persistence of the informal norms and activities of production of space in the area. Developers build in any way they afford so long there are no conflicts relating to plot boundaries. The interviews with dwelling owners revealed that 27 out of 30 about 93% of respondents have bought land informally, and 29 out of the 30 about 96.67% of respondents have constructed their dwellings without permits. 28 out of the 30 about 93% of respondents, have constructed their dwellings without drawings or the involvement of technical experts like architects, planners, and engineers. 28 out of the 30 about 93% of respondents have constructed their dwellings in non – timely and incremental fashion – the mode of dwelling construction that enabled dwellers of the settlement particularly the majority of the low-income group to build over time and within a period that is specific to available resources and affordability. 24 out of 30 about 80% of interviewed dwelling owners, particularly the dwellers of an area where majority of the original dwellers of this settlement were residing (Indigenous zone), indicated that they share utilisation of their spaces with others. The shared activities included public congregations and allowing others to pass through the unbuilt spaces. During physical observations, two shared spaces (Figures 18 and 19) were revealed whose owners allow public activities like political and religious congregations to take place. However, the informal production of space was seen as advantageous to local dwellers, particularly the low-income group. The piecemeal land subdivisions enabled landowners to use their lands as economic assets to save them during financial crises. However, scholars such as Raman and Roy, 2019 and Yoo and Lee, 2017 caution that, if the informal activities continue to be left unguided or controlled, they result in a chaotic urban form. The uncontrolled constructions in this area may result in compromised designs with poor orientations, safety, health issues, and poor-quality materials in the future.



Figure 4. Mr. Chuma’s compound (Source: Authors, 2021)



Figure 5. Location of shared spaces in Kilungule “A”’s map (Source: Google map and authors, 2024)



Figure 6. Mr. Puluku’s compound (Source: Authors, 2021)

Secondly, the toleration of informal activities resulted in the formation of privatised settlement layout configurations. The physical observations assisted with Google Maps revealed 2 settlement layout configurations (Figures 13 and 14) with significant orderliness, the unordered ones and unordered high-density zones (Figures 10, 12, and 15) in the Kilungule “A”. The interviews with one of the owners revealed that the relatively ordered layouts emerged from landowners’ individual efforts and desires to produce the plots with such legibility for ease of access to community services rendering such plots the most favoured by land buyers. Speaking on her case Mrs. Komba said that: *“I bought this land in 1992 and fenced it. In the year 1995, I sold a portion of my land to cater to different necessities arising at that time. I intentionally subdivided my land in an orderly manner to ensure the people who bought land at my place would build their houses in good order”*. Further interviews with one of the local leaders observed that the landowners improved the orderliness of spatial layout after they faced inconveniences resulting from the unordered ones they created before (see the unfenced portion in Figure 13) which pose difficulty connecting community services. However, the collision of organic and grid layout needs a certain level of control to protect the settlement from chaos.



Figure 11: Part Map of Kilungule “A”
Source: Google map, 2022



Figure 10. The indigenous zone in Kilungule “A”
Source: Google map, 2023



Figure 12. High-density housing to the west of Kilungule “A”
Source: Google map, 2023

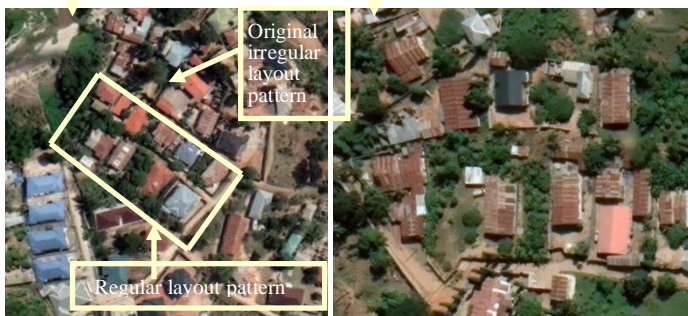


Figure 13: Mr. Mgaluka’s original unordered and new ordered layouts
Source: Google map, 2022



Figure 14: Regular patterned layouts at Mrs. Komba’s place
Source: Google map, 2022



Figure 15: High-density zone in the southwest of Kilungule “A”
Source: Google map, 2023

Thirdly, the toleration of the informal activities of production of space resulted in the emergence of plots of varying shapes and sizes as the individual landowners subdivided land based on their interests, needs, and preferences. Figures 16 and 17 show plots with sizes ranging from 74m² (plot no.25) up to 4428m² (plot no.55) respectively that were observed in Kilungule “A”. The plots have suggested a mixed land use development as they construct buildings of varying functions to the settlement. The on-site observations assisted with Google imagery, revealed some commercial and religious buildings in this residential neighbourhood. Though mixed land uses are good, scholars including Raman and Roy, 2019 caution that, if left ungoverned or the mixing goes beyond a suitable proportion, they result in chaotic urban settlements characterised by unwanted conditions like traffic congestion, encroachments, chaos, and noise – characteristics which have begun occurring in Kilungule “A”.



Figure 7. Small-sized plots in Kilungule “A” (Source: Kinondoni Municipal Council, 2016)

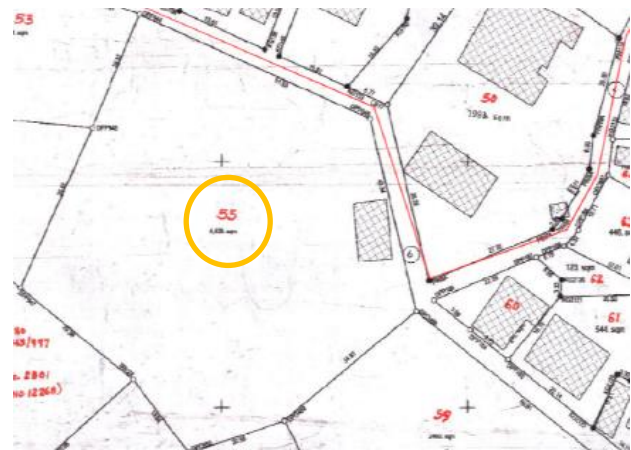


Figure 8. Big-sized plots in Kilungule “A” (Source: Kinondoni Municipal Council, 2016)

4.4.2. Effects of regularisation on Kilungule “A”'s urban form

The settlement regularisation was producing some effects on urban form. Firstly, the declaration of inhabitable areas on one part of Kilungule “A” settlement has decreased the sense of tenure security to the dwellers and hence decreased investments. During interviews, it was observed that 16 out of 30 or 53% of the respondents, particularly those staying in restricted areas like those prone to floods, were planning to leave the area and hence were hesitant to improve their dwellings. Conversely, the declaration of a habitable area on the other part of Kilungule “A” settlement has led to a higher sense of tenure security which encouraged its dwellers to invest more in their dwellings. They were investing more in new buildings and improving old ones as compared to their fellows in the inhabitable areas. The on-site physical observations in the habitable zones of Kilungule “A”, revealed some modern conspicuous buildings. The interviews with one of the owners of the modern buildings showed that the sense of tenure security encouraged him to invest more in new houses for rent and improve the old ones. The formal land titles have contributed to inducing rigidity in the informal transfer of land rights and discouraged piecemeal land-selling which was economically supporting the life of

dwellers. The formal land titles discourage the gradual piecemeal densification of this settlement that could give it room to grow adaptively to new uses and populations.



Figure 9. The affluent homes replacing the existing in Kilungule “A”



Figure 10. Building spent much in its improvements in Kilungule “A”

Secondly, physical regularisation among others contributed to the emergence of frustrated circulation paths that are impassable due to the existence of unremoved obstacles in the area. The physical observations and interviews with local leaders and one resident, identified one frustrated street namely Dodoma (Figure 21) with three properties (Figures 20 and 22) whose owners are already compensated but failed to remove or demolish them as per their agreements with the sub – ward government. It was noted that the compensation received by the property owners was not enough to cater for the demolition of the built structures. Thirdly, the physical regularisation also contributed to the re-infiltration of improved spaces with new informal activities. Street vendors built temporary kiosks informally on improved road spaces (Figure 19) in Kilungule “A” (Figure 23). It was revealed through interviews with one of the local leaders that Kilungule “A”’s sub-ward government allowed the vendors to temporarily locate their kiosks in their preferred areas within the road reserves under condition to vacate the areas when the government is in need to develop the areas.



Figure 11. Soakpit block access (Source: Field survey, 2023)



Figure 12. Kilungule “A” part-map (Source: Google map, 2023)



Figure 13. Kilungule “A” part-map (Source: Google map, 2023)

5. Conclusion

This study observed that the government involuntarily adapts the informal spatial dynamics by tolerating the informal activities of production of space and by regularising the informal settlement. Adaptation contributed

to the persistence of the informal norms and practices of space production, the emergence of plots of varying shapes and sizes, the formation of privatised settlement layout configurations, the emergence of frustrated circulation paths, and the re-infiltration of improved spaces with new informal activities. Further, the system of adaptation of the informal spatial dynamics in Kilungule A was seen as relatively efficient and effective in achieving inclusive and adaptable urban forms. Building on this background, this study observes that the government is still at the level of experimenting with the formal-informal space production approach where the prospects of achieving successful adaptation are bright. Such kinds of approaches still indicate the shift of viewing informality as a problem that needs to be eliminated to the view the formal and informal spatial development value can be utilised effectively to achieve viable urban forms that respond to the socio-economic condition of the community. This study observes that the approaches used by the government to adapt informality may reach a successful adaptation approach as both the government and community build a stronger agency of collaboration and association. This study therefore recommends the government make planning systems that interact with informality and from that interaction draw lessons on how to improve their rules while promoting the upgrade of informal spatial systems. Scholars in Tanzania are needed to create a model for adaptation of the informal spatial dynamics to enhance inclusive and adaptive capacity.

References

- Bahendwa, F. (2013), "Urban form through residents' practices: The unconventional transformation processes in suburban areas in Dar es Salaam, Tanzania", Doctoral Thesis, Oslo School of Architecture and Design, Norway.
- Bandaiko, E., Arku, G. and Nyantakyi-Frimpong, H. (2022), "A systematic review of gated communities and the challenge of urban transformation in African cities", *Journal of Housing and the Built Environment*, Vol. 37. No. 1, pp. 339-368.
- Banks, N., Lombard, M. and Mitlin, D. (2020), "Urban Informality as a Site of Critical Analysis", *Journal of Development Studies*, Vol. 56. No. 2, pp. 223-238.
- Boeing, G. (2018), "Measuring the complexity of urban form and design", *Journal of Urban Design International*, Vol. 23. No. 4, pp. 281-292.
- Chiodelli, F. and Tzfadia, E. (2016), "The multifaceted relation between formal institutions and the production of informal urban spaces: An editorial introduction.", *Journal of Geography Research Forum*, Vol. 36. No. Special Issue, pp. 1-14.
- Cozzolino, S. (2020), "The (anti) adaptive neighbourhoods. Embracing complexity and distribution of design control in the ordinary built environment", *Journal of Environment and Planning B: Urban Analytics and City Science*, Vol. 47. No. 2, pp. 203-219.
- Dovey, K. (2012), "Informal urbanism and complex adaptive assemblage", *Journal of International Development Planning Review*, Vol. 34. No. 4, pp. 349-367.
- Dovey, K. (2013), "Informalising architecture: The challenge of informal settlements", *Journal of Architectural Design*, Vol. 83. No. 6, pp. 82-89.

- Dovey, K. (2019), "The New Companion to Urban Design", in: Banerjee, T. and Loukaitou-Sideris, A., *The New Companion to Urban Design*, Routledge, London, pp. 1-714.
- Hasgül, E. (2016), "Incremental housing: A participation process solution for informal housing", *A/Z ITU Journal of the Faculty of Architecture*, Vol. 13. No. 1, pp. 15-27.
- Inam, A. (2019), "Designing new practices of transformative urbanism: an experiment in Toronto", *Journal of Urban Design International*, Vol. 24. No. 1, pp. 60-74.
- John, S., Mcgranahan, G., Mkanga, M., Ndezi, T., Stephen, S. and Tacoli, C. (2020), "The churn of the land nexus and contrasting gentrification processes in Dar es Salaam and Mwanza, Tanzania", *Journal of Environment and Urbanization*, Vol. 32. No. 2, pp. 429-446.
- Jones, P. and Jones, P. (2019), "The Shaping of Form and Structure in Informal Settlements: A Case Study of Order and Rules in Lebak Siliwangi , Bandung , Indonesia", *Journal of Journal of Regional and City Planning*, Vol. 30. No. 1, pp. 43-61.
- Kalugila, S.L. (2013), "Housing interventions and its influence on urban development: Opportunities and Challenges in Mixed Informal Settlements, in Dar es Salaam-Tanzania", Doctoral Thesis, the Faculty of Architecture of Bauhaus University Weimar, Germany.
- Khanani, R.S., Adugbila, E.J., Martinez, J.A. and Pfeffer, K. (2021), "The Impact of Road Infrastructure Development Projects on Local Communities in Peri-Urban Areas: the Case of Kisumu, Kenya and Accra, Ghana", *International Journal of Community Well-Being*, Vol. 4. No. 1, pp. 33-53.
- Kiss, D. and Kretz, S. (2016), "Introduction to Theories of Urban form", Professorship Kees Christiaanse, Department of Architecture, Network City Landscape, ETH Zurich, pp.2-23.
- López, O. S., Bartolomei, S.R. and Lamba-Nieves, D. (2019), "Urban Informality: International Trends and Policies to Address Land Tenure and Informal Settlements ", *Cne20 - Journal of Housing and Land Initiative*, Vol. 20. No. 1, pp. 1-28.
- Lupala, B.J. and Bhayo, S.A. (2014), "Building Densification as a Strategy for Urban Spatial Sustainability Analysis of Inner-City Neighbourhoods of Dar Es Salaam, Tanzania", *Global Journal of Human-Social Science: B Geography, Geo-Sciences, Environmental & Disaster Management*, Vol. 14. No. 8, pp. 28-44.
- Lutzoni, L. (2016), "In-formalised urban space design. Rethinking the relationship between formal and informal", *Journal of City, Territory and Architecture*, Vol. 3. No. 1, pp. 1-14.
- Manara, M. (2020), "Land Tenure Formalisation in Dar es Salaam: Institutional Transition through Endogenous Social Interactions", Doctoral Thesis, Department of Geography and Environment London School of Economics and Political Science, UK.
- Manara, M. (2022), "From policy to institution: Implementing land reform in Dar es Salaam's unplanned settlements", *Journal of Environment and Planning A*, Vol. 54. No. 7, pp. 1368-1390.
- McCartney, S. and Krishnamurthy, S. (2018), "Neglected? Strengthening the Morphological Study of Informal Settlements", *Journal of SAGE Open*, Vol. 8. No. 1, pp. 1-11.
- Mehaffy, M.W. and Haas, T. (2018), "Informality in the new urban agenda: A "new paradigm?", *Berkeley Planning Journal*, Vol. 30. No. 1, pp. 6-22.

- Mergoni, A. and De Witte, K. (2022), "Policy evaluation and efficiency: a systematic literature review", *Journal of International Transactions in Operational Research*, Vol. 29. No. 3, pp. 1337-1359.
- Mueller, J. (2015), "Formal and Informal Practices of Knowledge Sharing Between Project Teams and Enacted Cultural Characteristics", *Journal of Project Management*, Vol. 46.
- NIUA and IIT Kharagpur (2021), *Inclusive City Framework*, National Institute of Urban Affairs, New Delhi, India.
- NUSP (2015), "Introduction to Informal Settlement Upgrading: Building Houses Incrementally", available at: <https://www.ukesa.info/> (accessed 26 July 2024).
- Omar, H. (2018), "Building Permit In Informal Settlements. A Measure of Development Control Or Source Of Municipal Revenue: The Case of Ubungo Municipality ", *Journal of Geography*, Vol. 5. No. 2, pp. 1-15.
- Owusu, L.A. (2021), "The Impact Of Gated Communities' Developments On The Quality Of Life Of Local Residents In Peri-Urban Areas. A Case of Accra City, Ghana", Masters Thesis, Faculty of Geo-Information Science and Earth Observations at University of Twente, Netherlands.
- Pojani, D. (2019), "The self-built city: theorizing urban design of informal settlements", *International Journal of Architectural Research*, Vol. 13. No. 2, pp. 294-313.
- Purcell, B. (2014), "The City That Hides Itself: Movement and Meaning in Urban Form", Doctoral Thesis, Princeton University, United States of America.
- Qureshi, H. (2023), "Gated Communities as A Living Choice in the Global South: A Qualitative Review of the Physical and Socio-Economic Features (Review article)", *Journal of Architecture and Planning - King Saud University*, Vol. 35. No. 4, pp. 537-555.
- Raman, R. and Roy, U.K. (2019), "Taxonomy of urban mixed land use planning, Land Use Policy", *Journal of Elsevier*, Vol. 88. No. C, pp. 264-8377.
- Rapoport, A. (2016), *Human Aspects of Urban Form: Towards a Man—Environment Approach to Urban Form and Design*, Elsevier, Michigan, U.S.A.
- Rauws, W. (2017), "Embracing Uncertainty Without Abandoning Planning: Exploring an Adaptive Planning Approach for Guiding Urban Transformations", *Journal of Disp - The planning review*, Vol. 53. No. 1, pp. 32-45.
- Renger, R. (2015), "System evaluation theory (SET): a practical framework for evaluators to meet the challenges of system evaluation", *Evaluation Journal of Australasia*, Vol. 15. No. 3, pp. 16-28.
- Renger, R., Foltysova, J., Renger, J. and Booze, W. (2017), "Defining Systems to Evaluate System Efficiency and Effectiveness", *Evaluation Journal of Australasia*, Vol. 17. No. 3, pp. 4-13.
- Salingaros, N.A. (2021), "Spontaneous cities: Lessons to improve planning for housing", *Journal of MDPI*, Vol. 10. No. 5, pp. 1-15.
- Schuster, H.G. (2005), "Complex adaptive systems", In: *Collective Dynamics of Nonlinear and Disordered Systems* pp. 359-369. Berlin, Heidelberg: Springer Berlin Heidelberg.
- Shukla, N. (2023), "Assessment of urban form resilience: A review of literature in the context of the Global South", *Journal of Environment, Development and Sustainability*, pp. 1-37.

- Silva, P. (2018), "Designing urban rules from emergent patterns: Co-evolving paths of informal and formal urban systems - The case of Portugal", *Journal of IOP Conference Series: Earth and Environmental Science*, Vol. 158. No. 1, pp. 1-11.
- Tagliacozzo, S., Pisacane, L. and Kilkey, M. (2024), "A system-thinking approach for migration studies: an introduction", *Journal of Ethnic and Migration Studies*, Vol. 50. No. 5, pp. 1099–1117.
- Tuihedur Rahman, H. M., Albizua, A., Soubry, B. and Tourangeau, W. (2021), "A framework for using autonomous adaptation as a leverage point in sustainable climate adaptation", *Journal of Climate Risk Management*, Vol. 34, pp. 1-20.
- Williams, K. (2014), "Urban Form and Infrastructure: a Morphological Review", *Future of Cities: Working Paper*, Bristol City, UK.
- Wrigley, T. (2019), "The problem of reductionism in educational theory: Complexity, causality, values", *Journal of Power and Education*, Vol. 11. No. 2, pp. 145-162.
- Yiannoudes, S. (2016), "Architecture and Adaptation: From Cybernetics to Tangible Computing", *Journal of Architecture and Adaptation: From Cybernetics to Tangible Computing*, Vol. 11. No. 2, pp. 145-162.
- Yoo, C. and Lee, S. (2017), "When organic urban forms and grid systems collide: Application of space syntax for analyzing the spatial configuration of Barcelona, Spain", *Journal of Asian Architecture and Building Engineering*, Vol. 16. No. 3, pp. 597-604.
- Youker, B.W. and Ingraham, A. (2014), "Goal-Free Evaluation: An Orientation for Foundations' Evaluations", *Journal of The Foundation Review*, Vol. 5. No. 4, pp. 51–61.
- Zhao, R., de Jong, M. and Edelenbos, J. (2023), "Will the true inclusive city rise? Mapping the strengths and weaknesses of the city ranking systems", *Journal of Cities*, Vol. 143.
- Živković, J. (2020), "Urban Form and Function", in: Leal Filho, W., Azul, A.M., Brandli, L., Özuyar, P.G. and Wall, T. (eds), *Climate Action. Encyclopedia of the UN Sustainable Development Goals*. Springer, Cham