Chapter 1
Built Environment in Response to the Ecology, Design, and Perception of the Global South

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Abstract The need is highlighted never than before, that the urbanization and proliferation of built environment of the Global South require "new theoretic approaches" and in-depth analysis based on case studies, evidences, and scenarios since the causes of urbanization and its outcomes are significantly different from those in Global North. Hence it is evident today the Global South indicator is not based on geographical parameters but relies on various other considerations related to urbanization, development, and built environment. This particular chapter compiles some of such individual studies of the Global South which are very specific; however when looked into the analytical sublimity of these cases, its specificity gives way to the generic characteristics of these cases, merging with the common issues of the urbanized built environment and culture of the Global South. Hence, seemingly the built environment is to deal with buildings, urban regime, and human settlements; however a deeper introspection here extends its significance into much larger areas and forms. Thus when the design of the built is considered holistically against perception of the built and its environment, it gets truly understood. This chapter gives an overview to this understanding, which is discussed and elaborated substantially in the next chapters. The aim is to propound that it is very crucial to know that every component of the built environment is defined and shaped by context and each and every element impacts either positively or negatively to the overall quality of environments for built and natural and to human-environment relationships. Added with political and social complications, the urbanization of the Global South has been steadily and sporadically increasing with degradation of quality of urban environment and living. The skewed design of the built environment for these urbanized worlds, the conflicting perception of different stakeholders towards it, and the degraded ecology of the development remain ubiquitous throughout these countries or rather regions; hence a summarized view is presented in this chapter for a comprehensive understanding of the overall compilation of the book.

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Global South

It is quite a challenging task to define "Global South" more so when the world has become a melting pot of every aspects to do with human civilization. Aided with technological advancements, ever since industrial revolution, the world has stepped towards regionalism in terms of economics and associated politics; at the same time, it has fallen flat in terms of culture, living, and lifestyle and societal aspects at large. Post-1990s, marking the end of Cold War expression, the categorization of First, Second, and Third World has become outdated. Even the prominence of the terms which have been in abundant use, namely, "development" and "developing countries" has diminished considerably. Though they are still used eloquently and ubiquitously in a colloquial perspective, it has questionable validity and vitality, as the center of global economic growth has been shifting to places outside the so-called West (Europe, North America). These changes triggered debates and dialogues on varied aspects of postcolonial and developmental scenarios, which though started in a discursive manner soon gathered momentum. And one of the rather stable terminologies which surfaced out resulted into the origination of the divisions of "Global North" and "Global South" (Levander and Walter 2011). Though these terms have been coined by and predominantly used by social science and the humanities, in the initial stages, today natural sciences, medicine, and other sciences have been increasingly using the term. Business, management, law, and other disciplines are also finding the use of North-South dichotomy to be emergent. Research has shown that there has been a steady and steep growth in the usage of the term Global South in publications since 1996 (Sivertsen 2014). This is just a small indication that Global South is not only gaining importance as a terminology but also is being rendered intellectually and scholastically by different researchers in different disciplines.

Apart from this quantitative predominance of the Global South, it is important to note the qualitative notion of Global South. It is associated with the negative impacts of capitalism, mostly by Western actors, and served by the weak regulations, acting on the inhabitants of the countries or regions of the Global South. In contrast, Global North is often linked to strong governance and public sector. Another dichotomy noted for these terms relates to urban and rural. Global North is symbolized as having accomplished the complete urbanization process in an organized and orderly fashion, in the postindustrial revolution world, whereas Global South is visualized as predominantly rural, backward, and underdeveloped. It could be observed; there is always a lot of scope to describe the inadequacies and deficiencies in Global South compared to the urbanization standards set by the Global North. The urbanization process of Global South is rather termed as "chaotic" and "roblematic"

(Pagel et al. 2014). These researchers have highlighted that the urbanization and proliferation of built environment require "new theoretic approaches" and in-depth analysis based on case studies, evidences, and scenarios since the causes of urbanization and its outcomes are significantly different from those in Global North. Hence it is evident today the Global South indicator is not based on geographical parameters but relies on various other considerations related to urbanization, development, and built environment. Methodological national boundaries could be avoided; rather sub-national regions or localities could be considered, since the "internal conflict and contradictions" could lie anywhere in the globe (Dirlik 2007). With narrower and idiomatic usage of "North" as equivalent to the capitalist elite class and "South" as equivalent to marginalized segments, today indeed Global South could be anywhere and everywhere (Sparke 2007).

It is also observed that within Global South while there are similarities of pattern, diverse variations and heterogeneity exist which requires in-depth individual studies. A gross generalization of issues of Global South is almost impossible. This particular book compiles some of such individual studies of Global South which are very specific; however when looked into the analytical sublimity of these cases, its specificity gives way to the generic characteristics of these cases, merging with the common issues of the urbanized built environment and culture of the Global South.

Built Environment

Man like animals have looked at environment as a source for mitigating needs of self. The immediate environment has provided them with basic resources. And in many cases, if the immediate environment has been exhausted or not sufficient, man has resorted to migration. However unlike animals, man started looking at environment not just as a resource but as an inspiration that could be changed. The very basic nature of human exploration is visible if one observes how the children interact with the environment. Children with no particular experience of how to use a natural element come up with a very innovative approach when encountering a natural form, for example, a twig of a tree. In contemporary day-to-day living, a child would not see much use of a twig of a tree except that of observing twigs to be pruned at times. However when they are handed with a twig, they would find multiple uses; the twig then starts acquiring a greater importance than it could be thought of; hence the twig starts acting as an inspiration to the children. Children try to change their surrounding every time, with different materials and tools available to them. One would surely recall the experience of the child doodling on the clean walls. It is certainly a very simple example of changes being brought to the environment. Hence human being by very nature is a changemaker and brought changes to immediate or remote environment. As a part of this endeavor, man acted on the environment to build. Now the dictionary definition of "build" says "Construct (something) by putting parts or material together" (Oxford Dictionary 2018),

whereas the definition hinted for the "built" suggests that something is "made, formed, or shaped in a specified way" (Merriam-Webster Dictionaries 2018). It is understood from these definitions that both the words related to tangible form which are meant to exist in the environment and be part of it. Hence there is a strong connection of the verb "build" and the noun or adjective "built" to the environment.

Historically speaking the built environment is one of the most crucial parameters to mark human civilization. Today the built environment and forms are almost "natural" and elemental to us. People find them obvious. The built and the natural go hand in hand. However this is not to judge its impacts. From a theoretical discourse, every bit of earth has been transformed into built environment. One may argue what about pristine oceans, impenetrable forests, or frozen polar regions? The oceans are surfaced with countless voyages. Diving explorations, dumping of wastes, floating plastic bottles, sinking carcasses of junk machines, weapons, and the like have extended the "built environment" into the unimaginable spreads and into the depths of the ocean. The trackers fitted on wild animals, the satellites sending pictures from the deepest cores, and the aircrafts hovering over the densest foliage of the world have turned the scariest of the forests, heard in stories into the "built," the "built" that one experiences every day while sitting in an office room or strolling in an urban park. Needless to talk about the sinking ice, greenhouse effect, global warming, etc. and their impacts on the poles, the effects are not just restricted to the poles but percolate to every continent. In a broader sense, it deals with water. Which is essential for life, too much or too less of it, both are of great threat to human civilization. Hence, seemingly the built environment is to deal with buildings and urban regime; however a deeper introspection extends its significance into much larger areas and forms.

The most dominant impacts and effects of built environment are realized in urban areas, not to neglect the rural and other forms of settlements though. It is just that urban areas have higher density and large number of human interventions as seen against the natural environment. The rise of urbanism is a significant cause of concern. The United Nations data set predicts that 68% of the world's population would live in urban areas by 2050, which in 2018 was summed up to 55%. This increase in urban population resulting gradual shift in residential settlements from rural to urban areas and also taking into account the overall growth in global population by 2050 would add another 2.5 billion people to urban areas. It is also notable that UN report states that close to 90% of this increase take place in Asia and Africa (United Nations 2018). And because of rapid urbanization, there are other issues emerging. It is obvious that this exuberant urbanization is giving rise to growth of urban built environment which was never seen before. The built environment from its very inception has been seen as a place of recess and safety, a resort to protect from the turmoil prevalent in nature, such as storms, rains, harshness of temperatures, and the predictable and periodical ones, and also from the unpredictable ones such as attacks of wild animals or landslides. It still continues to serve these purposes of protection and harnessing. But with the growth of enormous built-up forms in contrast to its surroundings, it has started posing newer challenges to mankind. Pollution is one of

the examples. The by-product of urbanization has led to a threat to the human habitation again. The same notion of recess and safety is now contested. Hence as man starts altering his surroundings and his immediate environment, he also owns the responsibility of a holistic betterment and not a skewed one.

Environment, Perception, and Design of the Built

Built environment or man-made environment has various dimensions and aspects related to it. There are multiple disciplines which take different perspectives and discourses. This particular book attempts to look at the built from three distinct perspectives; these are based on aspects of environment, perception, and design. These are very broad areas of discussion and embrace interdisciplinary and varied modes. In most cases these perspectives seamlessly merge, one into another. However for a holistic understanding of built environment, one should be aware of these three perspectives and analyze its interrelationship while considering a built environment. Let us consider the example of peri-urban or urban areas. The growth of fringe areas of a city is inevitable. In many developing countries, the cities merge with the rural surroundings. The urbanism sprawls into the nonurban settings. This gives rise to unique characteristics not only to the built environment but also to the natural and sociocultural ambience. One would come up with an interesting analysis if the residential houses are considered in these areas. Many of the residential buildings use a combination of masonry, concrete along with natural materials such as timber structural members, and thatch or burnt clay tiles. Now, this perspective of the built form is a unique design endeavor by the local masons and housebuilders. Often the residents themselves build up their shelter using this unique hybrid technique developed indigenously. From a design standpoint, this is novel and technologically innovative. However these innovative frugal design attempts could be tested for its technological soundness, efficiency, and safety. Some of these stand very sound over prolonged trial and error. For example, the way bamboo roof framework is inserted and supported on masonry walls, concrete lintels or ring beams, and concrete columns or pillars is robust and effective. These houses are often considered to be “kuccha” or temporary. Many of the authorities and governing bodies do not even acknowledge these to be legitimate buildings. And compared to the buildings which are purely made out of masonry, stone, and concrete, these buildings are recognized to be inferior. They are socioculturally portrayed as of lower class, representing poorness and inadequacy. It is neglected and not praiseworthy. The perception towards these designed forms of the built environment starts coming into picture. Hence the design of the built could be analyzed based on the perception of the built. A simple place of living starts making a mark on social discrimination and on cultural mindsets. In the same neighborhood, a person having such “kuccha” house would receive social bias compared to a person living in a concrete-clad residence. However ecologically and environmentally speaking, it is found that

these hybrid models often turn out to be climatologically and economically very effective. Thus these are perhaps more sustainable scientifically compared to the concrete buildings. Thus when the design of the built is considered holistically against perception of the built and its environment, it gets truly understood. Just a partial understanding of the built environment is therefore always very limited and narrow. Until analyzed against these three perspectives, a discourse on the built environment remains incomplete and incorrigibly deficient.

Environment and the Built: Earth as an Inspiration

About 13 million years ago, man was a hunter and gatherer and lived in caves. With the advancement and invention of simple tools and discovery of fire, he advanced into the barbaric age. He then learnt that living in groups was safer and living closer to the water sources ensured a good supply of food and water. And this is when clusters and settlements started to form. With the discovery of agriculture, man learned to live on fruits and vegetables, and thus he did not have to move anymore in search of food; the settlements became more permanent. This journey from the caves to settlements had already taught humans the importance of the "built," which provided safety, security, and feasibility in all aspects.

If we talk about the first house that was built or the first ship that was built, it will be undoubtedly from the most local and natural materials which were found in vicinity, like timber, stone, thatch, etc. As technology advanced and new inventions happened, the built took different shapes and forms, like the monumental dome built by the Romans at the Pantheon and the gigantic Greek orders at the Parthenon.

Moving centuries later to a very important and life-changing phase in human history, the industrial phase, we start to see large-scale production of iron. The ready availability of iron contributed to the development of machinery, notably James Watt's double-acting steam engine of 1769. Although application of iron took place centuries before the industrial revolution, the first large cast-iron structure was the bridge over the River Severn at Ironbridge, a town in England. Built by the iron founder Abraham Darby III between 1777 and 1779, it has a span of 30 m. An extravagant sequence of iron and glass structures continued to the end of the century. The most important of these was the Crystal Palace, built in London's Hyde Park with standardized parts. This was to accommodate the Great Exhibition of 1851 (César 2017).

The built has come a long way since then, and in every stage, it has always had an intricate relationship with the environment. Firstly, by using the materials that the environment provided, the built took inspiration from natural forms only to exploit the environment at some point of time.

The environment has not only provided the materials but has also shaped the way we built in the past. A very good example would be a vernacular building of any area. Let us consider the vernacular stilt houses of Assam as an example. Being in a

very heavy rainfall zone, the high plinth not only helps during floods but is also used to shelter cattle. The very convenient sloping roofs make it easy to drain off rain water. The materials used are locally available ones like bamboo, mud, and thatch which are easily replaceable when needed. Moreover, these materials have insulating properties which keep the interiors warm in the harsh winters and cool in the summers. Being lightweight and constructed with flexible connections, such structures are very efficient during earthquakes which this zone is extremely prone to (Kaushik and Babu 2009).

Today, we often talk about the terms "green" and "environment-friendly" and we try building with materials which have lesser impacts on the environment. In this context the methods and materials used to construct a building that affects the environment are as important as to the knowledge on how the built is operated. For example, use of heating, ventilation, and air conditioning (HVAC) system is not efficient or sustainable having a long-term negative impact. Several other factors make huge impacts but are not immediately noticeable, like the energy used for building a shelter in the form of electricity and fuel consumption. The fossil fuel usage for transportation related to construction of contemporary buildings, unlike vernacular, is higher, as they do not tend to use locally available materials. Added is the transport of waste, produced from construction and demolition. Today perhaps we have reached the threshold, and thus, now it is absolutely important to understand and respect the relationship of the planet with the built and act accordingly.

So far man has created tools, harnessed fire, manipulated spaces, and modified the environment to make his life safer, comfortable, productive, and enjoyable. Now, times have changed, and man-made changes have increased, and populations have blown up, but the basic reasons for creating the built environment remain vitally the same; however the means have changed.

It is very crucial to know that every component of the built environment is defined and shaped by context; each and every element impacts either positively or negatively to the overall quality of environments both built and natural and also to human-environment relationships. These impacts are sometimes local but are experienced at every scale, including global and even planetary.

Perception and the Built: Eyes of the Mind

The Oxford Dictionary defines perception as "the way you notice things, especially with the senses." Thus, the way we realize, understand, or experience the surroundings depends on how we perceive it.

The built around us is guided by several factors, starting from basic ones like the site, climate, etc. to complicated ones like issues of territory and privacy, as well as the question of who determines and designs the physical spaces. Such factors often neglect the individual as well as the collective perception. Also, the implicit nature of our daily surroundings often changes individual perception.

Architecture as a crucial part of the built environment acts as an identity for the given region, community, or culture. It reflects culture closely with structural, historical, political, economic, and social features of society. The changing cultural and social attitudes in communities have the greatest impact on the built (architecture), and the key actor and factor is perception.

Without knowledge our eyes are nothing but mere instruments to identify and measure, and we tend to develop incapacity to determine meanings in what we see (Youssef 2015). This knowledge comes from the cultural and social aspects. It is interesting how the cultural and social perspectives can change the value of a building. Let us consider the case of Mawlynnong, a historic settlement in Meghalaya, as an example.

Mawlynnong is a small hamlet of about 500 residents located in the East Khasi Hills, about 90 km from the capital city of Shillong. Nearly 130 years ago, there was an outbreak of cholera in this remote settlement. Without the availability of medical facilities, the Christian missionaries suggested that cleanliness was the only solution. Since then, cleanliness has become a daily ritual for the local inhabitants.

Until 2003 it was like any other remote settlement in the state. No tourists visited the settlement as it had no proper roads and was accessible only by foot. Later in 2003 it was voted as the cleanest village in Asia by *Discovery India* magazine. It was reinforced by BBC and National Geographic in 2004, and UNESCO endorsed it in 2006, and thus the village won fame in the national and global scenario.

The architecture in this settlement is very traditional with typical features like sloping roofs with palm leaves, bamboo walls, and stilt houses with wooden columns. All the materials and techniques are sustainable and locally available, and the settlement has survived and flourished over the years in the same way.

Now with the inflow of tourist and increased interaction and mixing of cultures, the settlement suddenly has an outburst of concrete buildings. To cater to the tourists, modern sanitary facilities are provided, several houses have been converted to restaurants, and homestays, and a complete change in perception towards the local architecture is observed. The inhabitants who were once very proud of their traditional bamboo houses and showcased the same by building tourist lodges with bamboo are today willing to shift to concrete buildings at any cost. Concrete buildings are wrongly perceived as a symbol of status, and several traditional houses have been replaced.

It is also very interesting as how a neighboring object affects an object, with respect to perception. For example, one may find a sculpture simple because he is unaware of its intricacy; or he finds it confusing and complex because he is unaware of its intricacy; or he may be puzzled only because he is not accustomed to a new, modern style of shaping things.

To conclude, one can say that perception is one of the main factors which determine the success of the built in the long run. For a designer it is important to understand the perception of the user before putting forward his ideas. Secondly, we see that sociocultural aspects impact perception to a great extent, and in such cases knowledge in terms of awareness becomes crucial.

Design and the Built: Man the Place Maker

Design is a very broad concept. Generally speaking it is the process of envisioning and planning the creation of objects which in this context is the built. Designing is an intentional process. It is often misinterpreted as something that is done to make things look more aesthetically pleasing. Of course, no one likes to see anything unpleasant unless there is a specific reason to do so. But that is not what design is about. Most importantly, it is about making the user's interaction with the environment more natural and complete. It is a combination of both art and science; in brief it takes the expression of art and problem-solving aspect of science. And at the end, it is an attractive keyword, as it conveys to people the associated notions of ability and thought (Taura and Nagai n.d.).

Man has over the years mastered the several aspects of design in all possible ways. This process has developed with the new inventions, discoveries, identification of new materials, advancement of technology, and interaction with different cultures. Such knowledge has been passed down from generation to generation to have what we have today.

From the early civilization of Mesopotamia built in mud to the gigantic pyramids of the Egyptian civilization and to the more advanced brick houses and strategically planned settlements of the Indus Valley Civilization, man had it all sorted. We design and build our lives from one experience to another. Based on those experiences, components of the built emerge from human needs, thoughts, and actions.

Man has always been able to establish himself as a superior being on the planet. Our actions have built civilizations, unimaginable skyscrapers, bridges, roads, and dams. We have designed and built for the good of culture, religion, and society. But the irony is that sometimes, the essence of human actions is magnificent, and we design and plan quality life experiences for ourselves and others. At other times, the same human actions are shortsighted which ends up in creating uncomfortable situations that are not very feasible for healthy human activities and impacts the environments negatively.

Like mentioned before, design is art in terms of expressionism. A designer not only creates a space for a user but also expresses his thoughts and ideas with the same. Thus, there is always a cause-and-effect relationship between human purpose and the things we design and create. Human needs and values are manifested in the built environment. A persuasive historian and English Prime Minister, Sir Winston Churchill, expressed that "We shape our buildings; thereafter they shape us." Another noted historian, Arthur Cortell, conveys this same interdependency by claiming: "Tell me the landscape you grew up in and I will tell you about yourself."

When we look into the past, we know that most of society's knowledge of past civilizations, cultures, their habits, and everything for that matter is derived from remnants of the built environment. We would probably never have known the use of arches in a building if the Romans had never designed their temples using them. In the same way, our present cultures would be judged someday in the future by what

have been created today. We should think about the results then as whether our present practices will be applauded to or will be condemned as being insensitive and brutal. Perhaps when we design with such questions in mind, the true sense of design is achieved, which is through understandings of the present, with the knowledge of the past and keeping in mind the values of the future.

Urbanism and Urban Transformations

It is easily understood that the divide of the Global North and Global South is based on urbanization factor in a very significant manner. Though there are various other factors relating to difference in economics, lifestyle, culture, technology, etc., it could be inferred easily that many of these are rather by-product or outcomes of urbanization process. Kaul (2013) has strikingly projected the growth and rise of Global South in his report on United Nations Development Program. He also mentions that countries of the Global South have paced forward at different speeds and have been able to join the group of major global policy-shapers. On the other hand, in a need of their own sovereignty concern, the countries of the Global North have responded to this increasing power of Global South. Political multipolarity is adding economic multipolarity and military multipolarity, assimilating the role of Global South into the world economy. Kaul (2013) even states ambitiously, "the world has been fortunate that increasing economic openness and deepening policy interdependence have coincided with the rise of the global South."

With all these the immediate direct impact which has been noticeable is the growth of urbanization both in a planned and unplanned manner. Many of the countries of Global South have been influenced by the effects and privileges of urban settlements during the colonial stages. However the postcolonial challenges have shifted these urban lands into cluttered settlements in most cases. Added with political and social complications, the urbanization of Global South has been steadily and sporadically increasing with degradation of quality of urban environment and living. Again with the gradual rise and importance of these countries in the Global scenario for the past decade, the urbanization process is under strict vigilance by most of the stakeholders. Hence the urban transformation of the Global South is ever-changing and continuous.

This particular book starts with chapters on urban transformations with stories of some of the countries of Global South. These transformations are rather predominant and common for most of the countries in Global South. The design of the built environment for these urbanized worlds, the perception of different stakeholders towards it, and the ecology of the development remain ubiquitous throughout these countries or rather regions.

Discussions on Built Environment of the Global South: Structure of the Book

In the first chapter, the current state of some of the towns has been elaborated, which developed into urban settlements during the time of colonial proliferation around the globe. This is comparable to most of the countries in Asia, Africa, and South America. These smaller settlements were brought into the surface of the earth based out of native emergent settlements. These settlements manifested substantial rural characteristics with being hubs of economic prominences dependent on trade or agriculture. In India interestingly enough, on the eastern fringe in the state of West Bengal, series of colonial settlements started emerging influenced by the colony established by different countries of Europe. Such a combination was unique in the history of colonial period, and this region was often colloquially referred to as "Little Europe," though later on only one town emerged to become the capital of the country, erstwhile Calcutta. The saga and grandeur of the other town faded with passage of time. Towns such as Bandel which was a Portuguese colony, while Chinsurah – a Dutch settlement–Chandernagore, and Serampore corresponding to French and Danish provinces, respectively, have turned into mundane native urban settlements with legacy of the past. The built environment went through gradual change based on the needs of the people and government, on top of the initial colonial footprints of the cities, with changes which are incongruent and haphazard. Today with a huge pressure on urban lands, and with the political and economic shift of attention to smaller towns and cities, these cities are experiencing immense change. The focus has shifted from few prominent, populous, powerful cities of the developing countries coined as megacities or metropolitans to transforming urbanization of less popular cities which have been dormant for years. These changes are occurring in an uncontrolled and sporadic fashion, creating undesired and disorderly urban environments. This chapter discusses some of these issues and highlights on the need of quick intercession, to check further damage and also to redress the harms previously thrust upon in these cases. Role of residential settlements in the urban transformation process has been investigated in some of these cases, along with the function and impact in relation to the built environment of the past.

While the first chapter explores the part of residential areas of an urbanized domain in Global South, the next probes into the commercial arena. Twenty-first century marks the increase of commercial centers across the world in response to economic development. The "West" has been distinguishable in such propagation. The influence of the West percolated to the Global South inadvertently and witnessed local variations and conditioning. These transformations like the earlier case are facing turbulence too and eventually causing an overall impact on the urban development of these cities at large. This particular chapter looks at the combination of commercial centers and urbanization with scrutiny of cases in Africa and Asia.

If a child is asked to draw a city, his view of urban environment would certainly house roads and roads with vehicles. Apart from dense residential setting and commercial projections, the scene of a city is incomplete without its transport. Many of

the cities designed and developed in the USA were inclined towards strong bias on vehicular or transportation networks. It is indeed essential to run the functions and services of a city. The cities of the Global South experienced vehicular influx rather late in the timeline; however the growth rate is steep and, combined with lack of planning and designing which is oriented towards transportation from the inception, led to serious concern in the developing world.

The third chapter deals with issues and challenges for transit-oriented development (TOD) in a scenario of developing country. TOD ensures meaningful urban development and growth which is supported by public transits. This curtails the need to use private vehicles. The increasing number of private vehicles owing to the dense population and financial aid supportive policies, in the developing countries, causes enormous challenges and threats, such as traffic congestion, degrading urban environment, inequity in allocation of road space between vehicles and pedestrians, increasing road accidents, etc. to name a few. In India there has been an emergence in the rapid transit systems (RTS) in the last decade, and there is a strong need for appropriate TOD guidelines. Thus the entire fabric of the built environment today is governed by the transport modes and allied functions. Needless to say many of the developing countries are not really prepared for the outburst of vehicular load, related to changing governmental policies, and newer systems of transports such as RTS. On one hand, there is massive pressure towards mitigation of fast, effective, and comfortable transport needs of heavy population of these cities, and on the other hand, the aftermath confronted by the newer and advanced means of transport needs to be resolved. Hence the balancing act requires prudent decision-making, public support, and participation.

In continuation to the transit-oriented development, the next chapter looks into the possibility of conventional public transport as a solution towards the issues and challenges which have been raised in the previous chapter. While the governments are in constant strain to build more roads, flyovers, rail systems, and smart infrastructure, with immense investments, they are concerned with the returns and profitability of these ventures. At the same time, with all these developments towards betterment and ease of living and working, the quality of life ensured to the citizens is questionable. The fourth chapter focuses on the conventional bus transport which has existed in many of the developing world for years as an efficient and comfortable mode of transport. Though the newer and faster modes of transport are inevitable to flourish in future years, shaping the cities in a different form than that of present, the conventional means should not be neglected. Multimodal development needs to be explored in its true sense. These transport interventions have lasting impact on the shape and character of the city. The bus and similar public transit call for bus stops and shelter at intervals which again are designed at walkable limits of the neighborhoods and workplaces. Dedicated, safe bicycle ways are almost invisible in the developing countries, despite large number of users and strong urge to use this low-cost, eco-friendly mode, whereas the Global North has built environment responding to this need accordingly. The more the train tracks and fast tracks, the more the use of underground tunnels or overhead passageways, walk bridges, fly overs, complex intersections, and interchanges in the city landscape. Thus the built

environment goes hand in hand with some of these infrastructural inputs essential to urbanization.

The transport and its adversities raised the concern long back. Thus landscape urbanism was instigated in the history of time as a reaction towards these undesirable impacts. Today the growing concerns of global warming, greenhouse gases, and vanishing fossil fuel impeach existing transport systems to a large extent in Global South. Added to these are the alarming rise of accidents and degradation of quality of urban life. The government policies play an important role in the control of these, which is rooted to the issues of transport systems, traffic, and vehicular density. For example, in the capital city of India, in order to regulate the number of private cars, which causes choking and enormous congestion every day, the authority had set the rule to use car numbers ending with even and odd digits on alternate days of the week. This is not to discuss the suitability and effectiveness of such policy, but it is important to note that rules and regulations are imbibed into urban regime in order to bring greater good to the society. Various rules and codes have been formulated to make habitable environments with the limitations and constraints of each city. Each house and building that is being seen in a city is impregnated with countless codes. In developing countries these rules are often a device to counter alteration, anomaly, and biased advantage. The focus is rather based on unpleasant and tacky experiences faced by the authority.

The next chapter raises an important question to rethink some of these rules and codes, which play a central role in shaping up the built environment. It is often a matter of fact that these rules are very stringently adhered to in urban areas whereas loosely dealt in peri-urban, rural, and urban fringes. This is a detrimental mode of development for developing countries stagnating growth and future prospects of planned urbanization. Sustainable growth strategy and related modifications to the rules and codes are thus the focus of this chapter. An example from Bangladesh is cited to explain the pitfalls of textual document simply stating series of dos and don'ts. The Chittagong city of Bangladesh is the second largest city in Bangladesh blessed with ecological setting of mountains, forests, water bodies, and coastline. Urbanization has eventually desolated many of the natural richness. The "gray" patches have deluded the "greens" aided with the thoughtless rules such as – the setbacks along the perimeter of the site where no building could be built or the maximum ground coverage, which limits the amount of land in the site which has to be left unbuilt. Most of the city authorities resort to these rules for urban development and built environment; however a minor slip could be interpreted differently and unfairly, or taken undue benefit of, which ultimately leads to disastrous consequences. Hence a holistic and sustainable thought process is essential to be adopted for formulating these guidelines and documents, present in most of the cities of Global South.

From Asian context of discussion, the sixth chapter takes one to the Caribbean Region where the Americas merge in the realm of Global South in the Gulf of Mexico. Here the policies and guidelines are adjudged for natural disaster. These regions like many other regions of Global South lying in the equatorial to tropical zones of the earth face the risk of storms, hurricane, cyclone, tsunami, and the like.

Also with climate change, indicators such as soaring high menace of rising sea and sinking coastlines are not to be ignored anymore. The role of regional government and relevant policies protecting the inhabitants of the coastal regions, be urban or rural, is crucial. These require prudent analysis of the risk, benefit, and activities or uses of the region for climate resilience and preparedness. This particular chapter takes a comparative approach through the study of well-developed policies and rules related to coastal climate readiness and preparedness, of certain places like Florida, and comes up with an understanding of how these should be incorporated into the practices of the developing world which unfortunately encounter such coastal disasters. Loss of property and life and cost of mitigation of post-disaster damage, along with low profitability of land and property market, render these regions into territories of low and abandoned development. This chapter deep dives into how effective markets compensate for incorporated natural hazard risks and comes up with applicable models for Cuba and the Caribbean Region and other similar areas across the globe which have similar risk exposure and morphology but vary on national and sub-national institutions.

The sub-national institute in rural setting of the villages of India is termed as "Gram Panchayat." These village councils act as rural local governments with elected heads and act for local self-governance. This self-administrative structure is similar to many countries of the Global South such as the Majlis Daerah in Malaysia or Kelurahan, Kepala Desa in Indonesia, Gaunpalika in Nepal, Barangay Council in the Philippines, and Partidos in Paraguay. This particular chapter highlights the barriers of post-disaster recovery in rural and peri-urban dominions of a developing country based on the role of local governance. This is based on a post-tsunami case in India, in 2004, which had devastating impact not only in India but whole of the Southeast Asia. The villages had been worstly affected, and post tsunami the local village government or the Panchayat was key in decision-making for recovery. The effects have been flawed, delayed, and wasteful. From a built environment perspective, this is a good example which merges the boundaries of environment, perception, and design. An environmental impact of tsunami, perceived arguably by stakeholders – Panchayats, has complicated the design intervention and implementation of reconstruction. This is an undesirable circumstance. As discussed earlier, the role of built environment is to provide a safe haven and place for refuge for human beings. Its failure due to sociopolitical perception factors and design defects which were unsuccessful to encompass practical economic and management barriers, no matter how much technologically sound, is a glitch. This chapter tries to create awareness towards the same and at the same time researches on methods for future attentiveness.

Post-disaster recovery procedure is an aftermath, but the question remains "Can built environment be constructed sturdy and resilient enough to withstand natural anomalies to the maximum in the first place?"

Man has played various roles over course of time ever since he evolved superior than other animals, from hunter and gatherer to harvester, maker, and designer. The role of the primordial designer in response towards the needs has shaped innovations and civilizations. From family to society and from simple tools and weapons

for scavenging to shelters for protection against nature and beasts, man has been the creator of the "optimum" which balances issues, with best possible resources available. It does not necessarily have implications to the "most functional" or "best looking" or "most economical," rather the designed world of traditional man looked seamless, effortless, and almost a continuum of nature. Man as a designer has acted empathetically, and designs reflected long synergy of personal or societal observations and functions of nature. This led to harmony in the built forms reflecting wisdom and poise. This particular chapter looks at how traditional designs ingrained with knowledge from earlier generations built resilient environments, in one of the most disaster-prone areas on earth, the Himalayas. Difficult terrain, extreme climate and frequent hazard of hail, landslide, and earthquake have marked the Himalayas as one of the most difficult and adverse sites for human habitation. However the traditional forms of buildings have withstood these diverse forms of hazards effectively. With the increase of usage of cheaper concrete, easy erection workability, these traditional buildings are fast vanishing even in remotest part of the Himalayas despite difficult transportation and reduced performance of nontraditional materials. Over several past earthquakes, it was evident that the newer, engineered concrete structures have failed to survive unlike the commonplace traditional construction using locally available materials and using indigenous knowledge. Dhajji-diwari and Taq in Kashmir, Ikra in Assam, and Shee-Khim in Sikkim are some of the examples. Though these are specialized construction suitable for hilly region prone to disasters, the essence of this chapter is to highlight design for resilience using traditional knowledge of the built environment, which is effective, low cost, and locally pruned. These make it suitable for settlements of Global South, especially places prone to disasters. Harnessing vernacular architecture is effective in formation of resilient environments in the developing countries rather than resorting to mindless concretization.

Discussing on the Himalayas, one gets reminded of the impacts of climate change and global warming. One of the popular Indian dailies reported in their science news with headline stating "Himalayas will melt by 2100," based on the report by 350 researchers and policy experts from 22 countries, crafted over 5 years. It sounds unimaginable, but bit by bit, over the course of time, the contributors of global warming would cause this unprecedented phenomenon if remains unchecked. Urbanization is directly linked to this global climate and environmental change (Grimmond 2007). It is evident since globally, the urban areas almost always remain warmer than adjacent rural areas (Oke 1973). One of the noticeable facts in urbanization is the issue of growing urban heat islands. This is perhaps one of the most challenging climatic issues of this century, related to built environment. With the rise of built environment and with greater use of concrete and road surfaces, coupled with dense building fabric, lower ventilation, and climatic permeability, the persistent rise of temperature has caused pockets of perpetually heated regions both during the day and night. The problem is more severe in equatorial, tropical, and subtropical portions of the earth; the major chunk of Global South is constituted of this geographical belt. Studies have shown that heat stress-related morbidity is on the rise in the Southeast Asia. Needless to say, if not loss of lives, the comfort

thresholds have certainly crossed in the urban areas. And to mitigate this, people are heavily relying on electromechanical means of cooling and ventilation, which is an added burden to the energy consumption loads and economic sustenance. Both indoor and outdoor thermal comforts are heavily affected by urban heat island effect in the Global South. While indoor environment heavily resorts to conventional modes of comfort, outdoor environment still lacks a remedial approach. This particular paper raises a concern and provides a solution through informed and sustainable planning intervention in urban areas for achieving desired outdoor thermal comfort. This improvement is extremely needed for enhancing quality of outdoor urban spaces for its better usability and utilization finally affecting the betterment of human health and living, as well as bringing vitality to economic development.

Heat island is one of the prominent and conspicuous negative impacts of urbanization, and initially the Global North was blamed for this, but rapid and often unplanned urbanization in Global South is of significant damage too. Another pessimistic outcome of urban succession is the rise of waste generation. As per the World Bank (2018) analytics, each person on the globe generates 0.74 kilograms of solid waste per day, amounting to a total of 2.1 billion tonnes, which is likely to shoot up by 70% in the next 30 years. The report also states that compared to developed nations, citizens of developing countries, especially the urban poor, suffer the consequences of unmanaged solid waste, leading to serious health, safety, and environmental hazards. It is found to act as breeding ground of diseases, pollution, and contaminants, promotes urban violence, and contributes to global climate change again, through methane generation. The melting mighty Himalayas has been brought into focus earlier, but another facet remained undisclosed. Himalayan glaciers feed ten of the most important river systems in the world. Oldest civilizations have been nourished by the water of these rivers, and the combined drainage basin is home to approximately 600 million people. The rivers have played an important part in shaping the built environment. Cities have been conceived and grown on the river banks; these settlements like Varanasi and Harappa were cradle of strong culture and civilization. However with the passage of time, the built environment encroached into the sanctity and entity of the river itself. The issue is more pronounced in case of Global South due to population density, poor water, and waste management systems owing to economic and sociopolitical dissonance. This particular chapter draws attention to the harmful by-product of the city and culture which continuously flow into the river, making it polluted and hazardous for other usage. Though the chapter is a thorough and in-depth study of a particular case, it would be interesting to note the details through which a river contamination needs to be examined which arises out of practices of the riverside habitation.

Some of the most important rivers and river system supporting chunk of population is situated in the Global South. While these rivers are the lifeline of these settlements and societies, it is polluted every minute. The rivers have become vulnerable. As a result they pose the civilization with newer challenges of health, hygiene, drainage, irrigation, and many more. The most ancient of the human civilizations emerged in the cradles of these fertile river basins, having similar characteristics. Thus these places have become ecologically and culturally potential for tourism.

Tourism is also relevant from economic perspective. However there lurks a danger of overexploitation and unsustainable patterns, which would again add on to the existing damages to these rivers and supporting systems. This particular chapter looks into a meaningful analysis of riverine Global South in terms of tourism development. This analysis is based on geospatial and built environment characteristics; therefore the river and subsidiary settlements are focused. This leads to sustainable approach for water-based development in the Global South, leading to economic boost but not at the cost of ecological depredation as a result of mindless tourism. The built has percolated to every facet of nature today and needs a prudent justification towards the departure from the intrinsic agreement.

Chapter 13 brings forward the story of Indonesian Archipelago of the Global South which reminds one of the innate agreement which was referred to. The picturesque description of the built environment enigmatically emerges out of the fabric of the natural setting comprising of mountains, volcanoes, reticulate rivers, saline sea, and coasts. This characterizes the generic ecology and built form of archipelago in the tropical belt. This particular chapter redirects us to the basic settlement structure which governed the built environment of human beings for centuries. Farming and farm produce are the key to give form to buildings and related structures. The grain transcends from meager object of need to a symbol and value shaping society, customs, culture, and practices. Very importantly it takes a holistic approach towards the built environment in harmony with ecology and perceptual factors of the inhabitants. The design and architecture were not a need-based imposition but rather a humble expression of continuity of the social practices and cultural values, blended with local materials, ecologically supple. Thus Wanuas – the villages of Indonesia – were formed. This pattern of development is common in most of the agrarian societies and settlements of the tropical regions of the Global South.

From abundance and rich Indonesian vernacular architecture, the next chapter shifts into the discourse of housing shortage to one of the most economically backward continents of the world, Africa. The chapter title "Reflection on Rhetorics, Appropriate Building Materials and Domestic Utilities Towards Reduction of Housing Costs in Africa" is self-explanatory. The authors have addressed the need for suitable supply towards the scarcity of housing resources. Global housing rhetorics such as shelter for all by the year 2000, homelessness, low-cost housing, affordable housing, national housing corporations, housing corporative, and housing providers and enablers' strategies have existed for decades, but little is tangibly achieved by the poorest population of the world. Most of them dwell in the countries of the Global South. It is almost two decades after UN habitat declaration to have shelter for all by the year 2000, but statistics show there is a shortage of millions of housing units in Africa alone till date. Overdependence of industrial building materials reduces the number of required total number of housing units; hence there is a need for alternative building materials and sustainable use of domestic utilities such as water and electricity. Besides, there is limited information on how to reduce construction cost of housing as an attempt to provide affordable housing. Lack of knowledge on the effective utilization of both appropriate building materials and

utilities has led to unresolved economic burden to the poor population in Africa. Perception of the past housing policies and strategies at global, regional, and national levels provides self-assessment of how governments, professionals, and housing developers have contributed to the success or failure of the housing sector in different socioeconomical contexts. The chapter promotes the use of different materials and construction techniques, upholding principles of "3R," namely, "reducing," "reusing," and "recycling," citing examples from Tanzania. This has led to momentous cost reduction in the construction and utilization of housing resources. In developing countries the stakeholders of production and supply of housing should be made aware to use of appropriate and efficient building materials and apply 3Rs principles in housing, instead of conventional housing design to harmonize with ecology and make it cost-effective.

In the preceding chapters, the discussions expose that conventional and contemporary architecture and built forms seem to have posed issues in Global South and have worked towards inefficiency and ineffective modes compared to those of traditional forms. In the age of globalization and enculturation, in the developing world, the traditional buildings and houses are often perceived as financially nonviable and inefficient. The next chapter talks about settlement in a tiny island of the Aegean Sea. Part of Turkey but by all means part of the Global South, this island today is predominantly an urban piece with natural and archaeological abundance. Just like the case of Indonesian village dwellings in the archipelago, the houses of this island, in the far apart Mediterranean, were shaped in forms suitable for storing items produced in those houses such as grapes, wine, olives, and olive oil. And interesting to note, the building typology was honored and kept unchanged by the new owners of these houses after the exchange of populations. Documentation of these built forms is certainly precious and relevant from a perception point of view of the built environment.

In contrast to the discussions on residential settlements and houses, the next two chapters look at built environment corresponding to religious entities. Both argue analytically towards regionalization of the religious built form in context to local people and societal needs. The first one revolves around the design and construction of a mosque in West Sumatra. The icon of the Islamic architecture named as *Masjid Raya* was built in 2007. The regionalism has flowed into this building form through usage of local inspirations. People using the mosque and the immediate community have been taken into cognizance during the design process. The author also finds it important to comment on the role of critic in propounding the contrasts and harmony into the realm of social acceptance of the local community. The perception of inhabitants of the Global South towards unconventional built form is unique and requires conditioning owing to their variance in education, exposure, and diverse aesthetic appreciation. The other chapter discusses spatial characteristics of Hindu and Jain Temples. These temples have played a central role in building cities, forming sociocultural contexts, leveraging economy, trade, politics, and external relations spreading over space and time. From simple forms temple architecture construed complexity due to various factors. The evolution also influenced everything else directly or indirectly. Though it is debatable if the role of temple still

holds an overwhelming dominance in shaping the built environment in present states, the Hindu religious influence never ceased its crucial role. The predominance of *Vaastu Shastra*, which is the traditional methodology and framework for the buildings and built environment based on religious ideologies of Hinduism, has shown powerful trends in contemporary India. The design of the new capital city in 2015, for the state of Andhra Pradesh in India, called Amaravati, and its important public buildings have been reported to be guided by *Vaastu Shastra* (Srivasthsan 2015). Thus religious impacts on the built environment as a cultural milieu have not only been predominant in the past but are crucial in present too. The effects are more prominent in the Global South. This is a good example where human perception towards abstract form of religion amalgamates with something as tangible and practical as a building, a square, or a neighborhood. Temple towns are common in India and in some of the Southeast Asian countries. Today the design of these built environments, edifice of frozen human imagination and perception, serves to attract pilgrimage and tourism, boosting the economy and encouraging the heritage value in the developing nations.

Cultural heritage is often associated with architecture of a place along with many other ingredients which blend with entities of ethnography and other natural assets. Many of the cultures and communities of Global South have embraced natural resources, flora, and fauna as a part of their living and culture. This has percolated to the character of the built environment as well. Contrary to so-called conflict with nature as have been the case, postindustrial revolution in the developed nations, the developing countries have learnt to coexist. The harmony resulted in resilient and sustainable solutions instead of aggressive natural devastation. Chapter 18 with the title "Co-existence – migrated settlement redefining cultural heritage" based on a case in Bangladesh elaborates this further. This chapter is unique and puts up a case where the concordance of human settlement and buildings with hills, harbors, and forests has been investigated, to the extent of considering interactions and encounters with the wild animals. The particular tropical region is home to large mammals like Asian elephants. These giant beasts often explore into human territories and built forms, causing unintentional damage to the buildings, crops, and livelihood. The residents of the settlement have combined their wisdom and cultural values and weaved them into the design of their mud houses, so that it can resist the elephant attack in a passive fashion. It is a matter of perception towards the situations and solutions through design of the built, in context to the ecology and environment, that leads to "existence" and "existence" which is primordial to sustainability.

Talking about perception the next chapter focuses on how mindless urbanization, often a drive by the "West" later transformed into cultural and economic overburden of the Global North, victimized the Global South in terms of loss of identity. Place identity is governed by "imageability" which is related to a two-way process: one, the user or the audience perceives built form based on the experience and cognitive capabilities, and the other, where the built spaces are designed to reflect the cultural values and make it congruent to the perceiver's cognitive choices. Both cases are very sensitive and fragile to externalities of cultural cross pollination and technological advancement such as advanced information and communication systems of

telephone, the Internet, etc. Urbanization process has also brought into massive use of such systems, thus "altering the perceptions of culture" – the title of the Chap. 18 banks on this phrase. This chapter deep dives into architectural style that has balanced the indigenous knowledge system with the modern forms and in other words semantically differentiates and reunites the perceptual concepts in built environment, where there are certain things which are indigenous and others which are modern. In many of the Global South this dichotomy prevails, where postcolonial era, there has been introduction of the "modern" which was hitherto unfamiliar in contrast to indigenous practices and styles. Over generations there had been transition of these alternations into the population of the developing nations (Madeleine and Lee 2007).

A noticeable turning point in terms of demographic data of the Global South is related to gerontology, which deals with the aging population. Not too long ago, in 1975, the developed countries housed majority of the world's elderly people. Today this scenario has flipped making the Global South the home for the most elderlies. By 2020 this shift is predicted to reach 67% by the UN which is equivalent to double the population of the entire North America. The rate of this growth is faster than that of the rate of overall population increase; hence the proportion of aged persons in world population would sharply increase. And the trend of such growth is thrice larger for the Global South compared to Global North (Shrestha 2000).

With such alarming statistics, the obvious question posed today is if the developing nations around the world are ready for accommodating such demographic transferal. Rethinking existing built environment is certainly one of the concerns addressing this issue. Accessible environments are desired which is less accident prone and safe. Chapter 20 discusses the need for this inclusive design process of the built environment by analysis of various strategies adopted for creating urban public spaces responding to the needs of the elderlies in China. There is no other way than to bring gerontological perspective into the folds of urban built environment of the Global South. While these adaptations are essential based on the needs of the changing society, it is also important to look at the spatial limitations in developing countries. Many of these cities are densely nestled with cramped spaces, slums, alleys, and reticulate narrow road networks, with lesser public open spaces. The general populations in most cases do make-shift arrangements and adaptations which are feasible within the physical restrictions and not going too much beyond the legal limits. The story of alleys and living in these alleys of Indonesia in the next chapter would provide a vivid description of adaptive mellifluous simultaneous usage of restrictive physical built environment. The inhabitants have adjusted and accommodated the regular functions of living with the built form they are thrust into. There is a peaceful negotiation, though apparently seen as a urban blight; such settlements and patches are extremely common features of any country of the developing world.

The meandering alleys, with dense settlement around, prowling chaos, and puzzling clutter, often infringed with socioeconomically weaker strata of the city, are not the only symbolism to be related to the urban areas of a developing country. Often the alleys are lined up with havens of history and deep cultural icons. The

walkways not only connect the buildings and the roads but also in a way connect the past with the present. A walk through some of the cities of the Global South is termed to be rich and vibrant owing to the proliferation of life of people and society into public spaces or spilling into spaces beyond the restriction of the walls and buildings. The reverence towards heritage and related tangible assets is rather low in core capitalist regime since there is always an economic pressure exerted to demolish low-rise heritage built form for converting into a lucrative taller moneymaking device. There is a growing need to bring economic sustenance to counter such unwelcome challenges through tourism, heritage management, and other strategies (Ebbe 2009). One such mechanism has been discussed in the Chap. 22 through the usage of heritage walks in the city of Hyderabad in India. This not only serves as a component for cultural tourism integrated with the tourism prospects of the region but also seeps a sense of heritage awareness ingrained in the built environment into the minds of younger generation.

The next three conclusive chapters independently delve into three prominent areas related to built environment, its design, and perception in context to the Global South. With focus on many of the challenges of urbanization in the developing countries, it is obvious that the questions arise in terms of what is the way forward. The changes have been ever persistent, and the dynamics will keep changing with passage of time, but the questions remain on the approach towards the future. The first in the series is to understand the rural as against the urban, in developing country context. This understanding clarifies some of the social and economic juxtaposition which leads to a misleading direction for the developing nations, such has been in the case of Nepal. The perception of the residents and their beliefs and aspirations are key to shaping a built environment and not vice versa. This thought has been analytically presented in Chap. 22, whereas the next takes an outlook to "lively urban spaces." The future urban spaces irrespective of any classification in terms of South or North need to be lively and livable. Without synergy of life into the built environment whether a city or a village, it is no grimmer than a necropolis. Using open spaces and ecological facets, one may create hub of miscellaneous activities and social interests merged into the fabric built forms. A case from Brazil is cited to give more justification to the argument. The third industrial revolution began at the end of the twentieth century, and the digital revolution continues to the twenty-first century. This century is also to witness the culmination of fourth industrial revolution involving cyber-physical systems. In this context, one of the buzzwords which have made strong entry in this century is "smart" linked to the "Internet of things" (Satell 2014). Many of the smart city missions have been strongly patronized in Southeast Asia, South America, and Africa. Hence the string of "smart" in this century binds the Global North and Global South alike, honoring the rise of the Global South. The chapter as a conclusion investigates the latest trends in smart city, as a project for a built environment. The examination has been done in three specific areas, namely, architecture, technology and communication, and sociology of space. The smart cities or rather smart territories are expected to emerge as technologically aided design solutions of the built environment which are more sustainable, in terms

of ecology, economy, and society. Economic and social perspective towards the built is packaged into "perception" (socioeconomic), as an expression in this book.

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