1. INTRODUCTION

1-1. Research Background

Historic Urban Centres (HUC) are an expression of the diversity of societies throughout history that embody the values of traditional urban cultures. In Latin American cities, the centre has followed a particular pattern that gives it an important recognition in the shaping of the urban structure. The origins can be traced back to the Law of the Indies, where the Spanish prescribed for each town a certain structure particularly focusing on the plaza, with the Church and the City Hall as key elements of the colonial Spanish-American city layout. This plan was repeated in every colonial Spanish-American city. At present, due to their historical and cultural value, the tourism industry has provided an increasing importance for the rehabilitation of the HUCs where they remain and also represents a potential driving force in the socio-economic development of developing countries.

HUCs face, therefore, a double challenge. First, although the traditional centre remained a vital cultural and historic area, with numerous churches and monuments, the environment of the traditional centre became physically degraded, damaged or even destroyed by the impact of the urban development that follows modernization everywhere. Thus, HUCs have to ensure that tourism and modernization is developed and managed in such a way that does not contribute to the deterioration of the urban environment. Secondly, they have to be able to respond to the expectations and needs of the growing number of tourists who are attracted to their varied array of cultural, entertainments and shopping attractions.

1-2. Outline of the City of Granada, Nicaragua

The city of Granada is one of the first colonial Spanish-American cities founded in Central America, it is an example of a Spanish city founded in 16th century that still present till now and almost intact with its original urban structure. The HUC of Granada has the unique characteristic that up to now continues an important nucleus of administrative, economic, political and religious functions (Fig. 1 and Fig. 2).

1-3. Research Purpose

This research pursues the following three objectives:

1) To examine urban morphological models of colonial cities.
2) To clarify the geographic settings, historical development and characteristics of the colonial Spanish-American city.
3) To identify and clarify the present physical conditions and transformations of the case study

1-4. Research Method

Based on the concept of urban morphology that refers to “the study of the physical fabric urban form, which consists of streets patterns, building sizes and shapes, architecture and density”, this study is oriented to the form and structure of the traditional housing building typology.
The field survey consisted of the collection of physical characteristics from HUC composed by 106 blocks (93.46 hectares). Subsequently, 69 traditional Spanish colonial houses were also surveyed to find out the different transformations on the historic urban environment.

2. TRANSFORMATION OF COLONIAL URBAN MORPHOLOGY MODELS OF ASIA AND LATIN AMERICA

The method used for this study consists of the analysis of the urban structure models elaborated by other researchers. Based on the theory that colonial cities do share similar characteristics besides the different colonizers, these models were analyzed and compared among them as well as with some cases of study in order to point out common and different features.

2.1 Spatial Patterns on Asia and Latin American Cities

The most obvious effects of European and later United States expansion in developing countries were the creation of new cities, the generation of new urban forms, and sometimes the destruction of previous existing urban cultures. Most of these cities have the common feature of a previous colonial status and the urban pattern of them depends on the colonies of which they were a part of (Table 1).

2.2 Transformation of the Urban Morphology Models

(1) South and South-East Asian City Model

South Asian cities were originally built with a walled fort. The western style CBD and distinct commercial segments have been developed according to whether the entrepreneurs are Chinese, Indian or European. In the case of South-East Asian cities, the concept was commercial center rather than military. In order to control the economic role of the urban population, segregation policy of dwelling areas was implemented. On 20th century modernization process had been taken place in port cities starting by urban infrastructure evolutions. More rational functional and economic principles had replaced racial principles in the urban morphological organization (Table 2).

(2) Latin American City Model

During the early colonial period, the spatial pattern concept was centralized around the main plaza. On 19th century, changed to lineal with a main industrial ax. Subsequently, it changed to a polarized concept as a result of rural immigration to urban areas. The polarized concept has evolved to the present sprawl stage. The social status, previously associated with nearness to the centre of the city, became related to distance away (Table 3).

Table 1: Common Characteristics of Models

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>South-East Asian City</th>
<th>Latin American City</th>
<th>Asian City</th>
<th>Latin American City</th>
</tr>
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</table>

Table 2: Transformation of Asian City Model

<table>
<thead>
<tr>
<th>Period</th>
<th>Characteristic</th>
<th>Model</th>
<th>Concept</th>
<th>Special</th>
<th>Class</th>
<th>Urban</th>
<th>Organisation</th>
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</thead>
<tbody>
<tr>
<td>16th century</td>
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Table 3: Transformation of Latin American City Model

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<tr>
<th>Period</th>
<th>Characteristic</th>
<th>Model 1</th>
<th>Concept</th>
<th>Special</th>
<th>Class</th>
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<th>Organisation</th>
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<td>19th century</td>
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This aspect is considered as a fundamental base that throughout the process of urbanization and urban growth from 16th century onwards was determinant in the re-shaping and transformations of them.

3. AN APPROACH TO THE COLONIAL SPANISH-AMERICAN CITY LAYOUT

On this study was considered the case study of the city of Granada, Nicaragua. It is focused on the comparison between the implementations of the Law of the Indies and the present urban structure of the city.

3-1 Definition of Colonial Spanish-American City

The colonial Spanish-American city was a self-governing polity set up in 16th century with local councillors in charge of running an urban center and extensive hinterland populated by Spanish settlers, Indian villages and the unofficial communities sprang up in countryside.

3-2 City Planning Principles of the Colonial Spanish-American Cities

These principles are called "The Law of the Indies" and are considered one of the most important documents in the history of urban development. The fact that almost without exception they were followed in the construction of so many towns throughout the Spanish possessions in the Americas makes them doubly significant. The laws contained instructions for sitting, laying out, and building new towns that were implemented either partially or fully over three centuries. It has been argued that these regulations grew out of the experience gained on city planning efforts.

3-3 Comparative Analysis on the Implementation of the Law of the Indies in the Case Study

(1) Site Selection

"It had to be in an elevation with means of fortification and fertile soil, plenty of land for farming, fresh water as well as native population". The site selection of Granada corresponded to the location of Nicaragua Lake and its connection with the Atlantic and Pacific Oceans as an important commercial route.

(2) City Structure

The Major Plaza has to be the starting point for the town, surrounded by the most important religious, government, commercial buildings and the upper class houses. The middle and the low income groups were located in the periphery.

3. ANALYSIS ON THE TRANSFORMATIONS OF BLOCK, LOT AND TRADITIONAL SPANISH COLONIAL HOUSING TYPOLOGIES

4-1 Blocks Typology

(1) Representative Block Proportions

The original block proportions were a square shape (84m x 84m), initially divided into four plots but, soon divided into narrower plots.

(2) Block Typology by Shape

It was clarified that the grid pattern layout of Granada is composed by irregular blocks with different shapes and sizes.
dimensions. Based on the Law of the Indies block patterns, the typology of block transformation was built and found out nine different types. It can be suggested that due to various destructions of the city on different periods of time, the original morphology was altered after being rebuild progressively (Table 4).

Table 4 Block Typology by Shape

(3) Block Typology by Visual Elements

This typology was built based on Kevin Lynch’s theory of Good City Form about “legibility of the cityscape”. Some elements of the urban structure that create a visual image such as squares, landmarks, city edges and street segments were used for this typology, five types were identified (Table 5).

Table 5 Block Typology by Visual Elements

4-2 Lots sub-division Typology

The HUC of the case study has a total of 1764 lots. The lot area average is around 250m² located at the peripheral area of the HUC. These lots with an average area up to 1000m² are located at the central area of HUC. These findings show up that the original urban structure and the special distribution concept based on the hierarchy and social status still present up to date. Seven types of lot were found out based on the shape, area and location within the block (Table 6).

Table 6 Lot Typology

4-3 Traditional Spanish Colonial Housing Building Type

(1) Housing Typology

The housing type of Granada can be described as a succession of volumes from the street to the back of the building without front or side setbacks from the property lines. The main element is the courtyard. Based on the number of courtyards the housing typology was built. Table 7 Housing Typology

Based on the field survey, it was clarified a group of houses located at the interior and corner lot with 1, 2, 3 and 4 courtyards (Table 7).

(2) Housing Transformation Typology

After being identified the typology of the traditional Spanish colonial housing, and comparing with the present physical conditions, it was also found various types of transformations. These transformations are mainly the changing of land use and consequently changes of the internal distribution as an effect of the tourism trade.

Table 8 Traditional Housing Transformation Typology

For the internal distribution of the traditional housing, eight different types of transformation were found out. Transformations of the courtyard were also analyzed and clarified six main modifications (Table 8 and 9).

Table 9 Courtyard Transformations

From this analysis of block, lot and housing transformations, it is concluded that besides this physical changes Granada still conserving in significatively the characteristics of a Colonial Spanish-American city up to date.

5. CONCLUSIONS

In this study we clarified that Traditional Spanish-American cities have been reshaped in the process of transformation at different levels. From the first study in chapter two it is pointed out that Latin American cities at present time possess most colonial characteristics compared with the Asian colonial cities. Consequently, it was pointed out through the chapter three that the Law of the Indies were not fully implemented but up to date Granada retains the main elements of city planning that characterized the colonial Spanish-American cities.

On the analysis of chapter 4, it was clarified the variations of block, lot and housing transformations. In summary, it can be concluded that in spite of these transformations the HUC of Granada maintains continuity and persistence of form, what represents a meaningful value at the present time.

REFERENCES