

**REDEFINING URBAN HIERACHY
CASE STUDY BASED ON SABARAGAMUWA
PROVINCE OF SRI LANKA**

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**Degree in Master of Science in Special Planning Management
&Design**

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Sri Lanka

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Science in Special planning management and design

**DEPARTMENT OF TOWN & COUNTRY PLANNING
UNIVERSITY OF MORATUWA
SRI LANKA
JULY 2019**

DECLARATION

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CERTIFICATION

The above candidate has carried out research for the Masters' dissertation under my supervision

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ABSTRACT

With the advent of the liberalized economic culture in 1977 in Sri Lanka, the need for urban development became unavoidable. In such a situation, the role of the urban centers became leverage for the blooming of the country's urban development and plays a vital role in the reduction of regional disparities. Development prospects in each urban center should be clearly understood to harvest benefits from these urban centers as a nuclear for national & regional development. For this purpose, capacity or sustain of these urban centers should be analyzed. Hierarchical order analysis of these urban centers manifest the actual potentials of these urban centers and more prominent for the national & regional development.

The development potential of cities is subject to change over time. In order to gauge the level of development of cities, it is necessary to identify indicators and criteria that are relevant to the current development conditions, identify development trends using these criteria, and redefine the urban hierarchy according to these development trends. Proper analysis of each urban centers leads to gain maximum benefits from these urban centers. Up to now, there is no clear understanding of this hierarchy system in National & Regional physical plans in terms of attributes, factors, and methods used to determine the hierarchical order. So, there is a need to arise to explore the attributes, factors, methods used in the analysis of the hierarchy of urban centers. This study seeks to explore the indicators, factors, and methods used to analyze the hierarchical sequence of urban centers as articulated by urban development.

Sabaragamuwa Province was chosen to define the urban hierarchy which is the theme of this research project. This study analyzes the characteristics and methodologies of the Sabaragamuwa Province of Sri Lanka to assess the potential of "Ratnapura and Kegalle Districts".

Keywords: Redefine; Urban hierarchy; Sabaragamuwa Province.

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1 INTRODUCTION

1.1 Background

Cities are places of socially and technically innovative highly complex dissection of efforts with rapid growing economic accumulation. Thus, cities are experiencing continuous transformation and adjustment to new situations. This phenomenon creates hierarchical order for cities depending on the level of transformation.

Hierarchy of urban is a system composed of economic, political or culturally based systems. It highlights the development of urban centers (Pumain D., 2006). The variety in size is extremely and ordinarily related to the arrangement with corpus determinants, likely the Gross Urban Production of the whole number of businesses or the 'spatial array' and 'influence' of the cities.

Cities to identify potential areas that could be developed in this way in a hierarchy, grading is important. Therefore, in the formulation and implementation of regional development plans, aligning with the urban hierarchy, it is possible to identify the development needs of the area and to identify the undesirable development activities for the area.

The hierarchy was used before illustrating symmetric population distributions (Zip, 1941) rather than city rankings. The latest theories of the hierarchy of cities are used to explain functional diversity (Duncannett, 1960), as well as globalization and competitiveness. The interconnections between cities for various purposes create complexities in the cities, (Reynard, 1841), (Christaller, 1933), (Poomin D., 2006). Although the concept of urban hierarchy is an old concept, it is now used to determine the developmental status of cities in different aspects (jasmina.M. &vito 2015).

According to the urban hierarchy, the city level is identified by comparing cities using different criteria. Based on that can study the development of the city and the economic growth of the city. Increasing population causes poverty. To eliminate this, it is necessary to select the right locations to launch various development projects locally. Otherwise, resources are wasted when launching development projects. Urban hierarchy can be used as a tool to prevent that. It is best to use qualitative data that is relevant to the present.

Urban hierarchy is a process of comparing cities with other cities in terms of development levels. The urban hierarchy is important for understanding the development conditions of cities and as a tool for implementing new development projects.

The levels of these hierarchies are measured from time to time using different components. It is difficult to understand the development potential between cities by interpreting the urban hierarchy according to the criteria previously used. The urban hierarchy, as defined by the criteria used earlier, does not properly understand the development potential that exists between cities...

1.2 Research problem

In this context, important measurements are needed to measure the level of urban development. For these purposes, the three main components (principle of administrative the principle of transport, the principle of market-based.) of the center place theory introduced by Walter Christaller (1933) are important.

Cities' growth, equity, and environmental sustainability are essential for regional planning the indicators used for the currently defined urban hierarchy are not sufficient to measure the current level of development...

The indicators used for the urban hierarchy currently do not match the current level of development. This is a problem to accurately measure cities.

Therefore, we need to identify appropriate indicators for measuring current levels of development resulting from the change in global development status. According to that criteria rearrange urban hierarchy.

Natural disasters such as floods; landslides could be minimized due to unnecessary development. Moreover, the urban hierarchy helps to develop the development plans of the urban centers.

An empirical examination of urban hierarchy in Sri Lanka is the subject of this research. In the Sri Lankan context, characteristics and systematic approaches define the hierarchy of town centers. To promote urban development, development activities can be compared to other urban areas. (Indrasiri, 2001) But it is best to study the hierarchy among small-scale cities in the competitiveness of the size of the urban centers' hierarchy.1). For this determination, generally, urban areas have been analyzed in a hierarchical order in preparation of national and regional physical plans. The importance of urban hierarchy was raised to promote urban development in National & Regional context. But size-based Indication of urban centers hierarchy has been analyzed and criticized ever since the urban systems have been identified as a complex network. But it is best to study the hierarchy among small-scale cities in the competitiveness of the size of the urban centers' hierarchy.

Due to the unorganized urban pattern, it is necessary to select suitable cities for implementation of development projects in the Sabaragamuwa Province. Therefore, it is necessary to develop a suitable urban hierarchy to identify the potential cities that suit each development. This enables cities to identify the top of each hierarchy and develop urban development plans accordingly.

The urban hierarchy can also be used to minimize the damage caused by development projects in areas where there is no development potential in this environmentally sensitive province. This will enable existing urban, economic, social, environmental and culturally potential cities to interact with the provincial level and strengthen the national level by strengthening the provincial level.

Due to the competition in the economic, social and cultural development of the city in the recent past due to the various settlements and urban settlements in the Sabaragamuwa Province, the changes in the urban structure of the city and the provinces should be studied. It requires studying and selecting appropriate methods.

Based on the interconnectivity/competitiveness of cities, it would be best to study the spatial hierarchy of these cities using the central location approach and other competing criteria.

Because the study of the existing spatial hierarchy of town centers is very dynamic for regional planners for regional development. Thus, there is a need to explore the indicators, factors, and methods used in the analysis of the hierarchy of town centers and observe the changes among that natural urban hierarchy and competitiveness in the urban hierarchy. Sabaragamuwa Province was chosen to develop an urban hierarchy using new indicators and coating it.

Sabaragamuwa Province, the eighth largest province in Sri Lanka, belongs to the Environmentally Sensitive region, according to the National Physical Planning Department. Environmental sensitivity in this area is frequently affected by natural disasters such as landslides, floods, Land sliding, land subsidence. As a result, many people in the province migrate to urban areas as safe places to settle. The expansion of urban centers has resulted in changes in the spatial structure of the cities in the province. It is, therefore, an opportune time to do an empirical study of the hierarchical ordering of urban centers and redefine the urban hierarchy for the Sabaragamuwa Province.

It consists of two districts, Ratnapura and Kegalla. Ratnapura is the capital and largest city in the province. It consists of one Municipal Council and three Urban Councils and twenty-six cities. The total population of the province was 1,918,880 according to 2011 census data. It is the fifth most populous province in Sri Lanka. It has a population density of 390 per square kilometre. The province ranks fourth in poverty (15.8%) among all provinces. Therefore, there is a need to implement various development projects to enhance the development of the province. Similarly, sustainable development must reduce the disorganization of cities and formulate urban development plans. For this purpose, urban development plans in the Sabaragamuwa Province need to identify urban development levels. There is no urban hierarchy in this province that is tailored to current development levels. This requires an urban hierarchy adapted to the current development level of the cities of this province.

1.3 Objective

1. To find out indicators for defining the urban hierarchy in a region.
2. To redefine the urban hierarchy in Sabaragamuwa province

1.4 Research Questions

1. What are the major changes in the existing city hierarchy?
2. What are the alternative indicators used in defining urban hierarchy?

1.5 Scope and Limitation

The study primarily pays attention to imaginary and theoretical attitude to recognize the characteristics which define the spatial preparations of town centers and the ways and means used in the investigation of the hierarchical order of town centers.

In this study, data has been collected based on Divisional Secretary Divisions. The accuracy of data may have been improved by collecting them based on GN divisions. But, non-availability of such data has led the researcher to resort to this alternative. Hence, it generates a problem in assembling the most recent data of the study area.

1.6 Methodology

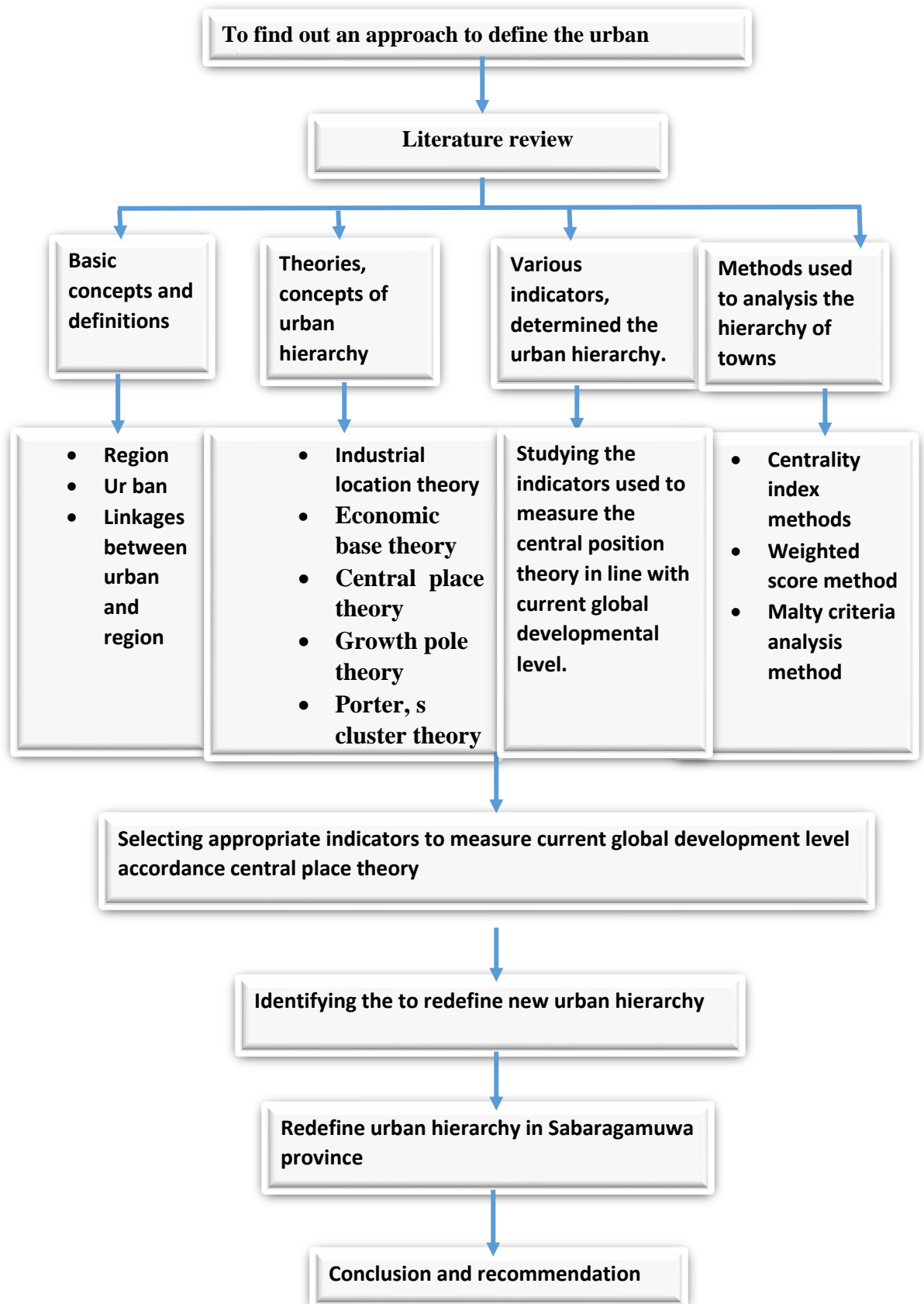


Figure 1: Methodology of the Study ,Source: Compiled by Author

2 LITERATURE REVIEW

2.1 Introduction

This chapter focuses on some theories and ideas that have been developed to explain urban hierarchy and urban competitiveness. All these studies contribute to an understanding of how urban hierarchy changes with the consequences of competition among urban centers.

This chapter presents Alfred Weber (1909), Walter Christaller (1933), Peroux (1950), Hoover (1948), Losh (1954), Potter (1990), and several other qualities developed by various people. Also, this chapter discusses the quantitative methods used to analyze the hierarchical structure of urban competition.

The purpose of the research is to study the hierarchical directives in the cities of the Sabaragamuwa Province, based on the theory of focal point theory and competition, to find a better spatial hierarchy in these cities. Regional development, studying the spatial hierarchy of regional centers, is important for regional planners to investigate the elements and factors involved in these hierarchical directives.

The terms city centers, the concept of spatial hierarchy, the theory of urban competition and the factors determining spatial hierarchy and urban competition are analyzed. In addition, the method of analyzing the spatial hierarchical ordering of a region was identified to analyze the appropriate spatial layout of cities in Sabaragamuwa Province.

2.2 Basic Concepts and Definitions

Understanding the basic concepts and definitions for studying the role of urban hierarchy in development is inevitable. As this section focuses on the urban assessment of urban hierarchy in the Sabaragamuwa Province of Sri Lanka, the need for this study discusses the concepts and definitions of region, regional planning, urban and urban hierarchy. It is important to note that the province is considered a region in the formulation of a regional physical plan, and the origin of the hierarchical system was drawn up with regional physical plans before the introduction of the Department of National Physical Planning in Sri Lanka.

2.2.1 Definition of region

For years, the concept of the region has been largely used and ignored. There are many controversies and arguments about its meaning. Zones are a means to an end rather than an end in itself. It varies according to the objectives, political decisions and administrative consequences of the decision makers. Zones are seen as detailed tools Glasson (1978), Peter Schmitt (2010).

Development must be internalized in a region that allows significant changes in the distribution of population and employment within its boundaries. States, the physical size of a region, can reach all parts of it from the center, and the center can be restored within a day with enough time to work (Kibel (1969)). Areas can be classified as a formal zone and a functional zone based on a single or multiple criteria. Formal zones, characterized by a common human property, are defined in terms of homogeneity. Ex: State institutions, states and provinces are defined by a common political identity. An active zone is a geographical area that indicates some functional correlation, interdependence of parts; Define based on specific criteria. Formal zones are described using the weighted index number method and factor analysis method. Functional zones are described using flow analysis method and gravity analysis method. Glasson, J., (1978) by Peter Schmidt (2010).

According to the definitions above, a region is a territory that is defined by a large area, defined by physical boundaries or other criteria.

2.2.2 The need for regional planning

Formal or informal active region combinations result in a third classification known as design zones. Planning zones are geographical zones suitable for planning and implementing development plans to deal with regional issues. From a regional planning perspective, a planning zone must be large enough to make economic and investment decisions; Klassen (1965), overall, believes the planning area is too small to see problems, Keeble (1969).

In the global context, two regional issues have arisen. Namely, the problem of congestion and the recession. The need for regional planning arose to overcome the problems of populated areas. There are two types of regional planning, namely, inter-regional planning; Consideration of resource allocation between regions. And inter-planning; It is the allocation of resources between sub-regions of the region. Glason (1978). For populated regions, it emphasizes the control of the workplace and population. Glason (1978) Peter Schmidt (2010) concerns the industrial development of the recession zone and allows its free growth.

Regional planning is important in order to minimize the development potential in the area and to promote the proper development of the areas.

2.2.3 Definition of urban

Urbanization is defined as the growth and cumulative activity of the people in areas known as urbanization. It is the cause of the socio-economic development of a country.

The number of urban and urban centers in a country based on the accepted meaning of urban, the source of the urban hierarchy, is different from what countries in the global context refer to "urban" Palen, J., (1997), scroll (2017). An urban settlement is defined on four criteria: culture (based on urban culture), political status (based on

administrative functions), economy (based on the percentage of people engaged in non-agricultural activities), and demographics (depending on the size of the population). As Table 1 shows the definitions adopted by different countries for the definition of urban.

Table 1: Definitions adopted to define “Urban” among different nations

Country	Definition of an urban area
Canada	An area where the population density is higher than 400 people per square kilometer, and where the number of populations passes 1,000. The boundaries of an urban area do not consider municipal or provincial boundaries.
China	An area where the population density is lower than 1,500 people per square kilometer. It can be an urban district, a city or a town.
Australia	An area where the population density is equal or higher than 200 people per square kilometer, which is also an ‘urban cluster’ with 1,000 or more people.
Malaysia	Formally designated areas with populations of 10,000 or more
Pakistan	Places with a municipal corporation,
Sri Lanka	All municipal and urban council areas
Republic of Korea	Any amount of population living in designated cities.
Thailand	Municipal areas
Japan	A city (‘shi’) is host to 50,000 or more, with 60 per cent or more of the houses located in the main built-up areas and 60 per cent or more of the population (including dependents) engaged in manufacturing, trade or other urban type of business. Alternatively, ashi with urban facilities and conditions as defined by a prefectural order is considered as urban.

Source: -<http://www.en.wikipedia.org>

United Nations (1971) has recognized five main measures to differentiate between urban and country areas specifically:

- Population size
- Administrative states
- Local government areas
- Urban characteristics
- Predominant economic activities Jester (1999)

Table 2- Urban population according to size of towns in Sri Lanka (1946 – 2001)

Year		Towns				Intermediate size Towns		Cities	Total
		Below 2000	2000 - 4999	5000 - 9999	10000 - 19999	20000 - 49999	50000 - 99000	100,000 &Over	
1946	No. of Towns	3	9	7	13	5	4	1	42
	Population	3601	28,386	55,874	1,745,981	1,771,231	2,213,88	362,074	1,023,044
	% of Total Urban	0.4	2.8	5.5	7.1	7.3	21.6	35.4	100
1953	No. of Towns	3	8	4	15	6	6	1	43
	Population	4,062	28,338	26,691	213,150	154,727	383,038	426,127	1,239,133
	% of Total Urban	0.3	2.3	2.4	17.2	12.5	30.9	34.4	100
1963	No. of Towns	9	21	23	21	18	5	2	99
	Population	15,342	74,681	158,280	278,153	487,986	379,265	622,578	2,016,285
	% of Total Urban	0.8	3.7	7.6	17.5	27.5	14.4	30.9	100
1971	No. of Towns	6	32	30	34	25	5	3	135
	Population	10,819	104,095	215,846	499,561	781,874	411,311	823,798	2,848,116
	% of Total Urban	0.4	3.7	7.6	17.5	27.5		28.9	100
1981	No. of Towns	3	28	28	35	31	3	6	134
	Population	5,173	90,518	199,189	511,138	976,957	195,094	1,216,830	3,194,899
	% of Total Urban	0.2	2.8	6.3	16	30.5	6.1	2.8	100
2001	No. of Towns	3	2	6	8	17	5	6	47
	Population	1215	8,526	47,237	116,636	545,665	370,385	1,376,805	2,466,469
	% of Total Urban	0.05	0.34	1.91	4.72	22.12	15.01	55.82	100

Source-population and housing department

According to National Census 1981 the definition of urban population residing in MC, UC, and TC areas, but in 1987 PC system amalgamated TCs and VCs as PSs which have been considered as rural according to above table.

According to the UDA Law No.41 of 1978 all the definition of urban centers covers the Municipal Councils (MCs), and Urban Councils (UCs) areas, which is shown in Annexure 01, Mendis (1982).

Urban centers are generally wider and more sophisticated in secondary (product) and tertiary (service) activities, creating more sophisticated markets that are consumer oriented. Analysis by NPPD in the formulation of the urban hierarchy in 2000 shows that there are about 300 urban centers of various sizes across the country.

Accordingly, by 2030, 65% of the urban population is expected to expand in these urban centers. NPPD, Indrasiri (2001)

A city can be described as a populated area that is sustainable and integrated with modern technologies apart from rural features.

2.2.4 Links between urban and regional development

In the context of Sri Lanka, the role of urban centers under the settlement policy has been recognized in the formulation of the National Physical Plan. NPPD (2001), UN HABITAT (2012).

This urban center network will support human settlements in a hierarchical manner, with several consequences for regional physical planning. Adedeji O.H (2011), UN HABITAT (2012).

Urban settlement plays an important role in regional development. Several studies have shown a close link between urbanization and socio-economic development. Indrāvati.M.S.(2014). The hierarchy of urban centers therefore promotes the development and efficiency of growth in all regions of the region by increasing the potential for job creation and increasing the income level of the people Singru R.N. (2015).

According to the hierarchical structure the necessary social and economic services will be provided for the population within the specified catchment area and for the required threshold population for the efficient functioning of the urban system, center for economic research (2013).

Because of the regional imbalance need for regional plan emerged Manda M.A.Z(2015), Glasson (1978) said in a backward region needs a city high in the National Urban Hierarchy to plug into the national communication network for innovation and information flow.

Some regions need injection of investment because of imbalance compare to other regions new form of infrastructure, industry provides catalyst for the particular regions economic growth in this consideration urban hierarchy decides the priority Manda M.A.Z(2015),.

Mendis (1973) shows, there is a necessary to conceive that agricultural development can't be separated from other sectors of the economy therefore in a region not only the village and town centers but also the higher order urban centers also have to be established.

By designing a development oriented hierarchical structure of urban centers it believes to achieve rational, integrated, comprehensive and orderly development in Sri Lanka through development management, and delivery capacities of those urban centers, there by achieving a balanced growth World Bank document (2015). Urban centers are the engine of growth through appreciates the investment for industrialization at different levels according to its role, for the future development and special dimension of the national and regional development of the country, World Bank document (2015).

2.2.5 Concept of Urban Hierarchy

In the global context of physical planning, urban centers are classified into a hierarchical structure based on several criteria. These hierarchies in urban centers play an important role in achieving rational, synergistic, and comprehensive urban development through design, development management, and service capacity improvement. It is clear that Chrysler's hypothesis of a hierarchical knowledge of city centers has given considerable attention to the examination of one genuine relation

between cities. Edward JT, (1962) Guides'. Costa.S. Brondizio.E. (2012). below are some definitions that have been adopted to define the urban hierarchy.

Neo- classical economic models are certainly to be found in this verbal point, assuming that the mid-periphery, from the big city to the other cities, is in decline. (Nelson, 1993). In minor, rebellions and evolution are identified as dispersing from major urban centers, descending through minor centers and into the rural periphery. Defines the UN-adopted definition based on the size of the population; In the lowest form of the urban hierarchy, the population consists of more than 20,000 cities.

Intermediate urban centers with over 100,000. The population of large metropolises exceeds 500,000. Different countries categorize the hierarchy of urban centers based on different criteria:

There is a close correlation between urbanization and socioeconomic development. Urban settlement plays an important role in regional development. Therefore, the hierarchy of urban centers plays an important role in enhancing the growth and efficiency of job creation and the income level of the people in every city in the region, Fang. Liu.H, Pang B (2017).

Table 3- Hierarchy of urban centers in different countries

East Africa		China	
Urban Centres	Central Function	Size Category	Population
Major Urban Centre	International & National whole sale and retail	Metropolis	over 1,000,000
Port Centre	Retail and whole sale with bulking	Large cities	500,000 - 999,999
Market Centre	Retail and whole sale with bulking	Medium - size cities	200,000 - 499,999
Local Centre	Retail and bulking	Small cities	50,000 - 199,999
		Country Town	40,000 - 49,999
		Market Town	3,000 - 9,999

Republic of Malawi			India	
Order	Term	Centrality	Size category	population
1st	National Centre	High	Class 1	100,000 or more
2nd	Regional centre		Class 11	50,000 to 99,999
3rd	Sub - regional centre	Intermediate	Class 111	20,000 to 49,999
4th	Main market centre		Class 1v	10,000 to 19,999
5th	Rural centre	Low	Class v	5,000 to 9,999
6th	Village	No centrality	Class v1	5,000

Source: – Compiled from literatures

According to the hierarchical structure, the city provides essential social and economic services to the people who feed the city and provides the city with the goods and services needed for the efficient functioning of the urban system, David A smith. (2005).

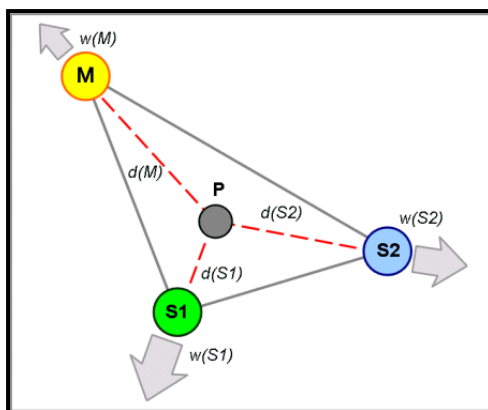
Considering the region's imbalance, the need for the service of a city at the top of the national municipal hierarchy is crucial for the network to communicate with the national communications network for information flow in lagging regions, Glasson (1978). Due to the imbalance compared to regional infrastructure, investments in some areas need to be promoted. Therefore, urban hierarchy is important as a catalyst for determining the priority of industries in regions, Glasson & Marshall. (2007).

Agricultural development cannot be separated from other sectors of the economy. Therefore, not only villages and town centers in a region but also urban centers should be established. A development-oriented hierarchical structure of urban centers will enable integrated, wider development in the country. It should be designed with development management and development capabilities for those urban centers and ultimately balanced growth. Urban hubs are the engine of development that contributes to the future development of the country's national and regional development, through the industrialization of various levels of investment and spatial development, Mendes (1973). According to the above concepts and definitions, it is clear that urban centers need to be identified in order to solve problems in a country's zones and that these problems can be solved by regional planning. On view. Since not all urban centers can be developed at the same level, it is important to analyze all these urban centers hierarchically according to the size of the urban center.

2.3 Theories and Concepts

The contribution of theories and models is crucial for describing the spatial setting and pattern of cities. These theories focus on the macro-level picture of places, and they increasingly regard land-use economics as the main determinant of locations. Accessibility is the key factor in determining locations. The following theories and models are important for describing the central development of a city and its relationship to cities, as well as for building an urban hierarchy.

2.3.1 Industrial location theory



P – Optimum Location
M – Market
S1, S2 – Material Sources
W (M), w(S1), w(S2)– Weights of inputs & outputs
d (M), d(S1), d(S2) – distance between location, input & market

Figure 2: Theory of industrial location

Source: An Introduction to Regional

Alfred Weber was the first person to formulate a comprehensive theory of industrial location in 1909. Weber considered three factors that affect industrial location: transportation costs, labor costs, and cumulative or canceled factors. The distance between locations is directly proportional to the cost of labor and the cost of transportation. The advantages of accumulation include the development of a skilled labor pool and the establishment of excellent services. The Webern model has been criticized for some of its assumptions

Hoover (1948) elaborates the Webern model and divides it into cost transport and production; He assumed that the cost of transportation varies according to the composition of the goods involved in the length and direction of transport. Losh (1954) understood that the optimum position is the highest earning point. In practice, the optimal profit maximization point may not be the lowest cost or maximum revenue point, Glason (1978), (Dobis, Michael S. Delgado, Raymond JGM, Floraux, and Peter Mulder, 2015). While the urban hierarchy is not described, the development of the center of gravity is somewhat explained

2.3.2 *Economic base theory*

According to the economic foundational theory, the size of city limits depends on the amount of property and facilities provided to the city. Thus, the growth of an urban area is a response to the industrial development of the area. According to the theory above, urban economic activity is divided into two parts; Ie. Production of goods or services that are "exported" as primary economic activity and outside the domestic economy. This theory implies the relationship between basic activities and non-core activities. Also, there are many criticisms of this theory, its assumptions, and the general principles underlying it. Elizabeth A., p. Dobis, Michael S... Delgado, Raymond J.G.M. Florax and Peter Mulder b, 2015. Therefore, it is clear from the above theory that only the factors that determine the size of a city are important in creating the urban hierarchy.

2.3.3 *Central place theory*

In 1933, Walter Kristler attempted to establish the spatial properties of economic laws and the geography of settlements, and tried to describe the size, number and location of cities in a region, and introduced the why-center theory to study It., planning tank, (2017).

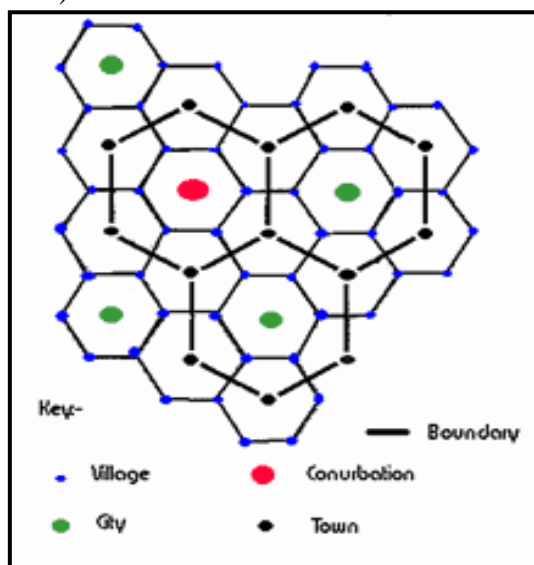


Figure 3: Central Place Theory

Source-<http://www.csiss.org>

Christaller has prepared a number of molds such as areas with, (assumptions),

- An isotropic (flat) surface
- An evenly disseminated population and resources
- Similar consumer's behavior
- Transportation costs equal in every direction and proportional distance
- No excess profits (Perfect competition)

He then outlined a valuable idea of the range, which is a key part of the theory. The exact distance that people have access to better than the focal point is known as the range, planning tank (2017).

Christaller has noted three dissimilar preparations of central places according to the following principles.

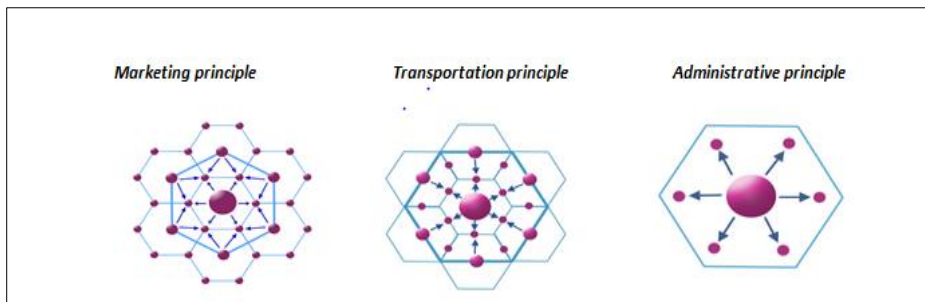


Figure 4: Principles of central place theory

Source: An Introduction to Regional Planning

- **The Marketing Principle (K=3 system)**
- **The Transportation Principle (K=4 system)**
- **The Administrative Principle (K=7 system)**

The Marketing Principle (k=3 system)

The purpose is to serve large numbers of customers with one nucleus. After regulating the 3s, a customer who is within the same distance from the three hierarchical advanced locations of the sales model can obtain goods and services from any one of these three locations. - $K = 3$. (Christaller, 1966). Each development center receives $1/3$ of each sub-development center (6 of them), thus $K = 1 + 6 \times 1/3 = 3$.

The Transportation Principle (k=4 system)

In the mode of transport, the goal is to reduce the network distance and maximize the connectivity of the hubs. To reduce transport costs, a different model of $K = 4$ carrying the hexagon is proposed. The settlements are then placed at each point at the midpoint, and each turning point serves a large number of neighboring hexagons.

The Administrative Principle (k=7 system)

In the model of Administrative, the aim was to produce the hierarchy of controls, where the minor level hubs are fully organized or administrated by the high order places. Christaller's other organizing principle was based upon from a political or administrative perspective, where it might be unrealistic for the centers to be 'shared'.

Those centers were referred as K=7s.

The theory assumes Uniform plain and even distribution of resources. But of course, settlements may develop due to the localization of natural resource. In some area this can be applicable, but in other areas, resource localization distorts the regular hierarchy. The theory also assumes uniform distribution of population. However, this does not seem to be practical as the depending factors of population density (ex: soil fertility, climate) vary from place to place. The Final problem is ranking central places. This involves the dual problem of the actual identification of central places (which may be confused with the problem of sprawl) and the choice of criteria to rank the centers.

2.3.4 Growth pole theory

The *growth pole theory* was developed by Francis Perroux in 1955, who thoroughly believed that the 'growth' does not appear everywhere at once; which is appearing in point wise or development poles with variable concentrations. Booneville (1966) extended Perroux's original theory and included more spatial dimensions. Parallel to this theory the concept of growth center also illustrated. According to the (Fox, 1966) it has clear development hubs to a city place which also can act as a 'Central Point' for Development Planning. The difference between the uses of the theory is, the growth poles are required the development of a selected industrial focused propulsive firm from leading industries, the center policy involves the concentration of investment in a chosen location of those facilities which will create urbanization economies that are attractive to industry. Furthermore, Perroux and other authors on "Growth Poles" attempt to prepare the base of the idea on the philosophies of the exterior economies, compression and relations. This concept has been of only peripheral position in considering local trade and industry problems. However, the concept of 'growth pole' has got a main part in expressing the policies. (Frank Modular, 2010)

2.3.5 Porter, s cluster theory

and the link between cities. In the development and development of cities, this same relationship has been transformed into a competition between cities, Athanasios K. & Papantoniou G (2017). Porter provided this simple framework for measuring and evaluating the competitive strengths and status of a business association, Magretta J (2011).

He was built this theory based on the concept that there are five forces that strong-minded the competitive strength and alternativeness of a market. His five forces important to recognize where power lies in a commercial location. This is very valuable both in accepting the asset of an institution's present competitive situation, and the asset of an institution may look to move in to, Swords J. (2013)

Strategic forecasters habitually use his power forces to recognize whether original products or services are potentially lucrative. Through accepting where power lies, the

theory can also be used to recognize spaces of forte, to develop faintness and to avoid errors.

Porters Five Forces of Competitive Position Analysis

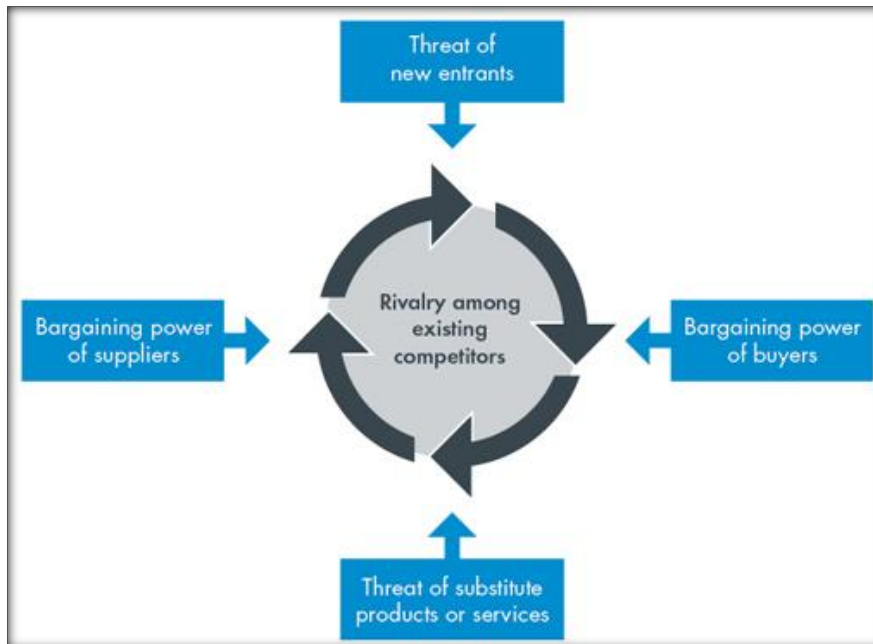


Figure 5: Rivalry among existing competitors

Source-Essential tool for management accountCGMA,2013

The five forces are:

- 1. Supplier power** –according to this factor, number of suppliers of each essential input; individuality of their product or services; comparative size and strength of the provider to another.
- 2. Buyer power**- Number of buyers, in the market; importance of each individual buyer to the organization; price to the buyer of switching from one dealer to another. If there are new powerful buyers, they are often too able to dictate period.
- 3 competitive rivalry**- The key chauffeur is the amount and possibility of competitors in the market. A lot of competitors, posing identical products and services, will decrease market attraction.
- 4. Threat of substitution**- As a consequence of substitute products insert to the market, it increases the probability of customers moving to alternatives in reaction to price rises. This decreases both the power of suppliers and the attractiveness of the market.
- 5. Threat of new entry**- lucrative markets entices new competitors, which corrodes probability. Except occupants have forceful and assured hurdles to entry, for example, patents, economies of scale, capital requirements or government policies, and then productivity will decline to the rate of competitive.

Advantages	limitation
* Recognize the factors carrying out likelihood in a specific industry	*hard to determine market with advanced competition dynamic because they can change speedily.
*helps to notify decisions connecting to 1 whether to enter a specific industry 2 whether to increase capacity in a specific industry	*nowhere to be found care to 'Digitalization', 'Globalization', and 'Deregulation'
* Developing competitive strategies.	

Source: Fabian Dalen (2014), Lawrence E. (2012)

2.4 Attributes Determine the Urban Hierarchy

Following table depict several attributes which determines the urban hierarchy, which have been considered by the above theories.

Table 4- Attributes Determines the Urban Hierarchy Considered by Theorists

Theory	Explanations of Attributes
Central place	Service Activities Threshold Population Market range
Growth pole	Leading industry Location and facilities External economies Agglomeration Linkages
Economic base	Amount of goods & Services supplied to outside
Industrial location	Advantages of Agglomeration
cluster	Quality and quantity wise natural resources Human resources Capital resources Infrastructure Physical infrastructure Information infrastructure Administrative Scientific and technological infrastructure

The theory of 'Central Place' replicas and accepted the position of urban competitiveness and the use of interdependence. But from few researches and previous studies have directly understood and examined the relational factors focusing on population size as an optional indicator (Garrison, 1960). A lot of experimental evidences regarding the central place hierarchies are proving that, larger cities were having larger tributaries and were being more complex in their inter-relationships on

demanding and supplying goods and services (Berry & Garrison, 1958). Thus, central place model was theorizing a network-based urban hierarchy, where the major empirical applications were done accordingly, instead of basing a size-based hierarchy (Preston, 1971).

Espousing these conventional and traditional form of the theory, marketers (e.g. Reilly, 1929), geographers (e.g. Berry & Garrison, 1958) and sociologists (e.g. Schettler, 1943) has gathered a large and strong evidences signifying that, urban functions were formed according to a 'size-based' urban hierarchy. Although, this concept has received widespread attention as well as empirical backup (Berry & Pred, 1965; Mulligan, 1984), it was also being criticized for ignoring the role of networking which are highlighted in previous studies and forms of central place theory. Also, Christaller has identified that indicators of inter-city networks such as telephones, should be preferred to the attributes as population size as measures of central place's status (Ulman, 1941).

'Urban ecology' represented one of the earliest returns of an open-relative approach to urban hierarchies. By looking on cities as they having compound connections of inter-dependency with each other, which are more like 'living organism' it required to move farther more simple and top-down relationship of central place to hinterland (where larger cities are dominating smaller cities). Many studies which are focusing on technological inventions in transportation as a substance to a principle of competitive exclusion as the regular technique basing this modification. The general concentration of the space, increasing fluidity of the products and the effect of intensifying inter-city competition a bringing variety of inter-city in inter-regional divisions of labour. These suggestions were sophisticated and empirically examined by Duncan and his colleagues, who found an urban division of labour, in which occupation (Duncan & Reiss, 1956) and industries (Duncan et al., 1960) were sorted with cities based on their bigger roles in the interdependent urban system (integration, coordination versus production and extraction).

Although McKenzie and Duncan's outsets of urban hierarchy clearly sketched on concepts of interdependence an urban network, empirical investigations tend to depend on some indicators such as population size (Duncan & Reiss, 1956; Duncan et al., 1960; Wins Borough, 1959). Thus, the central place models, in theoretically inter-urban relationships are recognized as critics where in the practice they do not appear in real ground accounts of urban hierarchy.

The concept of size-based urban hierarchy was also criticized by Vance (1970) who observed the central place model's use only suitable for closed and self-sufficient (endogenic) urban systems which are more like those who got emerged under feudalism. When advances and inventions in transportation technology was accommodating the spatial separation of production and consumption, commercial activities in the form of wholesale and retailing, where he was arguing these cannot be explained using a pure spatial model. That is where a size-based urban hierarchy might be able to demonstrate "where the farmer goes in his Saturday marketing", it cannot "account for the destination of his Hogs" (Vance, 1970; pg. 162).

To overcome this shortage, he has proposed a 'Mercantile Model' in which 'Dominant Cities' (i.e. those at the TOP of the Hierarchy) emerged with both natural and built transportation routes and to originate their economic moves from long

distances, inter-regional trading relations which being facilitated. Within this network of 'Trade and Transportation' secondary cities fill the gaps following a central place patterns with their economic moves resulting intra-regional exchanges with dominant hubs. Empirical evidences were provided a supportive ladder for these concepts demonstrating, the late eighteenth century main U.S cities been integrated into an urban hierarchy which structured by information networks (Prod, 1973), transportation (Cozen, 1975), capital (Cozen 1975) and bank correspondents (Cozen 1971).

The size-based central place model offers an incomplete understanding of how cities are acquiring their unique economic moves while the size-base urban hierarchy describes the circulation of some urban functions such as retail goods and services. It is describing about the distribution of other urban functions likely trade or finance which depend on long-distance interactions as well. Thus, their criticism of central place theory does not pursue either propose the replacement of a size-based urban hierarchy with a networked platform, rather their simultaneous examinations with each different domains of urban economics which encourage competitiveness between cities.

To comprehensive the importance of the town centers for urban development, the analysis and the forecast of the hierarchical structure should be effective bearing in mind the existing development and future changes.

The population size develops the main subject of spatial hierarchy studies, for the reason that demographic data area more comparatively accessible from statistics. Also, the population density specifies convinced aspect of competence for urban services. Also, he designates the location factors and accessibility must be examined not as an end in itself, but as a tool for recognizing current and possible facility and growth centers. (Shahi, 1984) west (2014), (Ladislav Novotný, Stela Csachová, Marián Kulla Janetta Nestorová and Dická, Loránt Pregi in 2016.

It is expected that the economic growth would occur with appearance of an extremely developed and consistent hierarchy of urban centers, where the development is comparative to the size of the collection (Friedman, 1986; Kresl and Letri, 2016) Green & Carruthers (1966, 1957) have bid to delineate the effect of a center, using bus services as needles of economic connections, therefore he was select the most economic routes which reflect the areas of highest demand and functional linkages with the main center. Journal of Transport Literature (2016) also described that. Allowing to Dickson (1964) in his early work in East Anglia, conventional a define hierarchy of towns consuming bus route data and information at the regional scale. In preparation of NPPD hierarchical structure of the urban centers worked out by analyzing the functional circulation pattern, Indrasiri (2001). Following are the attributes can be derived which determines the spatial hierarchy.

Population size

- Connectivity and accessibility
- Economies of scale
- Location of functions
- Positive externalities
- Accessibility to infrastructure
- Local government state
- State of educational institutions
- State of health institutions

Population size

Population size normally mentions to complete or comparative number of populations. Dias (1982), International Journal of Population Research Volume 11. (2011), shows the size population is sufficient for the enough of the service in the central place. Although threshold not challenging that service, transport links, consumer behavior pattern, availability of other services and collection economies play big role in location of specific service at that center.

Connectivity and Accessibility

Knesl (1982) specified, connections play an important role in regional growth which permits growth impulses to flow from the margin and their products flow to the core region. There is a large connection among transportation cost and higher rate of outward economy, specified by Hillier (1996), David Levinson (2012).

Economies of Scale

Economies of scale determine the source and long nourishment of a city or town. It is linked to three facets; Externalities, factor mobility and economies of scale. Economies of scale determined by threshold population, space to grow and connectivity (Wen-Tai Hsu, 2016).

Friedman (1986) assumes that the economic development would happen, if there is a salient of an exceedingly developed, interrelated functional hierarchy of towns. Moreover, he assumes that such growth of a hierarchy is proportionate to the size of agglomeration. Stefanie Knoll (2014) also explain about this.

According to Henderson (1974, 1988), between two forces, there is a tension. When applying this to cities, the two forces can be identified as the external economies associated with the agglomeration of firms within a city, and the diseconomies generated in order to commute in a more or less large city. Hierarchy depends on the type of firm's city accommodates, because with the differences in the industry, the sizes become different, creating differences in the external economy. Munasinghe. J (2005) defined standard for a good spatial form process for a medium scale town which define the growth of urban areas such as "economies of scale, external economies, compact transporting cost, and space to grow". It is important because these factors have influence in determination of future hierarchy of urban centers which was examined by Chuangin F, Danllin Y, 2017.

Threshold Population

Munasinghe.J (2005) specified, threshold population is the smallest amount number of people that is needed to support service activities. Cumulative of population growth the threshold level of a particular activity and entices large amount of other activities in the city midpoint. (Yang Wei, Cui Huang, Patrick T. I. Lam, Yong and Yong Fang 2015).

Location of Functions

Indrasiri (2001) shows, size of the urban area are decided by the number of activities situated within it. Virtually location functions of administrative institutions are important in determining hierarchical pattern which attracts complementary activities for the evolution of the urban areas. Gilvan Guedes, Sandra costa, Eduardo Brondizio (2012), Fang meng, Tongqian Zou, Hengyunli (2016) also define that.

Urban Competitiveness

Using heartening the adaptation of possible economic improvement techniques and by improving total presentations urban competitiveness contributes to the city development. As per the previous findings, many scholars have explored urban competitiveness principally from an economic view while some have explored locational conditions as indicators that may influence on local industrialization and urbanization. Urban competitiveness can be identified and defined as the capability to attract production factors, utilize the environment and resources, develop the industry, produce enough goods and services, capture the market and create large fortunes in an increasing an effective manner. And in the process of competition, corporation and development supply welfare to the citizens in contrasting with other cities.

Also, there are few researches done with the special focus on the competitiveness of the speedily moving cities and their evolving economies. In 1989, the first world competitiveness yearbook rankings (WCYR) was confirmed and in the present with 20 years of experience it has been composed to 331 evaluation criteria and 52 companion institutes that procure data and information about their economies' studies. Representing the most crucial elements of competitiveness, the final outcome is divided into four main categories. According to Swiss those categories are,

- Economic Performance
- Government Efficiency
- Business Efficiency
- Infrastructure

Component cities as the most basic unit of an urban cluster, their competitiveness might be an indicator of the overall competitiveness of the urban cluster and it manifests itself in many respects such as economy, society, education as well as environment.

2.5 Methods and Approaches for Analysis

2.5.1 . Methods Use to Determine the Hierarchy of Town Centers

“Rank size rule” used to rank the city settlement according to descending order of population size, by Singer (1936). The various studies to support the theoretical systems can be classified into inter urban and intra urban at the national level and regional level. Smiles, (1944) go the credit for the first hierarchical classification of central places on a national scale on the basis of certain selected activities. At the regional scale, Dickinson (1932 in his early work in East Anglia established a definite hierarchy of towns, using bus route data and information. Ljudevit Krpan, Marin Milković, Miroslav Štimac by L Krpan - 2014 described that.

In Sri Lankan context according to L.H Indrasiri, (2001) following are the methods used in analyzing the existing hierarchical structure of urban centers in preparation of NPPD.

- Weighted Score Method
- Centrality Index Method
- Orthogonal Factor Analysis Method

Numerical techniques were used to forecast the future changes in urban centers.

- Internal Physical Densities (pixel analysis by using Remote Sensing)
- Internal Functional Densities (functional magnitude by centrality index)

Following steps have been applied in Centrality Index Method to carryout for analysis;

- Preparation of central place list
- Central place function matrix
- Derivation of centrality value matrix

2.5.2 *Competitiveness parameters evaluated by various studies.*

- Investment attractiveness (JLLM, 2007a)
- City prosperity, governance, business environment, infrastructure and quality of life index (Ernst and Young and FICCI, 2007)
- Multi criteria analyse methods
- Demand conditions, factor conditions, context for firm strategy and rivalry and supporting and related industries (IFC, 2010)
- Retail activity and property opportunity (JLLM, 2007b)

2.5.3 *Other related parameters evaluated by various studies*

- Attractiveness of service globalization locations (NeoIT, 2006)
- Wealthiest, highest consuming and most aware cities in 2003–04 (Maps of India, 2011)
- Largest population cities in 2006 (City Mayors, 2011a)
- Fastest growing cities from 2006–2020 (City Mayors, 2011b)

2.6 summery

According to the above concepts and definitions, the need for identification of urban centers arises because of the problems in the regions of a country, which is solved by regional planning. Identification of urban centers of a country is based on country's definition for "urban" it decides the number of urban centers. All these urban centers are analyzed in a hierarchical manner, because all urban centers can't be developed at the same level, it is depending on size of the urban center. Through this literature review, description of my research area, role of town centers in the development, meaning of "Rank size rule", connectivity & accessibility, number of factors that are being considered to determine the hierarchy of town centers have been clearly understood.

Christaller base theory provides the framework for my study, and for the studies done prior to mine, as well. Christaller mainly interested with towns' functions, as markets, and argued that population alone was not significant enough to determine the importance of a central place. His model has suggested a hierarchical provision of

settlements and he hypothesizes the model via hexagonal provisions. As per the literature studies in global context was the technique used for the analysis of existing hierarchical structure in central index method. Techniques used for the prediction of future hierarchical order are varying from one country to another.

Many authors have identified the importance of determining the exhibitions of cities with various pointer sets. Generally, they were addressing the aspects of urban and regional sustainability and economic development. This study suggests the growing importance competitiveness between cities in emerging interactive economies through particular goals for cities in Sabaragamuwa Province. Present knowledge on competitiveness between cities was improved by linking redevelopment and property related business strategies and was evaluated by applying a hierarchical model. The capacity of the model was three levels, which is also replicates its flexibility and applicability.

THEORIES AND CONCEPTS

THEORIES	Industrial Location Theory (Alfred Weber in, 1909)	Central Place Theory (Walter Christaller in, 1933)	Growth Pole Theory (Francis Perroux in 1950)	Economic Base Theory (Hirschman, 1958)	Cluster theory- (competitiveness theory- Micalle, E. potter, 1979)
EXPLANATION OF INDICATORS	*Advantages of Agglomeration	*Service Activities *Threshold Population *Market Range *Economies service i •Transport links *Infrastructure *Urban Governance *Population size *Physical environment *Human resource	*Leading industry *Location and facilities *External economies *Agglomeration Linkages	*Amount of goods & Services supplied to outside	*Hu man factors *Institutional factors *Physical factors *Economic factors *Urban Governance
SELECTED INDICATORS	Agglomeration	*Economies *Human resource *Infrastructure *Urban Governance	Location and facilities	Services	*Physical factors
METHODS USED DETERMINE URBAN HIERARCHY	*Material index *Demand curve	*"Rank-size rule" *Centrality Index method *Weighted Score Method	*"Rank-size rule *Weighted Score Method" Regional economic growth depending variable.	*Direct Method *Indirect Method *Mixed Method *Methods *Location Quotient	*Centrality Index method *Weighted Score Method *Malty criteria analysis method.
SELECTED METHODS		Centrality Index method *Weighted Score Method			Centrality Index method

Singer (1936). Smiles, (1944) Shabli (1984) Glasser (1998) L.H Indrasari, (2001) (JLLM, 2007a) (Ernst and Young and FICCI, 2007) David Guerrero (2012), shaldeen, stanly M.G (2013). Ljudexit Kirpan, Marin Milkovic, Miroslav Stimac by L Kirpan - 2014, City Mayors, (2017).

3 RESEARCH DESIGN

3.1 Introduction

Urban hierarchy is useful for aligning cities with development and change. The main objective of this study is to redefine the urban hierarchy to the current level of development. This chapter focuses mainly on the conceptual process for identifying the criteria and for the reconstruction of the urban hierarchy, and the research framework for achieving the objectives without any problem. First, it explains the sample for selecting the study area and collecting the data. It then discusses data collection methods, data types collected, and data analysis methods. Finally, this chapter discusses the limitations of the study.

“Town centers grow in a particular location to deliver certain services for the surrounding national, regional and local markets. To promote urban development, the size of an urban area concerns more with its size in relative to the size of other urban areas” (Indrasiri 2001, Reuben J, Sebago, Thando.D., Gwebu 2013). For this purpose, generally, urban areas have analyzed in a spatial hierarchy in preparation of national and regional physical plans.

3.2 Study Area

Sabaragamuwa Province has affected by natural hazards such as landslides, floods, and earth slips during the last years. Presently, This Province is facing a lot of physical changes and many development activities happening. As a reason, competitiveness among cities has aroused. Hence, this is the suitable time to carry out a study on existing hierarchical orders of town centers in Sabaragamuwa Province based on central place theory and other criteria to find out a better spatial hierarchy of the towns. The study of the existing spatial hierarchy of town centers is very vital for regional planners for regional development.

Generally, urban areas have been analyzed in a spatial hierarchy during the preparation of national and regional physical plans. Considering this, the Urban Development Authority and National Physical Planning Department had analyzed the town areas in Sabaragamuwa Province based on population serviced. Among these towns, 33 towns were selected for my study based on the population serviced in descending order and the town centers in the scattered pattern based on the distance between each town centers. The main intention of the thesis is to study the region in order to identify a suitable spatial arrangement of towns in Sabaragamuwa Province. Sabaragamuwa Province is the case study area of the study. Rathnapura and Kegalle districts are the main two districts of the Province. Many towns located along the Colombo-Ampara (A4) road, Colombo-Kandy (A1) road, Colombo-Hatton (A7) road and Pelmadulla-Nonagama road (A18). Geographically, covering a land area of 4,968 sq.km. It is bordered by the Kurunegala District in the North, Kandy District in the

Northeast and East, Nuwara Eliya District and Uva Province in the Southeast, and Hambantota district in the South, and Kalutara District in South West and Colombo, Gampaha district in the West.

Sabaragamuwa province

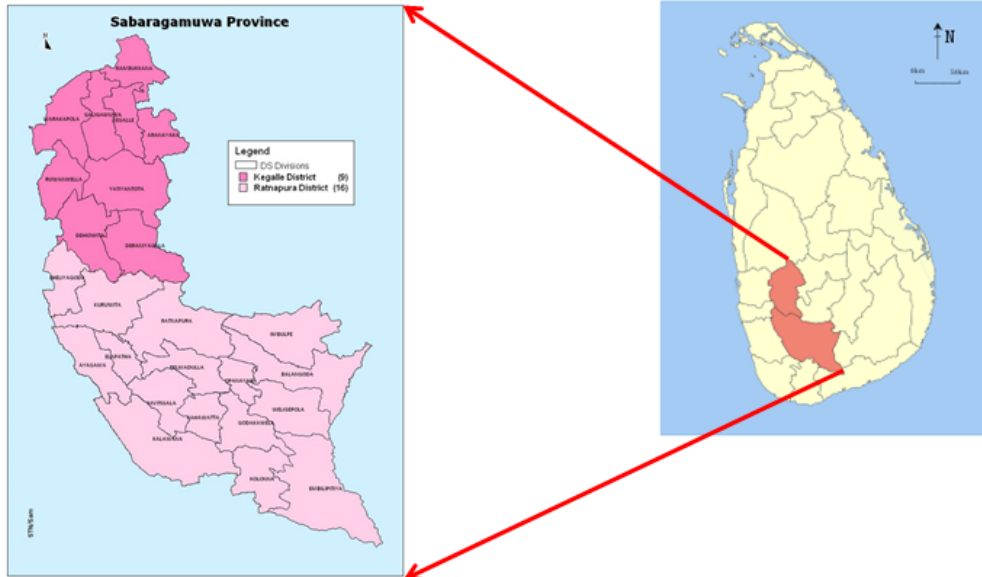


Figure 6- Sabaragamuwa Province in Sri Lanka

Source: Sbaragamuwa provincial council profile, 2010

Ratnapura administrative center located in the western boundary of the province. There are 01 Municipal Councils, 03 Urban Councils and 24 Pradeshiya Sabhas in this province. This research is designed to examine urban competitiveness and city hierarchy in the Sabaragamuwa Province of Sri Lanka. There are 33 town centers in the province, Out of which. Cities with more than 5,000 populations are selected for study (according to 2011 census data from the Department of Census and Statistics). This will restrict research to areas designated as development areas under every local authority in the province. The area where the assessment fee is collected is also considered for selected urban centers. This definition includes 33 cities in the Sabaragamuwa Province.

Table 5- Population serviced in selected areas

Town Centers	Population Serviced
Rathnapura District	
Eheliyagoda	52,839
Kuruvita	95,646
Kiriella	18,613
Ratnapura	111,212
Galagama-Pabahinna	29,477
Balangoda	77,563
Opanayaka	16,587
Pelmadulla	82,469
Ayagama	13,894
Kalawana	33,298
Nivithigala	14,130
Kahawatta	42,298
Godakawela	36,469
Weligepola	19,183
Embilipitiya	134,713
Kolonna	18,954
Kegalle District	
Rambukkana	81,169
Mawanella	119,127
Hemmathagama	12464
Kegalle	89,854
Galigamuwa	64,490
Warakapola	111,056
Ruwanwella	60,913
Bulathkohupitiya	27,095
Yatiyanthota	61,096
Dehiovita	81,315
Deraniyagala	45,869

Source: Census of Population and Housing - 2012 Sabaragamuwa Province

Table 6- Administrative areas of Sabragamuwa Province

D.S Division	Municipal Councils	Urban Councils	PradeshiyaSabh	Town centers
Ratnapura	Ratnapura		Ratnapura	Ratnapura
Eheliyagoda			Eheliyagoda	Eheliyagoda,Kiriella
Kalawana			Kalawana	Kalawana
Pelmadulla			Pelmadulla	Pelmadulla
Nivitigala			Nivitigala	Nivitigala,
Kuruwita			Kuruwita	Kuruwita
Ibulpe			Ibulpe	Pabahinna,Belihuloya
Kahawatte			Kahawatte	Kahawatte
Godakawela			Godakawela	Godakawela,Rakwana
Elapatha			Elapatha	Elapatha
Balangoda		Balangoda	Balangoda	Balangoda
Embilipitiya		Embilipitiya	Embilipitiya	Embilipitiya,Kolonna
Ayagama			Ayagama	Ayagama
Opanayaka, Weligepola			Weligepola	Opanayaka, Weligepola
Kegalle		Kegalle	Kegalle	Kegalle.
Mawanella			Mawanella	Mawanella
Yatiantota			Yatiantota	Yatiantota,Kithulgala
Aranayake			Aranayake	Aranayake
Deraniyagala			Deraniyagala	Deraniyagala
Ruwanwella			Ruwanwella	Ruwanwella, Aguruwella
Warakapola			Warakapola	Warakapola,Nelumdeniya
Galigomuwa			Galigomuwa	Galigamuwa
Rambukkana			Rambukkana	Rambukkana
Dhiowita			Dhiowita	Dhiowita
Bulathkohupitiya			Bulathkohupitiya	Bulathkohupitiya
Total: 26	1	3	25	33

3.3 Process to Analyzing the Existing Hierarchical Orders of the Selected Town Centers

This theory has enabled geographers and planners to find new services and design settlements. In the analysis of the spatial theories and practicalities of cities in the Sabaragamuwa Province,

The development level Hierarchy of Center place Theory seeks to use a competing hierarchy to identify a suitable spatial plan and to find out what is the proper order of city centers in this province.

On this basis, it is proposed to study the commercial, administrative, social status, reliability features of a city, population, and environmental sustainability, in order to identify the appropriate spatial layout of cities in the Sabaragamuwa Province taking into consideration spatial theories and practical options.

For this study, Grama Niladhari Divisions, located 5 km away from the city center, were selected as the buffer area. All aspects of commercial, administrative, service, and environmental conditions in this buffer area are considered.

The weighted matrix is used based on the importance of the administrative, commercial and service components (Competition and Principles of Central Theory). Finally, the results of the weighted matrix analysis are ranked separately by the result. It also takes into account the detailed quality of the above components.

3.4 Improvement and Development of Urban Development Level Structure

According to the literature review, the indicators chosen to define the urban hierarchy should be weighed. The main indicators that were selected for the load were again assigned to the exhibitors, but smaller criteria were used to determine those sub-indicators.

This study attempts to use a hierarchical structure developed by Berry and Grail (2009) aimed at urban development built on renewal and possessions connected commercial connected economic strategies, social strategies, environmental development strategies.

Using a structure including an upper hierarchy segment is signifying the components of the development between urban centers and the inferior sector for key factors Using multiple criteria analysis which comes with Analytic hierarchy procedure techniques, the structure was verified and weighted. In order to present a weighted hierarchical structure for urban developments, a multiple analysis has been done; utilizing consensual values which were derived later thrice surveys.

Through the application of techniques, twenty-six indicators for urban development level were categorized under five components, in stage 4.

This method of hierarchical analysis, which was developed for urban measure urban development levels, built up as a general model in order to improve the development levels between urban centers by encouraging redevelopment and possessions connected commercial, social, environmental strategies.

The standardized model was verified by applying to the selected cities in Sabaragamuwa province in order to evaluate the development level performance.

3.5 Components and Indicators Used to Measure Urban Hierarchy.

Even assuming there is an integer of indicators derived through the literature review in order to analyze the hierarchical order of the urban centers, following are the indicators & sub-indicators have been analyzed using quantitative methods in the case study area.

3.5.1 Indicators reveal the level of development in urban centers

Table 7- indicators reveal the level of Development in Urban Centers

KEY -INDICATORS	SUB- INDICATORS
Economic	
1 Business Growth and Performance	Comparative revenue performance of firms on the first half of 2018 relative to 2017 b) Growth in the Number of registered businesses in 2018
2. Access to Finance	a). Number of universal/commercial banks in 2018 b). Ease of access to Credit from Banks
3. Business Dynamics	a. Membership to local business chamber of Commerce or industry Association b. International Orientation of Business c. Level of Risk Averseness by Business and Government d. Level of Business Collaboration
4. Property Markets	a. Efficient and effective land and property markets
5. Technology, Innovation and Information.	a. Level of Research and Development in Businesses and Government
Human resources	
Workforce Skill base population	Over-all quality of skills of present workers/ employees Business Management Skills Working population
Available Manpower	Availability of qualified job applicants
Skills-development programs	Attendance of any skills-development programs

	for the jobless or job-seekers being performed by the city management
Research and Knowledge Development	Research facilities and activities
Education Facilities and Services	Level and Quality of Higher education facilities
Infrastructure	
Transportation	Average travel time to reach the airport from city center or average commute time Levels of congestion on roads and public transport system Quality of regional road network servicing the city Over-all level and management of transportation services
Urban Infrastructure Services	General reliability of water services General reliability of electricity service
ITC Services	ITC network services Average down load Speed
Waste Management	City government's management of waste and sanitary services and disposal
General Maintenance of Infrastructure	Maintenance of the city's Infrastructure and Assets
Government contribution	
City Government Regulation, plans and Policies	operation of the urban management in the application of business regulations Enforcement of land- use regulations (e. g. zoning)
Investment Promotion	operation of the urban management in promoting local business outside the city
Urban Governance	Headship of the city mayor in reacting to the needs of depositors Performance of the urban administration (2012-2016) in replying to the needs of depositors Local Government Fiscal Autonomy Level of intra-governmental cooperation
Quality of life	
Public Amenities	Range and 'quality of the city' entertaining amenities such public parks, open spaces and playgrounds Range and quality of the Cultural facilities Range and quality of sports facilities Range and quality of Shopping facilities
Environment Sustainability	Air Quality and Pollution Water Pollution and Drainage Natural disaster and climate change risk
Housing	Quality of Housing

	monthly Rental costs
Peace and Security Civic Pride	Public Safety Levels of Crime
Public Health	Hospital beds per 10000 Doctors per 1000 population Percentage of households with access to potable water
Equity and social inclusion	% Population below poverty line % Population lives in underserve settlements Male to female school enrolment rate % Women in government jobs
Civic Pride	Level of civic pride in appearance of city

3.6 Method to Analyze the Existing Hierarchical Order of Urban Centers

Following process applied for the analysis of existing hierarchical order of urban centers because of quantitative measurable factors.

3.6.1 Population Size

Process for the analysis of existing hierarchical order in terms of population size in each urban center as;

Demarcate the boundary of the urban centers
Compute G. N. vise population and work force population.
Comparison of existing population size among the urban centers
Values given according to sequence.

3.6.2 Transportation Linkages

Existing hierarchical order in terms of connectivity is determined by direct linkages to reach one node from other nodes through road & rail network, which have been done through the following process.

Preparation of connectivity map based on major and minor roads.
Identification of nodes.
Analysis of connectivity based on direct access to each node with space syntax.
Calculate the final integration of each node.
Identify the node which belongs to each urban center.
Calculate the average integration for each urban center.
Values given from highest to lowest integration for each urban center.

3.6.3 Other development indicators

Following process is proposed to analyze the availability of Competitive functions

Categorization of development functions

Values given to these Categorized functions considering the contribution to the growth prospects of the urban center

Each activity under these main categories will be valued considering the level of the activity.

3.7 Process to Analyze the Future Hierarchical Order of Urban Centers

The future hierarchical order of the urban center depends on the extent of how particular urban center plays a strategic role in the development of the region. The following process has been followed for the analysis of future hierarchical order of urban centers based on the above factors.

3.7.1 Population Size

The future population of an urban center depends on natural growth rate & ability of the urban center to attract population from another outside, which increases the threshold population and attracts a large number of other activities in the urban center. Process for the analysis of future hierarchical order in terms of population size in each urban center as;

1. Population projection of each urban center for the year 2030
2. Comparison of projected population among the urban centers' values given according to the sequence.

Ability to attract population is determined by the availability of developable land for future development, proposed development projects, the potential for industrial activities in each urban center.

3.7.2 Transportation Linkages

Future hierarchical order in terms of connectivity is determined by proposed road, rail & economic infrastructure in each urban center, which will further increase the internal & regional transportation linkages of the urban center.

3.7.3 Dynamics indicate

Future dynamic function in each urban center is definite by the number of activities detects within it in future, which is determined by the aptitude of the urban center in terms of positive externalities where one activity attracts other related activities. Favorable impacts of the development projects will create more activities and rapid further investment occasions

3.8 Other Aspects which Affect the Hierarchy Order of Town Centers

According to most of the geographers and regional development planners, due to insufficient financial and infrastructure resources, small towns are unable to achieve their role in facilitating the development of their rural neighborhood. Moreover, in order to have their own development process, they lack power and authority. Appreciated information can be collected from the analysis of the theory's results vs. certainty. As a consequence of this information, central place theory has been subjected to many criticisms.

Those are: -

- Larger areas of flat land rarely exist and transport is 'irregular'
- More types of transport – costs cannot be proportional to the distance
- General public and Wealth are not dispersed evenly
- The general public does not always go to the 'nearest' place
- Many people search to live in urban areas without any disaster
- Perfect competition is unreal – some make more than any other factors
- Shopping behaviors may change – people travel more distances in order to buy lower ordered goods or either service. (hypermarkets allow customers to satisfy all their shopping needs in one routine/ trip.) so these changes may weaken the main assumption, which leads markets and their functional areas into overlapping.
- Theory accepts related consumer's behavior, but in practice, it's not possible. The purchasing power of people differs
- The theory sees the central place as having particular functions, but in reality, places are having several changes over time and it is in a constant stage of change.

We cannot fit reality into theory, but we try to fit theory into reality. Based on the above understanding of theoretical analysis and reality, there are several other factors that affect the urban structure of a region, such as population density, transport links, focal point functions, competitiveness and the extent of development.

3.8.1 *Urban safety*

Many peoples similar to live deprived of any risk or disaster. Because of that, they strained to live urban area without any disaster. Many planned cities have disaster risk reduction plans. Those urban areas consider urban safety it is a very important attribute to improve urban settlement and urban population.

3.9 SUMMARY.

This study selected Sabaragamuwa province as the case study area to study the existing hierarchy order of town centers. These study aspects spread on the principles of Walter Chris taller Central Place theory with urban competitiveness inside a Current urban area. The contest of this is that urban areas are much more difficult and less predictable than the rural patterns considered by Chris taller. For the purpose of study, definite attributes related to the Commercial, Administrative, and Service function of a town were selected with urban competitiveness. For the purpose of analysis, each variable's data was classified into few categories by using the weighted score method through applying Analytical Hierarchical Procedure with multi-criteria analysis, and the map which is related to these categories was prepared using unique colors and scaled icons for each attribute, reflecting the rank level of town centers.

There are some other factors which are also affecting the hierarchy of town centers, such as investment opportunity development, working population density, connectivity, infrastructure, urban safety and availability of developable land.

Connectivity is one of the crucial factors which decide the hierarchy order of a region. In that sense, connectivity analysis was done to find the connectivity of the region. Sabaragamuwa province has a well spread new road network to study comparative connectivity. Therefore, divisional secretariat-vies data was collected based on the above-mentioned factors which affect the hierarchy of town centers.

4 DATA ANALYSIS

4.1 Introduction

Along with the analysis, the study has identified five key indicators and twenty-six sub-indicators to be analyzed. After each analysis of appropriate numerical or design-related technology, the CCI scoring system was weighed and the total score for the province's city hierarchy was measured by the multivariate analysis method

4.2 Data Analysis

To identify the development configuration of the province, it is also essential to identify the town areas and urban population of the province. According to the accessible census and statistics in Sabaragamuwa Province, there is only 960,860 of urban population who belong to Rathnapura MC area. This is due to the methodology used by the Department of Census and Statistics to calculate urban population, which is to consider the population belongs to urban and municipal council areas. Even though there are several other areas which can be identified as urban areas, since they fall under Pradeshiya Sabha boundaries, they are not considered as urban areas. Since this method is not suitable to use in this research, there is a need to identify a better way to assess the other towns which are needed to be assessed.

The below method describes how the urban areas are identified for the research. Within the 25 local authorities in the Sabaragamuwa Province, there is the number of town centers. Considering the physical development and urban characteristics, each local authority has declared development areas covering all the urban centers. These development areas have been identified as urban areas in this study, and are indicated in map 3.

The population of these development areas is studied by Grama Niladhari Divisions. The population is included in the Grama Niladhari Divisions, which are five kilometers away from the center of the city. There are 32. Therefore, these 34 cities were selected for the case study, taking into account the time constraints. Suburbs were then weighted according to the chosen weighing method. According to the Global Sustainability and prosperity Development Index, five key indicators have been identified for these examinations.

According to the list of towns, there are thirty-three city hubs in the province covering both districts which have more than 5000 of the population in the year 2011. Hence, these 34 towns were selected for the case study considering the time constraints as well. Then, the townships were weighed according to the selected weighting technique. According to global competitiveness index, recognized five key indicators for these exams.

- Economy
- Human resources
- Infrastructures
- Government contribution.
- Quality of life

Each indicator divided into sub-driver indicators. Subsequently, each sub-driver indicator divided into assessment indicators as shown Annexure2.

According to the calculations, it is assumed that each individual specialist's response will get the highest score by using the response of each factor. According to the literature review, a percentage weighting of 0.2 points is used for each of the major components.

In this study, the total number of points that each city should take is 26. This is the maximum score. The maximum number of points that can be obtained from the selected components to the economy index is 5 points. The city receives the sum of the total number of points obtained for each city divided by the number of components.

When cities are sorted according to their size, they are grouped according to the geographical information system according to the natural range. The hierarchical map of cities is then prepared.

Table 8- Benchmarking the Theoretical Supreme score for the Town

Components number	name of component	Amount of factors beneath each component (A)	Summation of maximum feasible mean values of scoring on factors(5*A)	Weightings achieved from the literature review(B)	Theoretical maximum for each component (5*A*B)
1	economy	5	25	0.2	5
2	human resources	5	25	0.2	5
3	infrastructure	5	25	0.2	5
4	Government Contribution	4	20	0.2	4
5	quality of life	7	35	0.2	7
	Theoretical maximum				26

As per the calculations it is assumed that the highest possible score of 05 is gained by using each expert responds for each factor which is also associate under the mentioned five indicators.

4.3 Relationship between functional Urban Hierarchical indicators and selected new urban hierarchical indicators

Considering the criteria used in the city hierarchy and the competitive urban hierarchy that is determined by the city's activities, it can be seen that there are differences between the urban hierarchies in relation to these criteria and the differences.

Therefore, different technological capabilities have contributed to the development of urban areas. Based on these rapid changes, it is clear that the criteria used to measure the urban hierarchy also need to change based on the development of the city.

Previously, people moved from rural areas to urban areas to obtain goods and services, but today, with modern technology, people can meet their needs without having to migrate to cities.

For example, people who came to the “Kachcheri” and the post office because of telephone and internet access now no longer have to visit the city. In studying the urban hierarchy, it is not enough to determine the number of workplaces or population size and amount of infrastructure categories. Therefore, it is important to consider the quality of those criteria.

Currently, the criteria used to define the urban hierarchy of urban centers in the Sabaragamuwa Province are the population, infrastructure, and number of educational institutions, number of schools, number of hospitals, number of medical centers, number of roads and road type, number of shops and number of banks in the city.

But to update the city hierarchy, the quality of education, the human resource potential, the quality of the environmental elements, the quality of the economic development, the social development should be used.

Table 9- indicators used to measure urban hierarchy.

Main indicator	Existing urban hierarchy-indicators	Sub indicators	Propose urban hierarchy-indicators	Sub indicators
Human resource	Population size		<ul style="list-style-type: none"> • Population • Size • Workforce Skill base 	<ul style="list-style-type: none"> • Over-all quality of skills of present workers/ employees • Business Management Skills • International Language Skills • Workforce
	Educational Function	University Schools - 1AB Schools -1C Schools – II Schools –III	Available Manpower Skills-enhancement programs Research and Knowledge Development Education Facilities and Services	Availability of qualified job applicants Presence of any skills-enhancement programs for the unemployed or job-seekers research facilities and activities Level and Quality of Higher education facilities
Political situation	Local Administratio	Pradesiya Saba	1. City Government	A- Performance of the city government in the

	n	Municipal council Urban council	Regulation, plans and Policies 2. Investment Promotion 3. Urban Governance	<p>implementation of business regulations</p> <p>B- level of devolution of national government responsibilities to city governments for the regulation of businesses</p> <p>C- Performance of the city government in amending legislation to respond to new business needs</p> <p>A-Performance of the city government in promoting local business outside the city</p> <p>B- Transparency of the city government in its dealings with business</p> <p>Performance of the city government in implementation of policies simplification and streamlining of business procedures</p> <p>A-Leadership of the city mayor in responding to the needs of investors</p> <p>B- Performance of the city administration</p> <p>C- Local Government Fiscal Autonomy</p> <p>E- Level of intra-governmental cooperation</p>
Social and cultural situation			1 Public Amenities	<ul style="list-style-type: none"> • Range and quality of the city' • recreational facilities such public parks, open spaces and playgrounds • Range and quality of the Cultural facilities • Range and quality of sports facilities • Range and quality of Shopping facilities • Air Quality and

			2.Environment Sustainability	Pollution Water Pollution and Drainage
			3. Housing	<ul style="list-style-type: none"> • Natural disaster and climate change risk • Quality of Housing • Monthly Rental costs
			4 Peace and Security	<ul style="list-style-type: none"> • Public Safety • Levels of Crime • Hospital beds per 10000 • Doctors per 1000 population • Percentage of households with access to potable water
			Public Health	<ul style="list-style-type: none"> • Population below poverty line • Population lives in underserve settlements • Male to female school enrolment rate
	Health Institutions	Base hospital District hospital MOH-Office Medical Clinics	Equity and social inclusion	Women in government jobs
			Civic Pride	Civic Pride
	Roads	Class-A Class-B Other		
	Post offices	Main Post offices Sub Post offices		
	Other infrastructure	Electricity Water Sanitary	1. Utilities	a. Over-all reliability of water services b. Over-all reliability of electricity service Overall reliability of

		facilities Communications Land lines CDMA	2. ITC Services 3. Waste Management 4. General Maintenance of Infrastructure	telephone and internet services (WDI: Telephone subscribers (per 100 ppl), Internet users (per 100 ppl) a. ITC network services b. Average down load Speed Adequacy of drainage system (flood protection) City government's management of waste and sanitary services and disposal Maintenance of the city's Infrastructure and Assets Maintenance of the city's Infrastructure and Assets
	Transportation	No of buses (CTB) No of buses (Private) No of Trips per day	1. Transportation	a. Average travel time to reach the airport from city center or average commute time b. Levels of congestion on roads and public transport system c. Quality of regional road network servicing the city d. Over-all level and management of transportation services
Economic situation	Commercial Functions	Small & Medium industries Wholesale & Storage Retail Shops Super	1. Business Growth and Performance	a. Comparative revenue performance of firms on the first half of 2016 relative to 2015 b. Growth in the Number of registered businesses in 2016

		Market		
		Business Dynamics	a. Membership to local business chamber of Commerce or industry Association b. International Orientation of Business c. Level of Risk Averseness by Business and Government d. Level of Business Collaboration	
		Property Markets	d. Efficient and effective land and property markets	
		Technology, Innovation and Information	Level of Research and Development in Businesses and Government Innovation and creativity Use of information technology	
	Banking Facilities	Government Private	Access to Finance	a. Number of universal/commercial banks in 2016 b. Ease of access to Credit from Banks
			Business Taxes and Charges Business Regulation Procedures	Local property taxes and charges a. Time to renew business permit b. Process and procedure of the city government for obtaining or renewing business permits Existence of informal fees

			Informal Fees	(e.g. bribes, fees paid to fixers or tips given to government officials) in addition to the required fees
			Utilities (Water and Electricity costs)	a. Electricity rate per kilowatt-hour b. Water Rates per Cubic Meter c. Land Prices
			Skilled Labor costs	a. General cost of professional Labor based on Income and expenditure survey

The criteria used to measure new urban hierarchy are both qualitative and quantitative. For example, when measuring education, the level of education is better than the number of schools.

Also, the criteria used in the city hierarchy currently used, City hierarchies are not a barrier to comparison because they are included in the criteria used to measure the development level of urban hierarchy.

4.4 Circumstance Study Results

The results of the case study application are presenting below in three different stages. The higher stage is comparing the whole demonstration of each city and establishing a benchmark as a theoretical supreme for comparison purposes. The second level presents the competitiveness enactment of every city with six indicator check-ups of level four of the hierarchical structure. Concerning the theoretical supreme score for each module, a comparison is drawn. And the lower level is representing an evaluation of the performance of every city center with 32 identified factors coming beneath the above mentioned six components.

High levels of the competitiveness score, which is also known as the accumulated score of the performance of the city on five components of the hierarchical structure. Namely, Economy, Quality of Life, Human Resources, Infrastructure, Government Contribution which are also presenting in Table 10.

The analysis above shows the four highest-performing cities with peripheral variability in their development performance scores.

Embilipitiya, Keglle, Ratnapura, and Balangoda achieved the highest development performance with 17.5, 17.5, 17.4, and 17.0. Kuruwita's development performance is 16.3 points; Mawanella 16.0 and Eheliyagoda 15.0 are near Ratnapura and Balangoda. In contrast, karavanella and Aguruwella performed relatively poorly with a score of 12.0. It shows a lot more backwardness than Kitulgala, Kiriella, and weligepola. Pallebedda and Deraniyagala urban centers scored the lowest 11 points. The benchmark identified that the theoretical maximum value of any urban area is approximately 26, intended for relative assessment. This benchmark is the cumulative value of the five components of the hierarchy (Table 10). The sum of the highest mean scores for each factor indicates the scores for each component. All urban centers have shown to fall below the theoretical highest score of 26 (Table 10), and the 17.5th percentile performance of Ratnapura is 67.37% of the theoretical maximum. The scores for Embilipitiya, Kegalle, and Balangoda were 67.31%, 67.06%, and 65.39% respectively.

In the additional level of the analysis, it was evaluating the development presentation of each urban center, concerning five operational indicators. Embilipitiya had the highest development performance score of 81.7% achieved the highest score of economic, development. When considering other urban centers, together Embilipitiya have attained the highest score for the human resources at the same time, Rathnapura has achieved the highest score for Government contribution while Balangoda got the highest score in Government Contribution. In Quality Of Life, Yatiyanthota scored 60.1% when Pallebedda scored least for all five indicators. On the quality of life Kegalle, Ratnapura, Kuruvita, and Pambahinna have a score close to the maximum score of around 57%, 54%, and 51%.

Table 10- Development Performance Score of Urban Centers in Sabaragamuwa Province

No.	Case Study Urban Center	Development Performance Score	Rank
1	Rathnapura	17.6	1
2	Embilipitiya	17.5	2
3	Kegalle	17.4	3
4	Balangoda	17.0	4
5	Kuruwita	16.3	5
6	Mawanella	15.8	6
7	Ehaliyagoda	14.9	7
8	Warakapola	14.1	8
9	Galigamuwa	14	9
10	Rambukkana	13.7	10
11	Yatiantota	13.7	11
12	kahawatte	13.3	12
13	kalawana	13.3	13
14	Ayagama	13.3	16
15	Nivithigala	13.2	15
16	Godakawela	13.0	16
17	Elapatha	12.9	17
18	Nelumdeniya	12.9	18
19	Pelmadulla	12.9	19
20	Kuruwita	16.3	20
21	Dehiovita	12.9	21
22	Kolonna	12.8	22
23	Pabahinna-Belihuloya	12.6	23
24	Bulathkohupitiya	12.5	24
25	Ruwanwella	12.5	25
26	Kiriella	12.4	26
27	Opanayake	12.4	27
28	Aranayake	12.4	28
29	kithulgala	12.4	29
30	Weligepola	12.3	30
31	Karawanella	12.2	31
32	Aguruwella	12.1	32
33	Pallebedda	10.9	33
34	Deraniyagala	10.8	34

Source- results of case study 2018

4.4.1 Comparative Analysis of development performance of cities in Sabaragamuwa Province

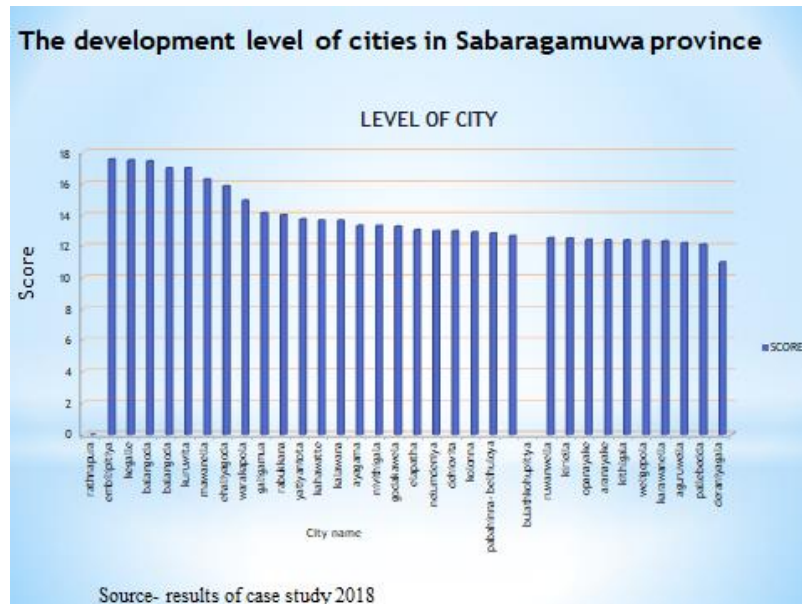


Figure 7- Development Performance Score -Sabaragamuwa Province
Source- results of case study 2018

As per the interviewers, Rambukkana gains the advantage of being a tourist destination. The area is identified as an alternate location, in order to complete the emerging urban development demands, which are available at present, towns near central province, are constrained gradually. By improving, providing some infrastructure (Roads, Railways or Highway links) Rambukkana city demonstrates a strong political will which focuses on image building and understanding the development perspective. For the long-term sustainability of the city of Rambukkana, the interview respondents raised concern, while advocating that the city enhances investment potential and attracts leading edge comparison to the theoretical maximum.

In economic potential, where Embilipitiya scores highest with a percentage of 40.6%, the business sector of Mawanella comes as the second. According to the interviewees, the synthesis of many cultures present in Mawanella gives the city a cosmopolitan character, having a young and educated staff with a developing cooperate section. Human resources performance of cities Balangoda, Ratnapura, Embilipitiya and Kegalle which can be identified as 80%, 77%, 77%, and 75% respectively, are nearer to the theoretical supreme as companies to the development (49.37). With the obtainability of expected and excellence talent, Mawanella urban area demonstrates an entrepreneurial character, even though there are several concerns of the city’s reliance on its important inheritance of being a ‘financial center.’

According to interviewees, in the efforts of the city in upgrading infrastructure and creating development opportunities, limited changes are evident, and are replicated by the low developments score of 57%. in order to region performance, interviewees’

idea is that the city is in need of adopting a joined-up accession by the government as well as an improved civic private partnership in improving business activities and infrastructure, including transport system.

According to the analysis, it is visible that the development performance of Pallebedda and deraniyagala is sustainably beneath the theoretical supreme in all components. The variation between the Economy (35%), human resources (34%), Government contribution 34%) and Quality of life (34%) is very little while having the lowest score of 41% for financial performance.

According to interviewees, even though the city appears to be politically active, organization arrangement and appointment with the private segment is found weak in several cities, as same as this urban center. Interviewees raised the point that in order to enhance the attractiveness of the city to be compared with other cities, the city requires increased support from state policies. In order to attract leading-edge business and to create quality employment, most of the cities need improvements in infrastructure and governance. Pallebedda, having a low development score of 43%, by way of having the minimum score on all five components, the statement is evident. All the evaluations are made, including the performance of the four cities, spending the mean values achieved from the scores given by experts/ interviewee.

According to the comparative presentation of the selected cities, their physical situation component point to that Kegalle and Yatiyantota cities outperform other cities with a score of 4.2, and the cities hold the maximum mean values of 6 out of 7 factors. Among 2 cities, Pallebedda holds the minimum mean value on possessions presentation, when Embilipitiya scores highest on place making. Aranayake, Aguruwella, and Nelumdeniya cities have not achieved any of the maximum mean values of the factors; however, in environmental sustainability development opportunities, Weligepola, Kolonna, Eheliyagoda, and Nelumdeniya cities have got the opportunity of achieving the highest mean values.

The tertiary base analysis offerings the presentation of every town on 32 recognized elements for city development collection under the five components (table 12-17). Presentation of the selected cities is assessed using the mean values achieve from a subject expert's/interviewee's scoring.

4.4.2 Relative analysis of urban presentation on factors beneath 'quality of life'

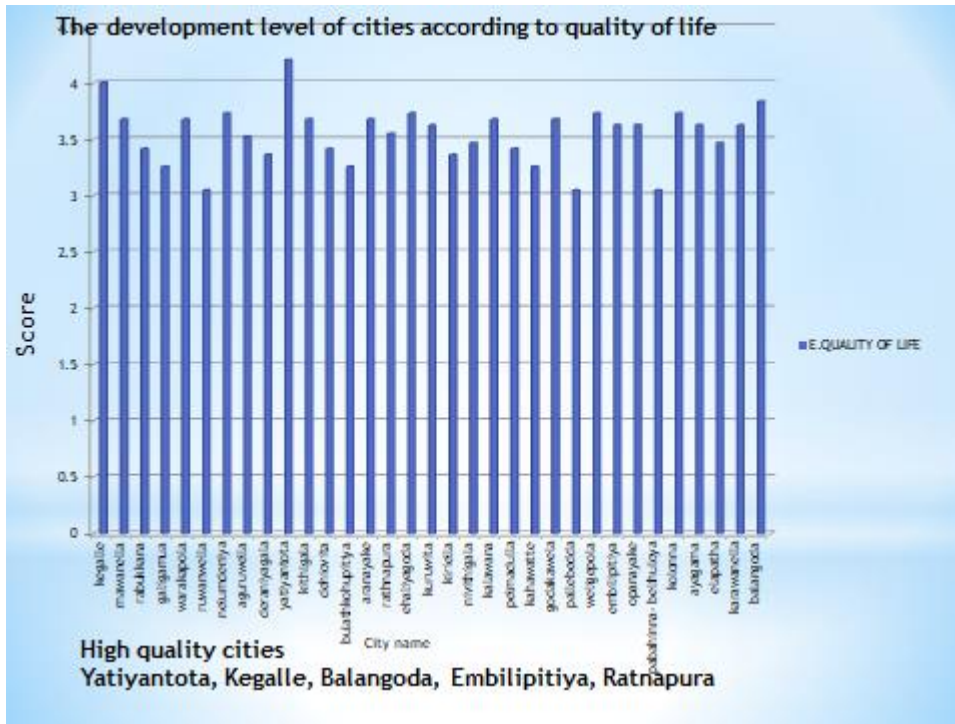


Figure 8- Relative analysis of urban presentation on factors beneath 'quality of life'

According to the relative presentation on the quality of life component, it signposts that Yatiyantota, Kegalle, Balangoda, Embilipitiya, and Ratnapura hold the highest station having the maximum mean value of 4 out of 5, even though the town established a lower value on the communal arrangement and image building. When considering Eheliyagoda Embilipitiya, it had scored the highest value for the latter, while kolonna and Pallebedda scored the lowest value on 4 out of 5 factors.

4.4.3 Relative analysis of urban presentation on factors beneath Human resources development

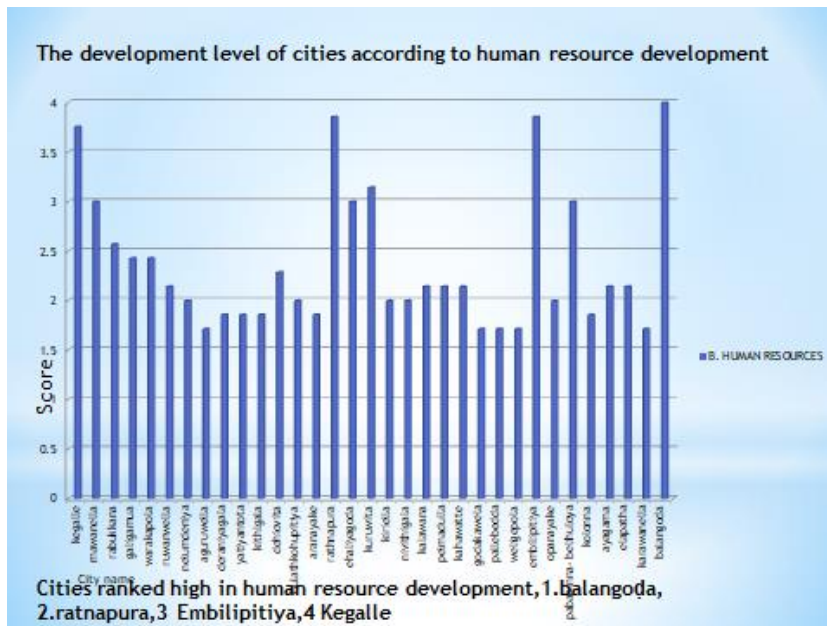


Figure 9- human resources development

According to figure 10 on the financial component of the comparative performance, Embilipitiya leads other case studies having a score of 4.08. A considerable gap can be found between Embilipitiya (4.08) and Kegalle (3.8), which comes as the second. On the element that creates commercial possible and investment dimensions, while upholding commercial development in target ranganer areas, Embilipitiya scores the highest mean value. Balangoda urban are achieves the highest value in using access to finance in the province while achieving lower values for other factors. Aranayake and Pallebedda cities have received the minimum values on all five sectors, and in using access to finance in this province, these two cities score lowest as 1.5. In contrast, for upholding commercial development in directed redevelopment areas, Kegalle scores the highest of 5.

4.4.4 Relative analysis of city presentation on factors beneath Economic development.

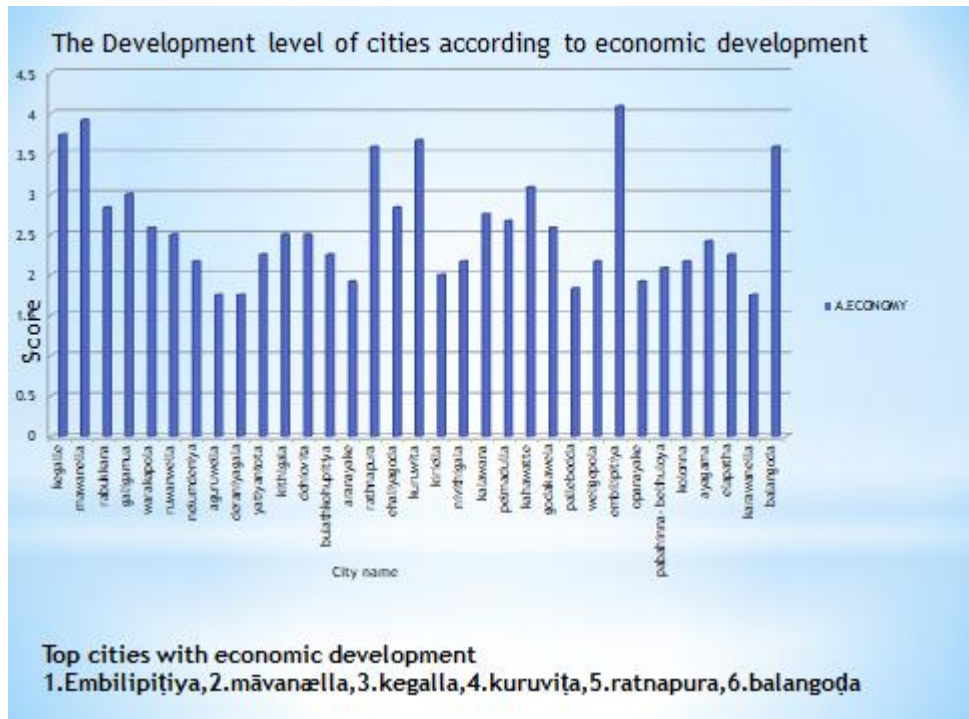


Figure 10- The Development level of cities according to economic development

According to the above figure, it indicates that in relative to the investment component, competitiveness reproduces the out-performance of Embilipitiya, Mawanella, Rathnapura, Kegalle and Balangaoda, having scores of 4.1, 3.72, 2.63, 2.6 and 2.53 respectively. Moreover, when Rathnapura achieves the maximum mean values of 2 out of 4 factors, it also holds the minimum value for investment promotion. On the other hand, Opanayaka and Kiriella hold the lowest mean value for investment promotion.

4.4.5 *Relative analysis of city presentation on factors beneath Government contribution*

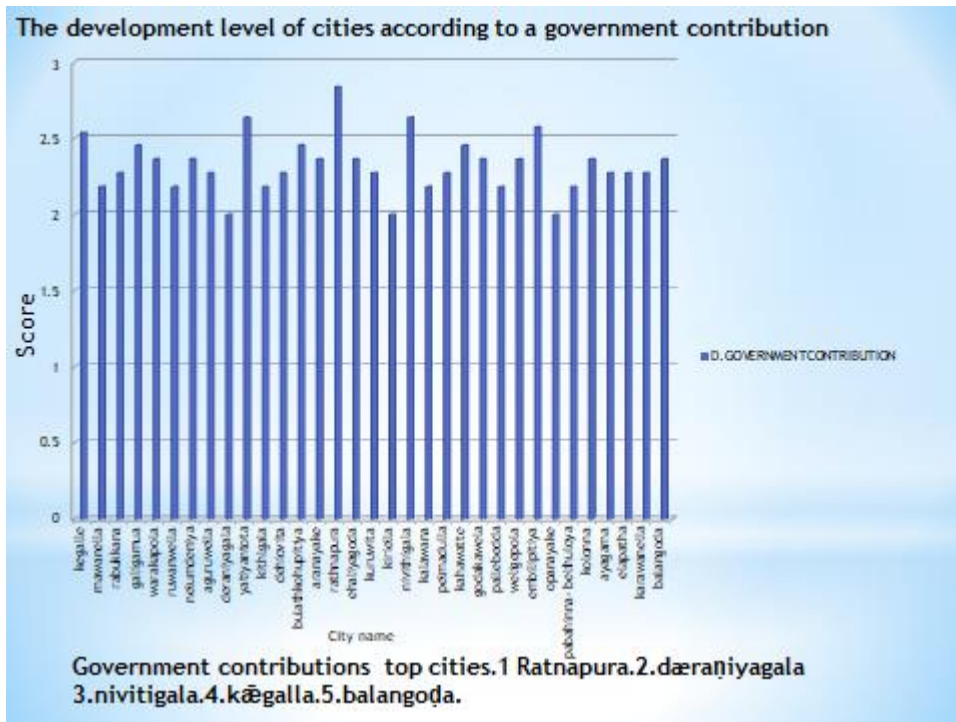


Figure 11- Government contribution

On the user potential and quality of life component, Rathnapura and Kuruwita again outstripped further cities with the maximum score (3.69) Kegalle also in same score (3.61), significantly above that of Embilipitiya and Balangoda, (3.3) at second position followed by Mawanella, Warakapola, Ehaliyagoda, Kiriella (3.6), Rathnapura succeeded maximum mean values on all five factors. Pallebedda reserved the minimum values on five factors and Kalawana and Kithulgala reserved the lowest value for Waste Management.

4.4.6 Relative analysis of city presentation on factors beneath infrastructure

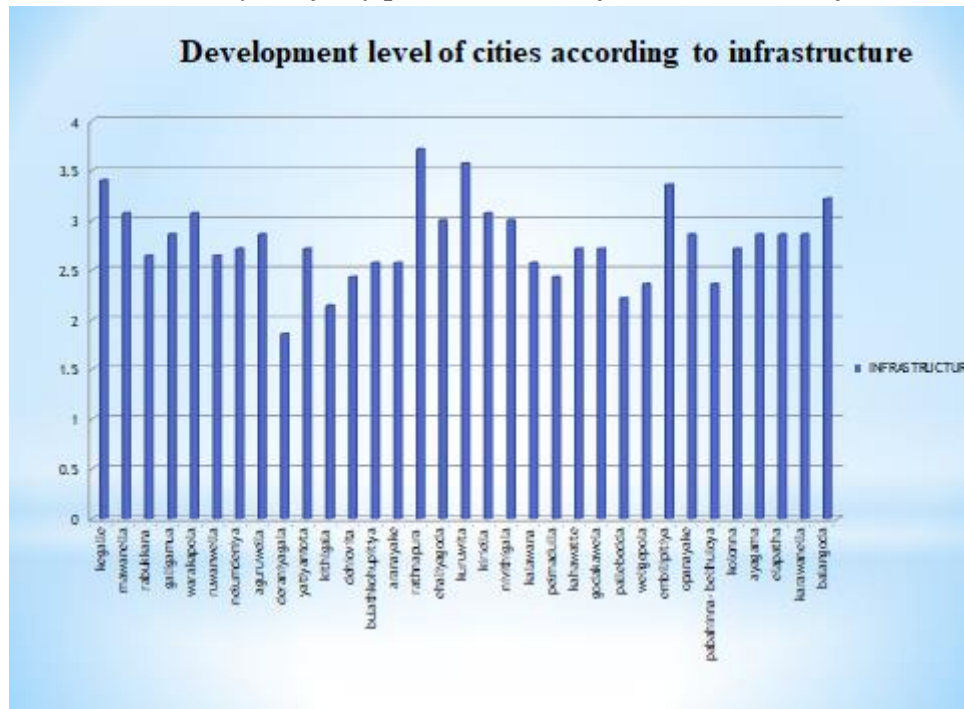


Figure 12- infrastructure

When considering all the 34 factors, Embilipitiya achieves the maximum mean rate for business growth which comes under finance and dynamics of local economy component, Mawanella and Embilipitiya (4.6) for Informal Fees under the development and cost of doing business' component, seven cities achieved this mean value for Civic Pride and six cities achieved this mean value for Peace and Security under user potential and Quality of life' component.

And the minimum value was reserved by Pallebedda, Weligepola, and Embilipitiya, Opanayaka, Pabahinna- Belihuloya , Kolonna, Ayagama and Elapatha (1) for Investment Promotion under the investment and. Responsiveness of government to business needs component. Examined results from the case studies indicate that there is a requirement for cities in Sabaragamuwa Province, in order to adopt focusing strategies to sustain performance over to longer time in the future.

4.4.7 Redefining urban Hierarchy Adapted to New Criteria.

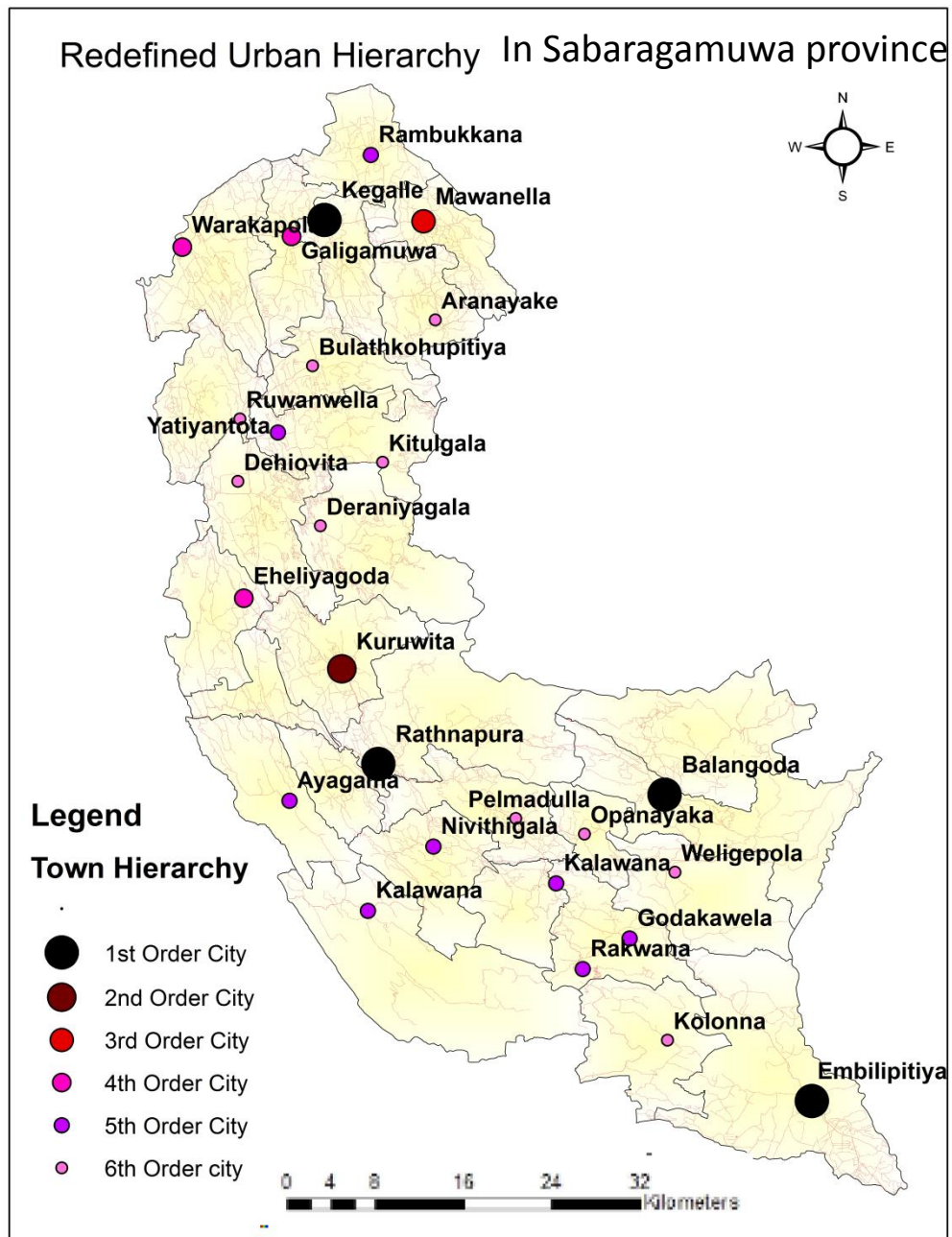


Figure 13- Urban hierarchy level based on central place principles and new indicators in year 2018

Source –field survey 2018

4.5 Findings

According to the new indicators, four high-growth cities have been identified
 Most of the cities are of medium development
 Mawanella and Kuruwita are moving towards higher development
 Embilipitiya ranks among the top commercially viable cities.
 Four first class cities can be identified in the province

- Embilipitiya
- Rathnapura
- Kegalle
- Balangoda

Urban hierarchy level based on central place functions In year 2018

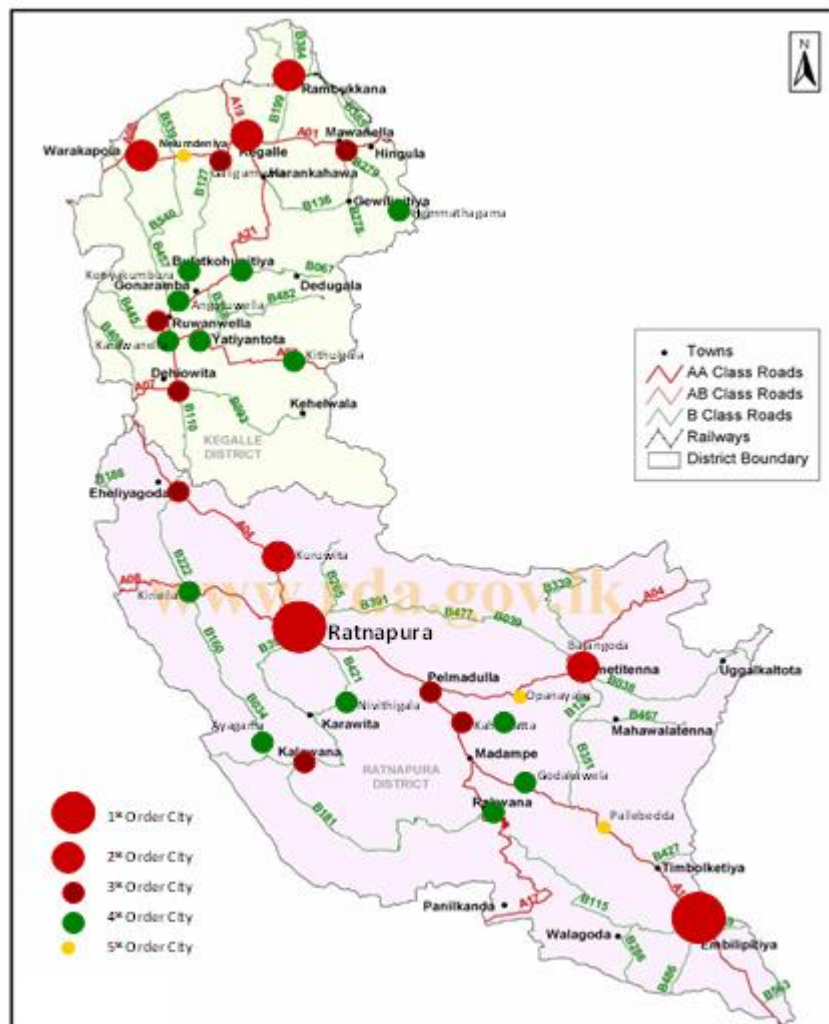


Figure 14- Urban hierarchy level based on central place functions in year 2018

Source: field survey 2018

4.6 Comparison of the Urban Hierarchy

In this study, two methods were used to identify the existing urban hierarchy: the definition of urban hierarchy based on the functional aspects of cities and the urban hierarchy based on competing parameters of cities. In 2000 and 2010, the component used by the National Physical Planning Department was used to measure the first municipal hierarchy based on functional characteristics. The second urban hierarchy was interpreted using competing parameters of cities. Accordingly, the following changes were identified when comparing the aforementioned urban hierarchy.

4.7 Comparison of the Urban Hierarchy

Table 11- comparison of the urban hierarchy

No.	City Name	Order of the city (according to functional indicators)	Order of the city (according to new development indicators)
1	Rathnapura	1	1
2	Ehaliyagoda	3	4
3	Pelmadulla	3	4
4	Nivithigala	4	4
5	Kalawana	3	4
6	Kuruvita	2	1
7	Kahawatte	3	4
8	Rakwana	4	4
9	Godakawela	4	4
10	Pallebedda	5	6
11	Embilipitiya	1	1
12	Balangoda	2	1
13	Pabahinna	4	4
14	Weligepola	4	4
15	Opanayake	5	5
16	Ayagama	4	4
17	Elapatha	4	4
18	Kolonna	5	5
19	Kiriella	4	5
20	Deraniyagala	4	6
21	Keglle	2	1
22	Warakapola	2	3
23	Nelumdeniya	5	5
24	Galigamuwa	3	4
25	Mawanella	3	2
26	Aranayaka	4	5
27	Rambukkana	2	3

28	Aguruwella	4	5
29	Ruwanwella	3	5
30	Karawanella	4	5
31	Yatinyanthota	4	5
32	Kithulgala	4	5
33	Dehiovita	3	4
34	Bulathkohupitiya	4	5

Hierarchy No 1- (According to Functional Indicators)

Hierarchy No 2- (According to new development Indicators)

Hierarchy	First order	Second order	Third order	Fourth order	Fifth order	Sixth order
No.1	2	5	8	15	4	0
No.2	4	1	1	3	23	2

According to the table above, hierarchical number 1 identifies two first tier cities and five second tier cities. According to hierarchy number 2 there are three first tier cities and four second tier cities. Hierarchical number one shows 15 fourth order cities. it is the highest city cluster according to the above hierarchy. Similarly, the number of two-city hierarchy shows an increase in the number of fifth-tier cities. Cities at the top of a numerically defined city hierarchy, if lower in quality, show lower rank in hierarchy number 2.

According to the above table, the order of the cities in Sabaragamuwa Province confronts several changes, while being located in different distances throughout the region. With the overall indicator analysis of the province, the highest score has achieved Embilipitiya, Ratnapura, and Kegalle. In previous hierarchy order highest score has achieved Ratnapura, Balangoda, Mawanella, Kuruwita, and Ehaliyagoda cities and in according to this study above mentioned cities correspondingly ordered with competitiveness.

Hierarchy level of central place functions didn't explain the quality level of cities and this research attempt to supplement quality level indicators measure to hierarchy stage. The city order according to city competitiveness can be shown as follows. The comparison of the urban hierarchy with the old criteria and with the new criteria shows that the development of major cities has improved and the development of small towns has not improved. This shows that even though there is numerical growth in the cities, quality development is not sufficient. It is clear that most of the cities in the Sabaragamuwa Province have to be developed.

5 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The main objectives of this study were to find appropriate development criteria to measure changes in the current development potentials of cities, and to apply these criteria to the cities of the Sabaragamuwa Province and to redefine its urban hierarchy. Based on that urban hierarchy, the results of this study can be used as a tool for determining new development strategies for measuring the level of development of urban areas in the Sabaragamuwa Province and enhancing regional development.

In the above analysis, the criteria selected for determining urban hierarchy were applied in accordance with the three basic principles of Walter Christaller (1933). According to the literature review; the criteria that represent the economy in line with the market principle were selected. In the selection of these criteria, the criteria that could be applied to an environmentally sensitive area were selected. The second set of criteria was selected to represent the infrastructure based on the transport principle. The third criterion group was selected based on the principle of governance. In addition, the population-based human resources criteria group was selected and indicators were selected based on the quality of life indicators for sustainability. The five new groups of indicators listed above include the three core principles of Walter Christaller's and the criteria for measuring current development trends in cities.

Accordingly, economic status, government administrative contribution, infrastructure performance, human resource contribution, and quality of life were identified as appropriate criteria for measuring development levels in urban areas and determining urban hierarchy. Another objective of this study was to determine whether cities are capable of measuring development successfully using these criteria. Using the above criteria, Hierarchical studies have made it easier to identify the level of development between cities. The study identified four first-class towns, one second-class city, one third-class city, three fourth-class cities, eight fifth-class cities, and seven sixth-class cities. In addition, cities with specific levels of development were identified for each of the criteria. For example, Embilipitiya is the highest city in economic development. Kegalla and Balangoda are the top cities for human resource development. Ratnapura is the highest city in administration.

Changes in the policies which are admirations to urban development and planning are required for the diffusion of urban development. Several scholars have studied about the prominence of calculating the presentations of towns by considering a variety of indicators. Holden (2006), Hemphill, McGreal & Berry (2004) and Wong (2004) are some of these scholars/ researchers who have discussed the aspects of urban and regional sustainability as well as economic development. The analysis of cities of Sabaragamuwa Province, which is carried put through of the research will be a strong aid in national and local policy market, which describes the budding importance of developments of the cities in the Sabaragamuwa Province of Sri Lanka, in emerging economies, at the same time examining a new hierarchy of the cities. Existing knowledge on the competitiveness of cities was improved through linkages and networking with regeneration on property-based business strategies an evaluated by

applying into a hierarchical model. Using three levels it was trying to reproduce the adaptability, applicability and the capacity of the hierarchy in the end.

-Findings of the study indicate that several cities in Sabaragamuwa Province, namely, Embilipitiya, Ratnapura, Kegalle, Mawanella, Kuruwita, Warakapola, Eheliyagoda, and Balangoda perform best in terms of competitiveness between cities. However, when considering Warakapola, Pelmadulla, and Dehiowita, the three urban areas are rising rapidly in the competitiveness agenda. Despite having improvements as developing cities, Kahawatte and Kalawana urban area lag behind, having a substantial theoretical maximum. There is a significant feature in the study, facilitating cities to increase their value and improve its situation relative to any constituent of competitiveness of cities. It was exemplified through a comparative analysis that took Embilipitiya in finance, Kalawana and Balangoda in the physical environment and Kegalle in social and capital and user potential outperform other cities.

5.2 Recommendations

Embilipitiya seeks to be a better city compared to other cities, with its remodeling approach and its high assets and commercial access and interconnection with other cities. At the same time; it will boost its development at the national level. A city with a natural disaster, it can be identified as a city with high potential for development projects. Even though Ratnapura is the administrative center of the country, the development of the city can be further enhanced by the implementation of new disaster mitigation projects. Balangoda is one of the best cities in which to live. Therefore, infrastructure development projects are a good fit for this area.

Cities such as Kuruwita, Kegalla, Mawanella and Galigamuwa have been upgraded by an integrated system which is essential to the existing economy. There are many examples that show that public and private sector participation can strengthen effective responses. However, for a city with strong potential and resources, there must be innovative strategies to restore the situation and advance its development capabilities in the national context. For example, Pallebeda needs political and business leadership, city mobilization, commercial backgrounds and resources. The development of the province can be formalized and strengthened by promoting a hierarchy of cities with the potential for further investigation of regional conditions to encourage a broad, inclusive approach to urban development, strengthening decisions and strategies. Selecting specific cities is also important.

By publishing a hierarchy of cities and setting the model for measuring city development, with the potential for further investigation into local conditions to encourage a broad, inclusive approach to urban development, strengthening judgments and encouraging strategies. Specific cities are also important.

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ANNEXES

Province	District	MC	UC	Total	
				District	Province
Western	Colombo	4	2	7	35
	Gampaha	2	5	7	
	Kalutara	0	4	4	
Central	Kandy	1	4	5	18
	Matale	1	0	1	
	Nuwara - Eliya	1	2	3	
Southern	Galle	1	2	3	14
	Matara	1	1	2	
	Hambantota	0	2	2	
Northern	Jaffna	1	3	4	10
	Mannar	0	0	0	
	Vavuniya	0	1	1	
	Kilinochchi	0	0	0	
	Mullaitivu	0	0	0	
Eastern	Batticaloa	1	1	2	12
	Ampara	1	1	2	
	Trincomalee	0	2	2	
North western	Kurunegala	1	1	2	8
	Puttalam	0	2	2	
North central	Anuradhapura	1	0	1	2
	Polonaruwa	0	0	0	
Uva	Badulla	1	2	3	8
	Monaragala	0	1	1	
Sabaragamuwa	Ratnapura	1	1	2	6
	Kegalle	0	1	1	
	Total	18	38	57	113

KEY DRIVERS AND INDICATORS			
KEY DRIVERS AND INDICATORS	SUB-DRIVER INDICATORS	TYPE OF DATA	ASSESSMENT INDICATORS
ECONOMY			
1. Business Growth and Performance	a. Comparative revenue performance of firms on the first half of 2018 relative to 2017	Qualitative /quantitative data	Twice national average = 5, 1.5 national average = 4, National average = 3 up to 0.5% national average = 2 less than 0.5% national average = 1
	b. Growth in the Number of registered businesses in 2016	Qualitative /quantitative data	Twice national average = 5, 1.5 national average = 4, National average = 3 up to 0.5% national average = 2 less than 0.5% national average = 1
2. Access to Finance	a. Number of universal/commercial banks in 2016	Qualitative /quantitative data	2 times national average per capita = 5, 1. = 4, = 3,, 0.5 = 2 <0.5 =1
	b. Ease of access to Credit from Banks	Qualitative /quantitative data	working age population have bank account and have access to credit More than 90%=5, >75 = 4, >50 = 3, >25 % = 2 , <25 % = 1
3. Business Dynamics	a. Membership to local business chamber of Commerce or industry Association	Qualitative /quantitative data	>25% business enterprises involved in industry/business Association = 5 , 10%-25% = 4 10% involved in business association = 3 5% = 2 less than 5% = 1
	b. International Orientation of Business	Qualitative /quantitative data	High Level of International business focus = 5 High Level of regional business focus = 4 High Level of national and interprovincial business focus= 3 High Level of provincial business focus = 2 Mainly local business focus = 1
	c. Level of Risk Averseness by Business and Government		1. Very weak =1, 2. Weak =2 3. Moderate=3, 4. Strong=4, 5. Very Strong =5
	d. Level of Business Collaboration	Qualitative /quantitative data	Strong International Cluster of collaborating competing firms = 5 Small Cluster of

			<p>nationally competing firms with some collaboration = 4 Moderate level of Business Collaboration between a networks local firms = 3 Limited Business Collaboration between competing firms = 2 Little of no collaboration between firms and businesses = 1</p>
4. Property Markets	d. Efficient and effective land and property markets	Qualitative /quantitative data	<p>Land and property markets are highly transparent and highly efficient/effective = 5 Some constraints and minor issues with transparency in land and property markets = 4 Functioning land and property markets but concerns about efficiency and transparency = 3 Significant inefficiencies and concerns about transparency in land and property = 2 Major problems related to efficiency and transparency in land and property markets (No public record of sales and values)= 1</p>
Level of Research and Development in Businesses and Government			<p><i>Percentage of businesses expenditure goes to R&D and business development: 1. Less than 2.5% =1mark, 2. 2.5%-5% =2marks 3. 5%-7.5% =3marks 4. 7.5%-10% =4marks 5. More than 10% =5marks</i></p>
Innovation and creativity			<p>Indicator provides a measure of business and government interest in local innovation entrepreneurs and innovation which is to the development of competitive economies; 1. Little business and government interest=1marks 2. Some government interest in local innovation=2marks creativity and entrepreneurship 3. Moderate business and government interest=3marks</p>

			4. Growing business and government interest and support =4marks 5. High-level business and government interest and support =5marks
5. Technology, Innovation and Information	a, General use of ITC in business and government	Qualitative /quantitative data if available	>75 % firms and government agencies use of internet and computers for conducting business = 5 , 60 -75% use = 4, 40 -60 % use = 3 , 20-40%use = 2 < 20%use =1

HUMAN RESOURCES			
1. Workforce Skill base	Over-all quality of skills of present workers/ employees	Qualitative/q uantitative data if available	Skilled workforce with more than 40% with professional/technical/trade qualifications = 5: 30% - 40% with qualifications = 4 20-30% with qualifications = 3 10-20% with qualifications= 2 <10% with qualifications = 1
	Business Management Skills	Qualitative/q uantitative data if available	Very high level of Business and Public Sector Management skills (10% workforce classified as managers in census) = 5: High = 4, Moderate = 3, Low = 2, very low (<2% workforce classified as managers in census)= 1
International Language Skills			Indicator of the extent that the local economy is engaged in international business 1. Majority of the work force communicates mainly in a mixture of local dialect 2. Majority of the workforce have basic literacy skills in the national language 3. Majority of the workforce have literacy and

			communication skills in the national language(s) 4. The majority of workforces have good national written and communication skills and some international language communication skills 5. A high proportion of senior public officials and managers have good international language skills
2. Available Manpower	Availability of qualified job applicants	Qualitative/q uantitative data if available	Very large pool of skilled persons to meet job markets demands = 5 large to moderate pool of skilled persons to meet skilled/semi-skilled job markets demands = 4 Moderate range = 3, limited to moderate = 2 very limited (very hard to get qualified staff to move to location) = 1
3. Skills-enhancement programs	Presence of skills enhancement programs for the unemployed or job-seekers being implemented by the city councils/ local government	Qualitative/q uantitative data if available	Many skills and educational development programs provided by firms, institutions and government = 5: moderate = 4 Limited skills development programs =3: A few but very limited or no skills development programs = 2 little or none = 1
4. Research and Knowledge Development	research facilities and activities	Qualitative/q uantitative data if available	High Concentration of International Research and Development, Higher Education facilities and activities = 5, Good National Research and Development, Higher Education facilities and training activities = 4, Good Regional University and research centers and training =3, Research undertaken in regional by national agencies/NGOs/consultants = 2 University or Technical college but not research active

5. Education Facilities and Services	Level and Quality of Higher education facilities	Qualitative/q uantitative data if available	International Level Universities = 5 High Quality National Universities and Schools = 4 High Quality regional university/schools = 3 Lower grade quality regional university/technical colleges and high schools = 2 Poor quality education faculties
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INFRAS TRUCT URE			
1. Transport ation	a. Average travel time to reach the airport from the city center or average commute time	Qual itati ve/q uant itati ve data if avail able	Less than 30 minutes to Airport = 5: less than 1 hour = 3: More than 1.5 hours = 1
	b. Levels of congestion on roads and public transport system	Qual itati ve Asse ssm ent	Very Low levels of congestion (level of service A with traffic average speeds >50 Kmh = 5 Low Moderate levels with average traffic speeds >40 Kmh =3: moderate with traffic speeds >30 Kmh = 3, Low with traffic speeds >20 Kmh = 2, Very Low < 20 Kph = 1
	c. Quality of regional road network servicing the city	Qual itati ve Asse ssm ent	Very High quality, maintained and accessible regional Network = 5 High quality, maintained and accessible regional = 4 Moderate quality, maintained and accessible regional = 3, Poor quality, maintained and accessible regional = 2 Very poor quality, maintained and accessible regional = 1
	d. Over-all level and management of transportation services	Qual itati ve Asse ssm ent	Very well developed, efficiently managed and maintained integrated public transport systems = 5, Good well, managed and maintained public transport system = 5 Moderate, but generally well managed public transport systems and services =3, Poorly developed, managed and maintained public transport systems = 2, Very poorly managed public

			transportation system = 1
2. Urban Infrastructure Services	a. Over-all reliability of water services	Qualitative Assessment	Very high quality and level of reticulation with few water shortages or pressure loss across systems > 95% coverage = 5 High level of reticulation with minor water shortages or pressure loss across systems > 90% = 4 Very good levels of service supplying > 100 litre per person per day > 75% coverage =3 Moderate levels of service supplying with some shortages across the network >50% coverage = 2 Very poor supply systems with breakdowns and occasional discolored water < 50% coverage = 1
	b. Over-all reliability of electricity service	Qualitative Assessment	Very high quality electricity service, reliability of supply and stable voltage = 5 High quality service, reliability of supply and stable voltage = 2 Good quality service, generally reliable supply with occasion failures and stable voltage = 3 Moderate levels of service, but fluctuation in voltage and occasional losses for more than 30 mines = 2 Very poor unstable supply system with breakdowns regular brown out = 1
Overall reliability of telephone and internet services (<i>WDI: Telephone subscribers (per 100 ppl), Internet users (per 100 ppl)</i>)			1. Very weak 2. Weak 3. Moderate 4. Strong 5. Very Strong entrepreneurial/risk-taking mindset
Overall quality and design of physical infrastructures building and facilities servicing the needs of the city			1. Very weak 2. Weak 3. Moderate 4. Strong 5. Very Strong entrepreneurial/risk-taking mindset
3. ITC Services	a. ITC network services	Qualitative Assessment	Very high 4-5 G quality ITC systems and internet with fiber cable services to the home = 5 high quality 3-4 G ITC systems and local internet fiber to central business and industry areas and nodes and local area WIFI services = 3 Good quality 3 G plus ITC systems with internet s = 3 Moderate levels of ITC network cover = 2 Very poor network coverage= 1
	b. Average download Speed	Data if Available	>20 Mbs = 5, >10 Mbs = 4, =>5Mbs =3, >3Mbs =2 < 2 Mbs = 1
Adequacy of			1. Less than 50% coverage 2. 50%-75% coverage 3. 75% -85% coverage 4. 85 - 95%

drainage system (flood protection)			coverage 5. Full city coverage (Risk mitigation plans and adequate infrastructure to avoid serious flooding in more than 95% of urban area)
4. Waste Management	City government's management of waste and sanitary services and disposal	Data if Available	Full City Coverage = 5 75% coverage = 3 < 50% coverage = 2
5 General Maintenance of Infrastructure	Maintenance of the city's Infrastructure and Assets	Data if Available	High level Infrastructure = 5 Moderate Level Maintenance = 4 Basic Maintenance only = 3 Low level Maintenance = 2 Little or no Maintenance = 1

GOVERNMENT CONTRIBUTION			
1. City Government Regulation, plans and Policies	a. Performance of the city government in the implementation of the business-related regulations	Qualitative Assessment	Highly responsive to business regulation reform = 5: Moderate = 3 Not responsive = 0
Level of devolution of national government responsibilities to city governments for the regulation of businesses			1. Very low level of devolution of functions and responsibilities 2. Low level of devolution of functions and responsibilities 3. Moderate level of devolution of functions and responsibilities 4. High level of devolution of functions and responsibilities

			5. Very high level of devolution of functions and responsibilities
	b. enforcement of land- use regulations (e. g. zoning)	Qualitative Assessment	Strong Commitment to enforcement = 5: Moderate commitment = 3: No Commitment = 0
Performance of the city government in amending legislation to respond to new business needs			1. No amendments made to laws, regulations and ordinances (although many are required) 2. Less than 50% of regulatory amendments requiring change have been made in last 5 years 3. A limited number of regulatory amendments have been enacted in the past 5 years 4. More than 50% of regulations requiring change have been amended in the past 5 years 5. Most Regulations have been actively amended in the past 5 years
2. Investment Promotion	a. Performance of the city councils in promoting local business outside the city	Qualitative Assessment	Municipal, Provincial and Central governments very highly engaged in international investment promotion for city = 5, Municipal and Provincial engaged in international investment promotion of city = 4, Municipal and Provincial governments engaged in national investment promotion of City = 3, Provincial governments mainly engaged in national investment promotion of City = 2, Municipal and Provincial governments not very engaged in promotion of city = 1

3. Effectiveness of City Government in dealings with business	a. Transparency of the city council in its dealings with their businesses	Qualitative Assessment	Processes for business and development approvals and access to information are highly transparent = 5 Moderate to high (public access to non-confidential information upon request) = 4, Moderate = 3 Moderate to Low = 2, Low (high levels of secrecy and non-disclosure of information) = 1
Performance of the city government in implementation of policies simplification and streamlining of business procedures	High level of performance of the city/provincial governments in crafting or implementing new legislation/regulation reforms responsive to new business needs	Qualitative Assessment	High level of performance of the city/provincial governments in crafting or implementing new legislation/regulation reforms responsive to new business needs = 5 high to moderate = 4 moderate = 3 Slow = 2 not very responsive = 1 resistant = 0
5. City Political Leadership	Leadership of the city mayor in responding to the needs of investors	Qualitative Assessment	Mayor is internationally recognized or known as strong civic leader = 5 Mayor is national recognized or known nationally as strong civic leader = 4 Mayor is provincially recognized as strong civic leader = 3 Mayor is well known locally as strong civic leader = 2 Mayor is weak civic leader = 1
6. City Administration Planning and Management	Performance of the city administration (2012-2016) in responding to the needs of investors	Qualitative Assessment	Very high of civic public administration, planning, management and leadership (strong city council adopting international best practice local government)= 5 Moderate to high = 4, Moderate= 3 Moderate

			to low having weak internal administration, coordination between agencies on planning and management = 2 Low or poor public administration and management= 1
Local Government Fiscal Autonomy			
Level of intra-governmental cooperation			

QUALITY OF LIFE			
1. Public Amenities	a. Range and quality of the city' recreational facilities such public parks, open spaces and playgrounds	Qualitative/ quantitative assessment depending on data	Very high quality well maintained public parks and gardens with > 15% urban area as public open space = 5 Moderate to high >10% urban area as public open space = 4 moderate > 5 % = 3, Low moderate > 3 % = 2 , Less than 3% urban area as open space = 1
	b. Range and quality of the Cultural facilities	Qualitative/ quantitative assessment depending on data	High International level cultural facilities and places of interest (international museums, theatres, art galleries) = 5 High level national or municipal facilities relative to city size = 4 Moderate level of facilities relevant to city size (i.e. has a museum and theatre) = 3 : Low level of cultural facilities = 2 City has poor or very few facilities = 1

	c. Range and quality of sports facilities	Qualitative/ quantitative assessment depending on data	High International level of international and national department stores or boutique shopping = 5 High level national department stores or boutique shopping relative to city size = 4 Moderate range of department stores and comparative shopping relative to city size (i.e. has national franchise shops food and clothing) = 3 : Narrow range of specialized shops but high number of shop housing and large public market relative to city size = 2 City has poor range of shopping facilities and markets relative to population size= 1
	c. Range and quality of Shopping facilities	Qualitative/ quantitative assessment depending on data	Very clean and well maintained city at international standard (i.e. Singapore) = 5 Moderate to high maintained city (little rubbish on streets and private property) = Moderate (regular street cleaning) 3, Moderate to low with litter and waste left in public spaces for long periods of time = 2, Low resulting in little of no street cleaning of public and private spaces = 1
2. Environment Sustainability	a. Air Quality and Pollution	Qualitative/ quantitative assessment depending on data	Very High > than PM10 standard of 10 µg/m ³ annual mean = 5 High to moderate: WHO standard PM10 standard of 10-20 µg/m ³ annual mean = 4 Moderate PM10 standard of 20 µg/m ³ = 3, < less than WHO PM ₁₀ standard of 20 µg/m ³ annual mean = 2 Severe > PM10 standard of 50 µg/m ³ annual mean (people wearing surgical

			masks) = 1
	b. Water Pollution and Drainage	Qualitative/ quantitative assessment depending on data	Highly efficient drainage, no flooding or stagnant water bodies and few mosquitos = 5 Efficient drainage, short-term flooding and pooling after heavy rains = 4 Good Drainage and limited isolated flooding = 3 Poor drainage with pools stagnant water and mosquito problems = 2 Impeded flooding and stagnate water bodies susceptible to severe water Bourne infectious diseases and other pests during wet season = 1
	c. Natural disaster and climate change risk	Qualitative/ quantitative assessment depending on data	Very Low risk likelihood and impact of severe natural disaster occurring next 100 years i.e. severe flooding from typhoons, earth quake = 5 Low to Moderate (<10 % urban area severely flooded or affected once in 50 years) = 4 Moderate (urban area severely flooded or affected by natural disaster once in 25 years)= 3 Moderate to Low (urban area severely flooded or affected by natural disaster once in every 10 years)= 2 Moderate to Low (urban area severely flooded or affected by natural disaster once in every 5 years or less)= 1
Quality of Housing			
Monthly Rental costs		Qualitative/ quantitative assessment	<30% HH Income = 5 Moderate 20% HH income = 3 : Low< 10% HH

		depending on data	income = 1 HH income and Expenditure surveys
4. Peace and Security	a. Public Safety	Qualitative/quantitative assessment depending on data	Very High levels of public safety, policing and surveillance: safe to walk on city streets during day and late at night = 5 Moderate High safe to walk on city streets during day and evenings = 4, Moderate; safe to walk in well-lit public spaces in evening = 3 Moderate to Low, some parts of the city not safe to walk at night = 2 Many parts of the city not safe or secure during the night.
	a. Levels of Crime	Qualitative/quantitative assessment depending on data	Very Low (international low levels rate of crime e.g. Singapore) = 5 low to moderate Crime rates per capita 50% below national average crime rate = 4 Moderate national average = 3 : high 50% above national average per capita = 2 Very high 100% + above national average per capita = 1
5. Public Health	a. Hospital beds per 10000	Qualitative/quantitative assessment depending on data	Very High >30/10000 persons = 5 Moderate 20/10,000= 3 : Low <10/10000= 1
	b. Doctors per 1000 population	Qualitative/quantitative assessment depending on data	Very High >30/10000 persons = 5 Moderate 20/10,000= 3 : Low <10/10000= 2
	c. Percentage of households with access to potable water	Qualitative/quantitative assessment depending on data	>95% = 5 Moderate 80% = 3 : Low < 65% = 1

6. Equity and social inclusion	% Population below poverty line	quantitative	Below poverty line=5 Same to poverty line=3 Above poverty line=1
	% Population lives in underserve settlements	quantitative	
	Male to female school enrolment rate	quantitative	
	% Women in government jobs	quantitative	
6. Civic Pride	a. Level of civic pride in appearance of city	Qualitative/quantitative assessment depending on data	Very high level of pride in the appearance of the city (High quality well-maintained and kept public and private assets, buildings, monuments, facilities and cultural traditions and assets = 5 high to moderate = 4, Moderate (most public and private assets, building and monuments maintained, painted or refurbished every 10 years = 3 Moderate to Low: Many public and private assets, building and monuments not well maintained, painted or refurbished every 10 years = 2 Most public and private assets, building and monuments are not well maintained, painted or refurbished = 1

Source- Compiled from literatures