DAR ES SALAAM:
restructuring of the harbor, dual planning method

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Abstract

Based on the author's experience with unplanned settlements in Dar es Salaam, Tanzania, a dual planning method was employed to develop suggestions for the reconstruction of that city's harbor area that can be carried out in small steps implemented independently. The paper illustrates the dual planning method and various visualization methods employed in the case study. After tracing in the paper the overall history of urban development in the harbor area, the zone is analyzed thoroughly in seven important steps in the city's history using space syntax method, supplemented by additional field analyses and observations. The results of the investigation and analysis are combined, evaluated, and summarized graphically to form a basis for establishing restructuring and renovation. Both methods produced interesting congruent results. The paper concludes by proposing selective interventions that allow development in a variety of directions corresponding to the regional context and how people may, in the future, prefer to use particular spaces in ways that are not fixed but offer flexibility.

The Quest for Urban Identity as an Open Process

In 1990, UN-Habitat announced its global "Sustainable Cities Program" (SCP); Dar es Salaam would be the first of twelve model cities. Dar es Salaam is an excellent illustration of the interplay between architecture and society, that is, the extent to which planned space influences society and, conversely, to which building and design are always responses to societal changes and expressions of functional and societal correlations, making them essential tools for influencing our environment in a positive manner.

SCP, fundamentally, renounces obsolete planning methods and reliance on relatively unrealistic and inflexible master plans. Such plans, because they often overreach in scope and goals, frequently have no hope of implementation, and are also seen as often ignoring local competence and insufficiently ignoring locals in the process. In Dar es Salaam, for example, the 1979 master plan is still the "official" framework for urban development, although it has been barely

implemented and conditions have changed tremendously. Consider, for example, Greater Dar es Salaam's rapid population growth, estimated at 6 to 10% per year – an approximate doubling of population every 10 years. The growth rate for this area of some 1,400 square kilometers is considerably higher than for Tanzania as a whole.

035-02

The 1993 UN-Habitat "Sustainable Dar es Salaam Project" (SDP) is a coordination and integration project executed by the local administration. In 1995, working groups were established with these goals: renew the city center, eliminate environmental dangers, promote the economy, and, in particular, improve living conditions in the unplanned settlements. Unplanned settlements house 80% of Dar es Salaam's population and cover 75% of the urban space. These areas lack roads, drinking water supply, sewage systems, electricity, or waste removal mechanisms. A peculiar Tanzanian phenomenon drives their development: it is illegal to occupy land, but not buildings, so the settlements are simply integrated into the urban space after a certain toleration period. They are not so much "unplanned but planned in an unconventional manner" (Bersani & Bogoni 2001, 28).

At present, several small-scale projects have been underway at different stages, with international support. One of these projects involved improving living conditions in the unplanned settlement Hannanassif. A special Strategic Urban Development Plan was drawn up based on three principles: 1) include all parties, 2) carry out a careful analysis of the area, and 3) establish working groups to draw up action plans for concrete implementation measures. These plans can be adjusted over time according to changing demands and requirements of the residents. One outstanding feature of this project is that the plan was integrated into the syllabus of the University College of Lands and Architectural Studies (UCLAS) at the University of Dar es Salaam to involve future architects and urban planners. The present author, who lectured at UCLAS from 1998 to 2001, witnessed this practical schooling and supported the curriculum with visualization methods.

UCLAS set out to improve living conditions in the unplanned settlements and draw up restructuring measures for Dar es Salaam's city center; these goals were linked to the government program. The university efforts unfold with the participation of the affected population groups and the realistic implementation of small- and extremely small-scale projects in individual districts. Students successfully conduct regular field surveys to uncover pressing needs and familiarize themselves with the areas. The results of the interviews are subjected to visualization. Programming (Henn 2004), a type of figurative language and model to illustrate every project phase, is one specific visualization method used to overcome language barriers and actively integrate eventual users. Students, their supervisors, and residents develop a keen personal relationship develops over the course of projects. The implementation process has strong support, and contact is maintained with residents involved in the small projects even after their conclusion, to monitor satisfaction and determine whether additional requirements need to be met.

Dar es Salaam - Restructuring of the Harbor, Dual Planning Method

Based on the experience in the unplanned settlements, a dual planning method was developed to draw up suggestions for reconstructing Dar es Salaam's harbor zone through small step-by-step implementation (Kohlert 2006). This method is based on the history and understanding of a city or an area, researched via an analysis of its urban development and through discussion with local

residents and using visualization methods. By affording planners the possibility of integrating eventual users into the planning process from the onset, this approach has proven extremely useful. Changes and developments can be discussed on a visual basis, which facilitates building consensus. The dual method also rests on analysis according to the space syntax method (Hillier & Hanson 1984) to produce rational, scientific evidence for architectural and urbanistic interventions. Even with its limitations, space syntax allows for a useful comparison with the historical analysis and, by producing similar results, confirms that analysis.

"Cities are the biggest and most complex things that we make as a society, and each city is unique with its own character, strengths, and potential" (Robbins 2002, 2). Thus, understanding a city's history and various developments are of great importance for the analysis of that city.

035-03

Two historical aspects of Dar es Salaam are of particular importance: the first building regulations during the German colonial period and the creation of the Mnazi Mmoja Park as an "ethnic" border under the British mandate. Both are used to compare the historical analysis with the findings from the space syntax analysis; the findings are complementary and the concurrence is astonishing.

German Colonization Period (1883 (Bagamoyo) 1890 -1919 in Dar es Salaam) - Ethnic Separation

Dar es Salaam's coherent urban character had completely disintegrated by 1890 (Vorlaufer 1970), and the German colonists redesigned the city – originally founded by Arabs –according to the ideas of German planners. The 1891 building code did not specify racial segregation but did establish zones for specific building types that coincided with the population's racial groupings – Europeans, Indians, and Africans – and corresponded to their cultural requirements and, in particular, their economic situations.

The city has no distinct military districts with strong fortifications. The basic outline of the road system from this period survives. First, the Germans extended the roads from the Sultan's time and then imposed two overlapping systems: first a grid of the sort typical for a city being first designed, followed by two crescent-shaped arches that follow the curvature of the bay and focus on the dominant harbor. The needs of trade and administration, deemed of equal consequence, drove these plans. As the city developed, however, the business district grew in importance, developing into a highly distinctive structural element in the urban fabric, as the arterial roads radiating in all directions from this district demonstrate.

The German administration tried to establish an urban planning authority for all settlement areas, not the least in order to ensure that infrastructure – roads, sewage systems, water supply, and drainage systems – could be implemented efficiently. While no spatially isolated residential areas were specified during this period, the traditionally weak economic position of Africans made it difficult for them to advance into the inner city areas. The distribution of settlement areas already reflected the city's class system. The city center's lively business districts were largely reserved for the Indian; they built simple-style houses from solid materials. Europeans retreated to the quiet, green eastern regions close to the ocean and thus with the most pleasant climate; there they constructed European-style buildings. Poor Africans were pushed toward the western fringe areas, where no building codes existed. It should also be noted that the uncontrolled and unplanned growth typical of African cities began in Dar es Salaam during this period.

The British Mandate (from 1919) and the Cordon Sanitaire

The 1919 Treaty of Versailles stripped Germany of all its protectorates. In 1920, the Tanganyika Territory was placed under a British mandate. The "Land Ordinance" passed in 1923 established that land not already held as private property would become public under the mandate administration, and some 80% of the land in and around Dar es Salaam was declared public. This ordinance and township rules passed the same year made it easier for the administration to group urban settlements areas into functional and ethnic quarters (Vorlaufer 1970).

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During this period, the inner city developed almost independently into an "ethnically homogeneous Indian residential and business quarter," possible only with the post-World War I political changes, when Indian traders took over "the land and buildings of German private individuals and trading companies, which were confiscated as enemy property" (Vorlaufer 1970, 28). Indians not only pushed the economically weaker Africans into the fringe areas, but also displaced the Europeans from a central, prime location. The mandate statute gave Indians the same status as Europeans, and the British were less keen on business and more focused on their role as administration officials. They preferred to live near their offices in the attractive climate of the city's northeast quarter.

After several fires in the African quarters during the 1920s, the *cordon sanitaire* envisaged by the Germans came to fruition as Mnazi Mmoja Park, and the British systematically relocated inhabitants to the purely African quarters of Kariakoo and Ilala by the British (Sutton 1970). On the city map, these quarters show a strictly orthogonal road network and a dense settlement structure, clearly isolated from the old city center.
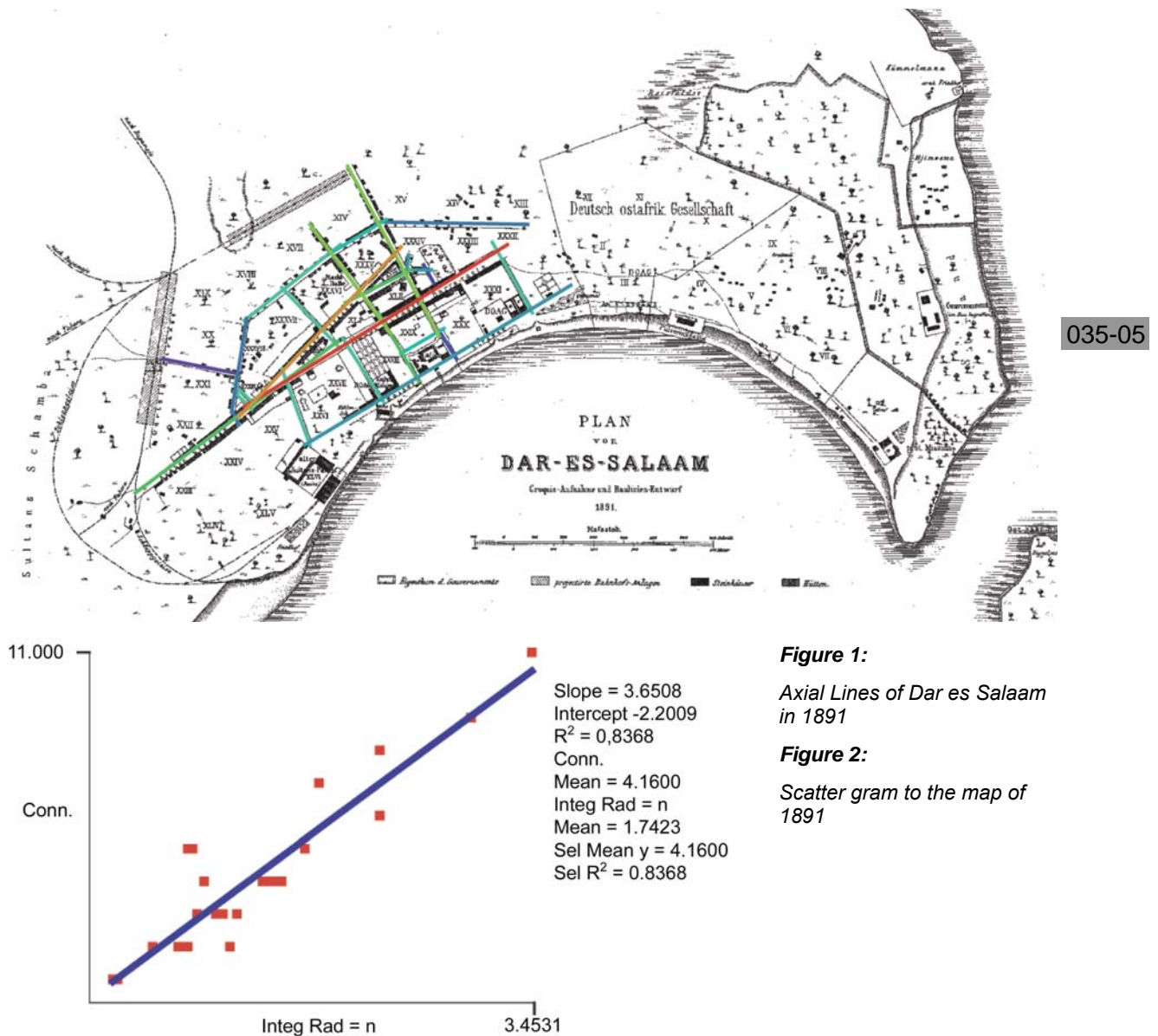
Analysis of the Harbor Area Using the Space Syntax Method

Seven maps from prominent times in the city's 110-year history were used for the analysis.

Step 1: 1891 City Map

The city map of 1891 represents the very first outline after the city was "refounded" by the German, and forms the basis for the analysis of the Dar es Salaam harbor area. The lines visualize the first streets of the small core settlement. Hauptstraße, the main street recognizable in red, runs through almost the entire emerging city structure. That all other streets are connected with each other via this main road makes it highly integrative. Inderstraße, the second-most important street, crosses Haupstraße diagonally and also forms a small square with it at the intersection. Both streets are crossed by connection roads (in green). All other streets in the city radiate from these four main arteries. Kaiserstraße runs parallel to the main street and touches the strand without following its curve. The color grading makes the importance of the streets visible: red for the most integrated street, orange for the second-most important, and so on until we arrive at cold shades such as green or blue for the least-important streets.

The distribution chart shows a relatively straightforward distribution of streets with respect to integration and connectivity. The main street shows the highest level of integration and thus the best possible connectivity with all other streets. The streets differ clearly in terms of structure, as shown in the total lack of clear horizontal lines. The clarity of the structure is expressed in a correlation efficient of 0.8368, a high value (also expressed in the almost 45° inclination of the distribution line), but the city is still quite small and manageable.

035-05

Figure 1:

Axial Lines of Dar es Salaam in 1891

Figure 2:

Scatter gram to the map of 1891

Slope = 3.6508
Intercept -2.2009
R^2 = 0,8368
Conn.
Mean = 4.1600
Integ Rad = n
Mean = 1.7423
Sel Mean y = 4.1600
Sel R^2 = 0.8368

Step 2: 1914 City Map

The 1914 map visualizes German planning at the end of the colonial period. Streets would follow the harbor's curve, thus displacing the integrative main street. This, however, was never executed – an instinct that proved to be correct. A comparison with the 1891 map using the space syntax method reveals that the center of Dar es Salaam would have moved towards the east had this plan been realized. Instead, the 1914 urban planning project continued the initial street configuration, with the center forming an irregular network. All new developments, except for the government quarter in the east, were realized as rectangular, regularly shaped grid structures.

The distribution chart of the planning shows a flat inclination: few streets have sufficient connectivity and global integration is quite bad. Hillier refers to cities of this kind as not "intelligible" (Hillier 2002). The R² value of 0.8368 (1891) would have decreased to 0.3027 for the unexecuted plan (also expressed in the relatively flat inclination of the distribution line), as opposed to the plan that was realized in 1914, which yields an R² value of 0.4519.

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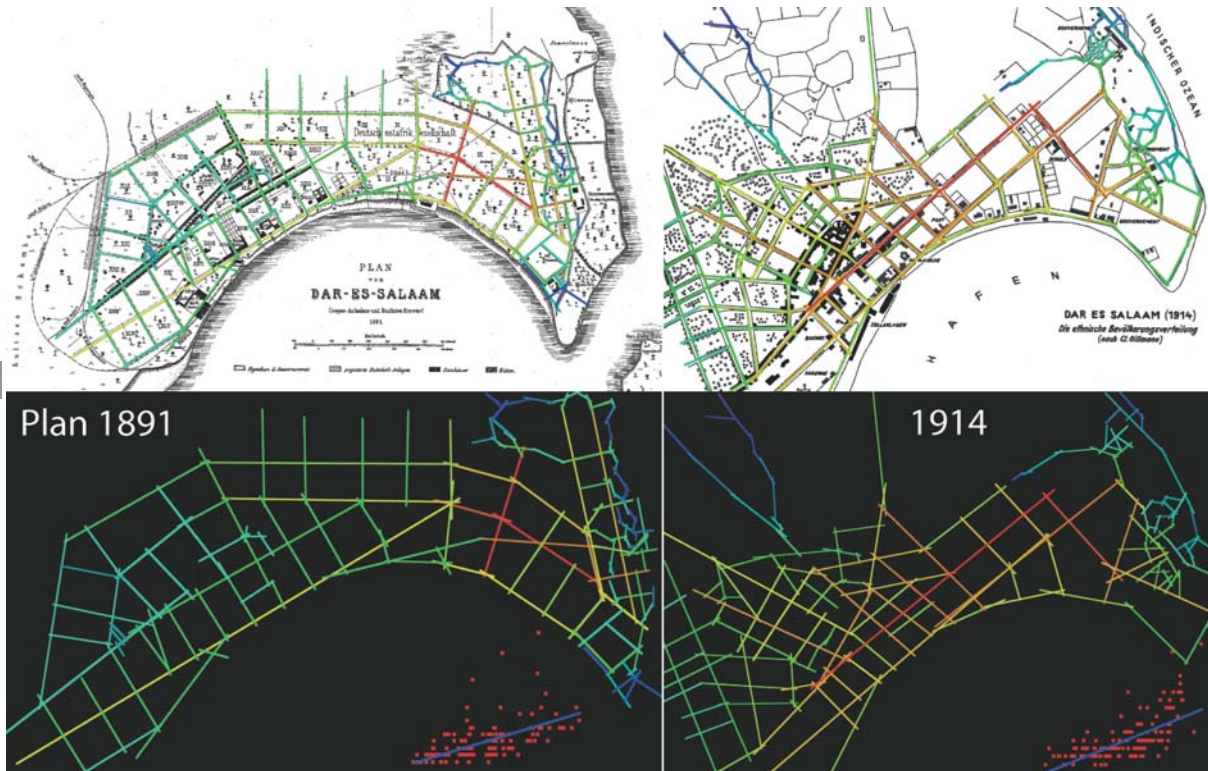
Figure 3:

*Dar es Salaam: intended planning in 1891 and actual realization in 1914*

A city's intelligibility is crucial, as are its structure and the relationship between its local and global elements. "The property of 'intelligibility' … means the degree to which what we can see from the spaces that make up the system – that is, how many other spaces are connected to – is a good guide to what we cannot see, that is the integration of each space into the system as a whole" (Hillier 1996, 170). The higher the correlation efficient, the more manageable the city. In cities with a weak relation between local and global elements – that is, a flat inclination of the R^2 value – people tend to feel lost and disoriented.

Step 3: 1920 Map

This map shows the British effort to bring the urban planning measures initiated in 1891 to their logical conclusion. They extended the interconnecting roads, thus keeping the center in its original area. They also formed several smaller access roads, constituting a closed road network with a deformed wheel structure and the core area as the hub - a typical layout for lively city centers where several longer roads connect the center with the periphery. The wheel hub forms a closed net of well-integrated roads that can be accessed.

Figure 4:

Dar es Salaam 1920: the deformed wheel structure – the hub
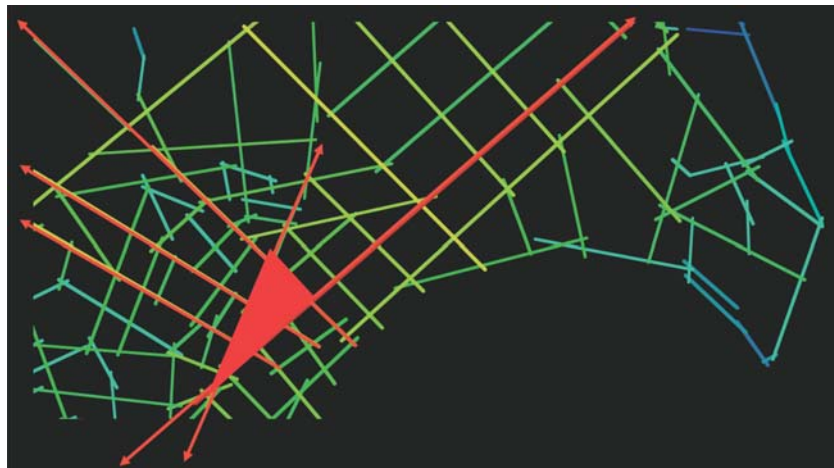
By keeping the system manageable and easy to grasp, these changes kept the city "intelligible." Liveliness results from the interplay of the center and longer, more spacious communication roads that link the other parts of the city with the center. If all building blocks and roads in a city layout are similar in design and size, the system becomes unclear and monotonous and people have difficulty finding their way around. Such cities have no flair and no unique identity.

Step 4: 1935 Map

The map from 1935 shows, for the first time, how the urban structure has split apart. The expansion of the city in the east with the Kariakoo African quarter, which is separated from the city's core by the large Mnazi Mmoja Park, was implemented without regard for interlinking roads. There is a rigid grid structure. Two centers have developed, one in the European and Indian quarter and one in the African quarter, and each with a main shopping street. Previously, the different quarters could have been cross-linked quite beautifully with each other, with one center for all, but the hierarchical structure of the population and how it was distributed made this impossible in 1935.
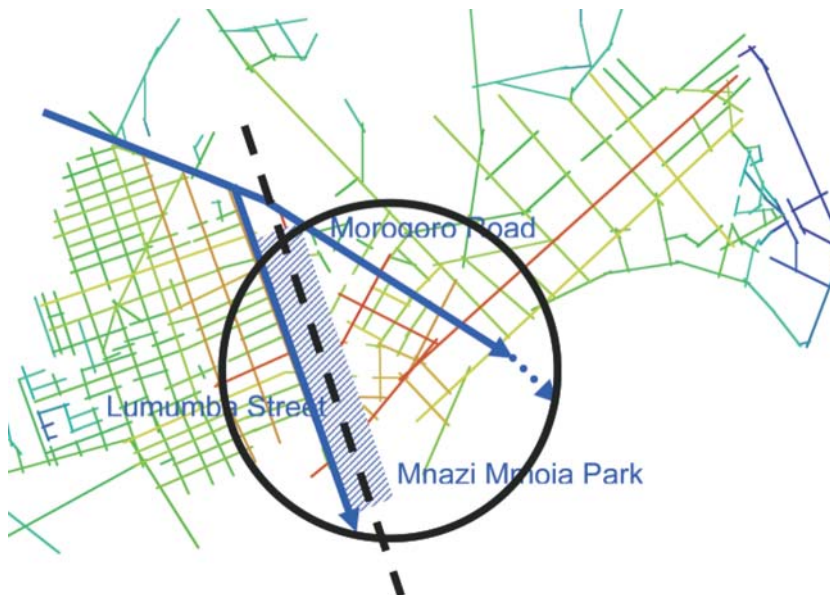
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Figure 5:

The separation – Mnazi Mmoja Park 1935

The distribution structure now shows increasingly shorter streets with few connections; the global integration decreases, as shown by the strongly horizontal structure of the street lines and the very flat average line. The integration value is now lower than ever before in the city's history, at 0.2368. Despite some cross-linking of streets, the overall integration of the city as a system suffered.
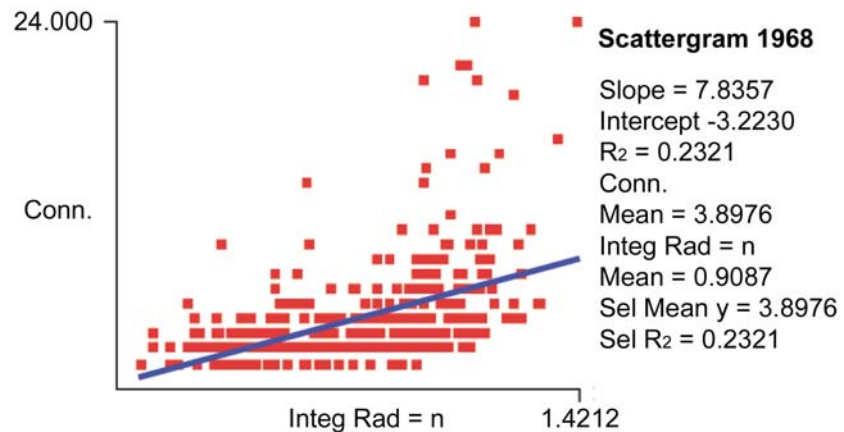
Step 5: 1968 Map

The 1968 plan arose with Tanzania's independence. The city has extended rapidly, with new quarters around the actual center. Kariakoo in the east has spread, and the net-like structure continues. In the north, large and relatively isolated housing estates have developed with few connecting paths between individual residential street, as the axial map shows. A new main axis – Morogoro Road – underlines the division of the city. This new road represents one of the main routes into the city and extends almost to the harbor zone.

The development with several centers continues. The good network structure of Kariakoo draws the best-integrated street more and more in this direction, which also signifies the liveliness of the quarter. However, the city becomes less intelligible because of the narrow grid structure; this is seen clearly in the distribution graphic. The

integration value continues to sink (to 0.2321); the inclination of the average line becomes flatter; and the streets form a more and more horizontal structure, attributable to Kariakoo and its even grid structure.

Figure 6:

Scatter gram 1968 – grid structure with lots of similar streets

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Scattergram 1968

Slope = 7.8357
Intercept -3.2230
R_2 = 0.2321
Conn.
Mean = 3.8976
Integ Rad = n
Mean = 0.9087
Sel Mean y = 3.8976
Sel R_2 = 0.2321

Step 6: 1979 Map

With funding from international aid donors, Canadian consultants developed a new master plan for Dar es Salaam in this period. The Kariakoo grid structure is now even more pronounced; its street network is the best in the city, as illustrated by the final shift of the central axis to Lumumba Street at the border of Kariakoo in the west of the park.

Figure 7:

1979 Axial lines – the expansion continues

Axial Lines 1979

The 1979 axial lines show the new structure quite clearly. There are further enlargements, and the original town center is no longer as dominant. The arterial roads leading north were extended further, a development that continues today. New, mainly residential and shopping quarters for the wealthy arise both in the northern direction and on the northeast peninsula, but without producing vivacity comparable to the African quarters. Unplanned settlements based on a Kariakoo-like pattern (and that become dense quickly) are linked with the center via the three main roads, but have few links with each

other (The planned settlements in the north and east were not relevant to the research and are not represented here).

Step 7: Dar es Salaam of Today

The 2001 map, a plan that derives from research only in the harbor area (a small part of the city), shows that Morogoro Road has been expanded and united with many smaller streets from the old town area, shifting the main axis back to the actual city center. Development continues rapidly, with many unplanned settlements grouped like satellites around the core, whose inhabitants come into the city center only to run errands or for work. None of these new quarters rise to the level of importance of Kariakoo and the original city.

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If we compare the 1914 map with today's map of the area, it is immediately apparent that while the basic structure has remained the same, the core of the city center has become denser, with many short roads. The deformed wheel, the outline of which was already discernible in 1920, has become more pronounced and is practically pulling residents, visitors, and new arrivals to the city from outlying villages into the heart of the city. The park in the east is less integrated and is no longer a public park; rather, it accommodates the government seat, cut off from the rest of the city.

Figure 8:

Comparison of the research area in 2001 and the map in 1914
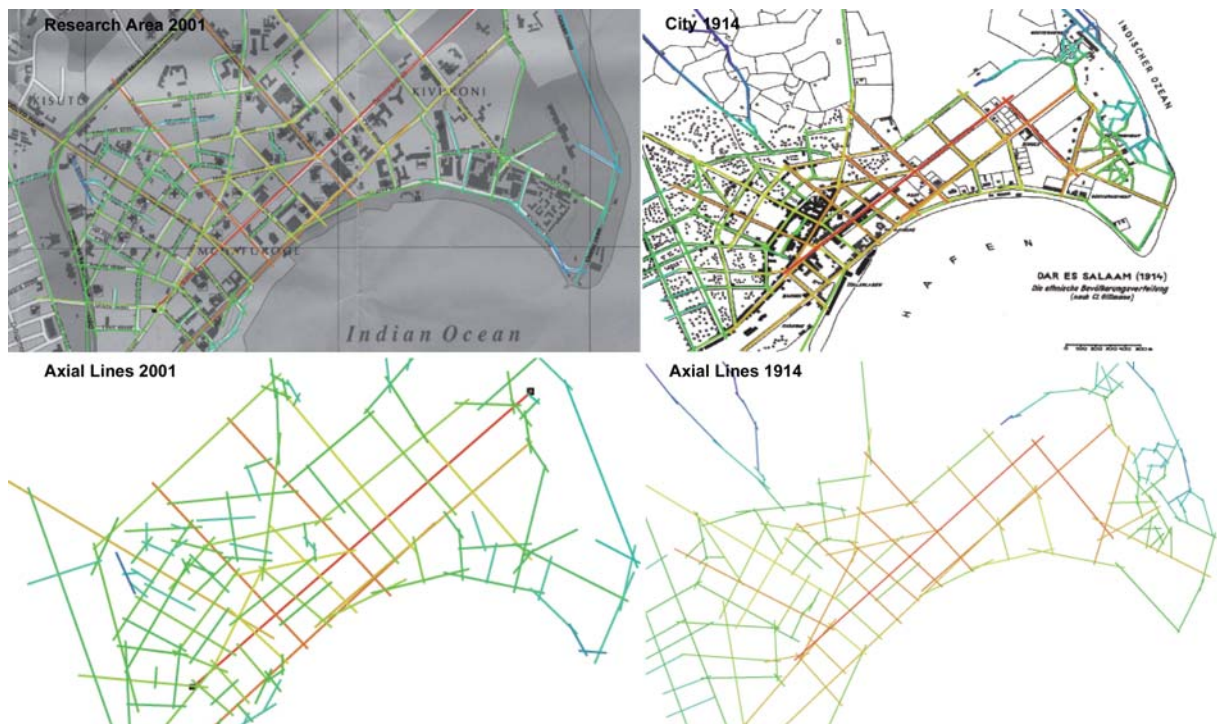
Results and comparison of findings

The findings and values from the historical analysis of urban planning and the space syntax analysis were combined and evaluated. Additional on-site observations were added: how people move and their main directions in various areas of the city and in the most popular locations; the connectivity among public spaces – parks, squares, and public buildings – via the most important roads; and how movement patterns differ between locals and people from outside the area.

The space syntax method confirmed the historical findings regarding Mnazi Mmoja Park, the ferryboat harbor, and the harbor zone. The space syntax analysis also confirmed that it was reasonable to extend Morogoro Road to the harbor as an integrated link. The need to connect the city's south is revealed through experience and from on-

035-10

site observation. Existing attractors, such as the museum and the botanical gardens, should be included in the new step-by-step plan that will be created.

Dar es Salaam's extensive urban planning history illustrates several concepts and offers important ideas for future development. The harbor zone must be viewed as the city's "germ cell" and heart. Sultan Majid positioned his first buildings to face the harbor, not only to greet arriving ships but also to provide residents an open view of the sea. The German colonizers extended this idea and created an inviting harbor promenade. A 1908 photograph illustrates the public function of the harbor zone particularly well: all important institutions and shops are located there. Unfortunately, the waterfront is no longer as inviting, and the city center must today fulfill this role for residents and visitors.

The space syntax method visualized various ideas, but its limitation of defining the harbor zone as the outskirts of a town necessitated adding lines of sight over the harbor. Then, a further vision was created that simulated waterways to the south part of the city. This was an attempt to overcome the edge situation that results along the shore (Eisenberg 2003, 9ff.)

A black plan of the buildings and the open spaces was also elaborated to complement the analysis. One can clearly recognize the open strip created by the Mnazi Mmoja Park. Around the dense town center are more and more unplanned settlements. In the east are the government buildings and many embassies, abutting generous open spaces. One recognizes the intent to frame the harbor with buildings, but without building right up to the sea in order to preserve a pleasant shoreline promenade.

A Focal Point for Development: One City Center for All

The harbor of Dar es Salaam has always been important. It was the trigger behind the founding of the city by the Arabs in 1862 and, after its demise, the "refounding" in 1891 by the German colonizers.

The results from the investigation of the city's history and the different analyses were summarized graphically to form a basis for restructuring and renovations. Several recommendations emerged.

1) The area where the piers for sailing ships were once located, adjacent to today's commercial port, remains largely unused. This creates an opportunity to transform a rarely used area of the harbor into a lively, urban extension of the city, directly at the waterfront.

2) The Morogoro Road, which brings people into the city, is one of Dar es Salaam's most important streets. A first step in any plan for the city should be to extend it to the harbor. Public transportation would be desirable on this street. The eastern shore street, also important, could be extended into the southern part of the city with a bridge. The harbor zone should become traffic-calmed, and pedestrian activities there should be increased. Good parking for cars in reasonable proximity to the harbor zone would be desirable.

3) Mnazi Mmoja Park should be activated as a public recovery and green zone and linked to the town center with additional pedestrian connections. Suitable attractors should be developed there and throughout the city,not only for the inhabitants but also as magnets for tourism. This will improve the economic situation and help create worldwide attention.

4) There needs to be a link with the southern part of the city; for instance, a spectacular bridge to the other side of the harbor could be constructed, and on the other side a tourist attraction, such as a maritime museum, could be located.
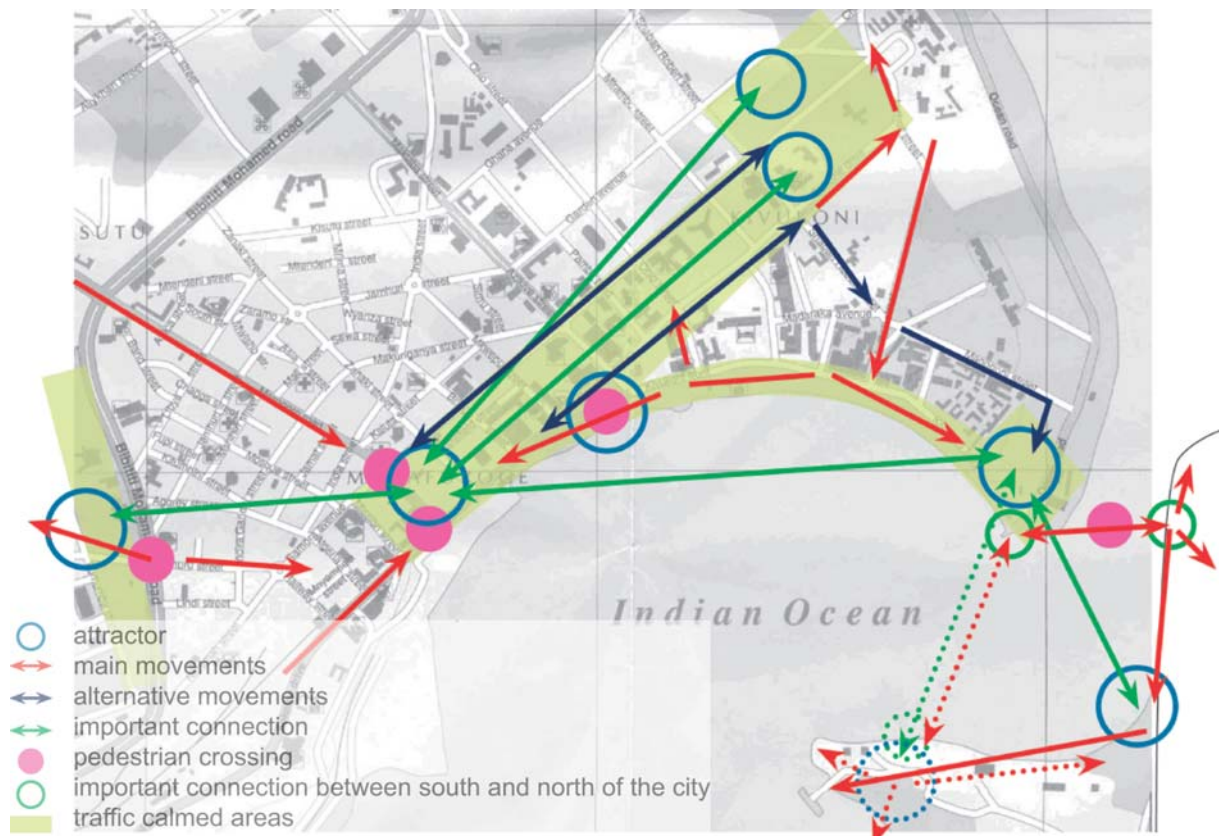
5) Dar es Salaam needs a cultural center for all social classes and ethnic groups, especially as a future education center for the local population, but also for interested foreigner to learn more about Tanzania. In a city of this size, there must also be a contact point for public institutions, but also for knowledge and culture. Such a center can also activate further developments that are then carried into the surrounding areas. From the tourism perspective, all routes leading to wildlife parks and other sights can be accessed from this center; this has important economic ramifications. In restructuring and developing this center, it should be oriented towards and be integrated with the harbor zone as well as involve the southern parts of Dar es Salaam.

035-11

6) The preservation of the center and its traditions should be an essential part of helping the city to find its own identity. Existing attractions, such as the museum and the botanical gardens, should be integrated in any new plan. These areas, as well as parts of the old Indian town, boast beautiful old buildings that have also been defined as worthy of preservation at other points in the city's urban planning history and are crucial for the development of its identity. These historical buildings must urgently be restored and given new functions, preferably of a public nature.

7) It is crucial to eliminate the ethnic segregation that resulted from the colonial city structure and that was exacerbated by the creation of Mnazi Mmoja Park. The goal of any further development must be to blur these borders once and for all and unite the city's population and space.

Figure 9:

Suggestions for a reconstruction in small steps

attractor
main movements
alternative movements
important connection
pedestrian crossing
important connection between south and north of the city
traffic calmed areas

Conclusion

The morphology of a city, its identity, results from its inhabitants. "[I]t awaits the imprint of an identity ... it invites you to remake it, to consolidate it into a shape you can live in" (Raban 1975, 9). Urban life cannot be controlled through rational planning methods alone. "The city as we imagine it, the soft city of illusion, myth, aspiration, nightmare, is as real, may be more real, as the hard city one can

locate in maps and statistics, in monographs on urban sociology and demography and architecture" (Raban 1975, 10). Every location in a city, every shape, every stone tells a story and adds to the overall picture of a place. "Locations have a potential for memory. They have a mind of their own ..." (Hassenpflug 1998, 13). These aspects give a city its unmistakable identity.

035-12

The reality of urban life, however, is shaped less by what we actually see than by the invisible treasure of its hidden meanings. As Italo Calvino writes, "[T]he city [consists of] the relations between its spatial gaps and the events of its pasts ... it is written in the roadsides, the window grills, the railings of the staircases ... The city appears to you as a whole, where no desire is ever lost and of which you are part ... Its memory is brimful: it repeats the signs so that the city can begin to exist" (Calvino 2002, 13-25).

The restructuring of Dar es Salaam offers a chance to unite the individual centers and points of attraction that developed in different cultures in a joint network of attractive, citizen-based zones and make a global connection possible via meaningful expansions. Cities exist to be experienced, perceived by their inhabitants, and evaluated according to their own aesthetic criteria and utilization patterns – all highly subjective. "To remember is to imagine, and it is the true source of our individual and collective imagination; our ability to shape the future" (Hassenpflug 2002, 12). The ways in which a city is perceived and experienced are thus part of actively shaping our future. This is true for everyone – residents, visitors, and planners – but in particular for a city's "users." It is, therefore, vital to integrate users in the planning process from the very start and to make them active participants with the aid of visualization techniques.

The method introduced here is one of many small steps, and involves a great deal of joint action and active participation on the part of residents themselves. This is a way to overcome past problems of implementation. For Africa in particular, where we find poverty side by side with a strong momentum for change, such an approach seems more promising than large-scale projects imposed from the outside, which meet with little acceptance and are often abandoned before completion.

Europe is currently trying to strengthen city centers by uniting them with the old core settlements, thus giving them back their identity. It is this identity that gives people a sense of belonging, providing them with a concrete point of reference in our globalized world. Cities in the less-developed world must also become locations and intersections in this globalization. Without this positioning, they will become transitory spaces absent meaning or culture, or they will be forgotten about in the international network.

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035-13

035-14