TRANSFORMATION A WAY TO MAKE AN OLD BUILDING POTENTIAL FOR INCOME GENERATION: A STUDY IN CORE DHAKA, BANGLADESH.

Shihabuddin Mahmud
College of Architecture and Planning – University of Dammam,
Dammam 31451 – Kingdom of Saudi Arabia

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A substantial amount of transformation in the old buildings of Dhaka has been observed in the last three decades. A major cause for such transformation is due to an ever increasing demand in housing. The impact of globalization also made enormous changes in such dwellings. The landlords of the traditional houses of Dhaka have realized the potentiality of these buildings to be subdivided into rental units for income.

In the recent past, a group of businessmen in the name of developers now is offering attractive propositions to the land owners for reconstructing apartments or market buildings. As a result, it has become difficult to preserve/conserve these old unique buildings with historical and architectural values. This study attempts to examine the process of transformation of the domestic spaces and to evaluate how the tenants or the landlords transform such spaces for income generation.

Keywords: Transformation, Traditional Housing, Conservation, Domestic spaces, Dhaka.

1. INTRODUCTION

Housing transformation all over the world, especially in major cities has continued to attract concern from economic and social stakeholders as the built environment is changing rapidly. The low-income earners in the urban areas of the developing countries live in inadequate housing where cities are congested and functional obsolescence in buildings have become the order of the day. This is a situation where households carry out far reach alterations, extension, modification or addition to the original forms, extent, patterns and uses of their buildings including their immediate environment. Various reasons may be responsible for this fast overwhelming practice (Aduwo, E. B., 2011). Therefore, it has become imperative to look into this prevailing phenomenon in order to understand why it is gradually becoming a prominent feature in most low-income neighborhoods especially in the third world cities.

According to Franklin (2006) any sort of housing and its gradual transformation is a reflection of cultural and social interaction of a society and the impact of globalization further accelerate this changes even more prominent due to the is the migration of skilled and unskilled labor to the urban centers and also due to the opening of market economy. This demand a substantial amount of traditional dwellings have been transformed in many cities and...
Dhaka is no exception. In search for the reasons of such transformation of traditional buildings some social scholars (Kermani & Luiten, 2010; Flanagan, 1990) have concluded not one but a number of factors such as, the social structure of the family is changing from extended to nuclear; the diminishing of guild system as mentioned by Knox & Pinch (2009); the diversity of the jobs and the mobility of the people; the maintenance of traditional dwellings; the emergence of developers and their attractive housing compounds with all modern facilities; and finally the potentiality of the traditional dwellings to convert into rental units for income generation.

“The vacuum was more than compensated by the influx of a rural population in search of opportunities and employment. The old city became a welcome refuge and intermediates stations for immigrants, who rented the old houses, often at the rate of one family per room. The resulting densification, coupled with the fact that absent landlords were not interested in maintaining their houses (investments being discouraged by strict rent control), industrial production geared to immigrant workers occupied all available niches inside and outside the historic city, often transforming old houses into workshops” (Bianca, 2000:253-254).

Dhaka, the capital city of Bangladesh, has long been regarded as one of the fastest growing cities and at present the city accommodates nearly 15 million inhabitants and 50 percent of this population is migrants (Cox, W, 2012). Islam (1996) pointed out that the destitute condition of the migrant’s couples with the severe shortage in the supply of residential land accelerated the transformation of the traditional dwellings especially in the old part of Dhaka (see Figure 1). In Dhaka the traditional houses have gone through two different phases of transformations, first by the original Hindu Jamindar (landlord) families and secondly by the current Muslim occupiers. In 1947, when the Indian sub-continent had been divided, many such Jamindars sold their properties to the local Muslim families and moved to India and thus the Muslim became the owners (Rahman, 2001). After 1947 only a few areas of the old city such as Sutrapur, Dalpatti, Bangla Bazar and around Baksi Bazaar were important locality with all traditional buildings, which has retained its middle class status until today. In 1971 after the liberation war there was one break through because a good number of Hindu families finally decided to move to India and sold their property to Muslim families with a nominal price. These houses are 2/3 storied usually around 100 years old, Islam, N. (1996).

However, for the last two decades due to a number of reasons these houses have been divided and subdivided into many small residential or commercial units. Most usual case is the owner moved to the new part of Dhaka to the apartments for education and better living conditions to achieve for their children. The chronic problem of traffic jam in the old center is another important reason; maintaining such big houses for the old generation is almost impossible; and these houses are potential for rental uses and other commercial enterprises. Thus, these houses are important in the context of its transformation as there was a major need to accommodate extra population and of course the contemporary pressure to change them according to the modern requirements.

However, this transformation in Dhaka is self-initiated and without the permission of formal authorities and could be noticed in two levels: firstly, by the original landlords (who changed or altered their interior/private spaces); and secondly by the tenants who occupied or take as sublet a portion of the housing unit.

This paper aimed to focus to evaluate the reasons for transformation of the traditional dwellings in old Dhaka and also to understand up to what extent this transformation is viable and justified that become inevitable phenomenon especially in old Dhaka.

1.1. Transformation of the Domestic Spaces and its Potentiality
The degree of transformation and its potentiality to change the domestic spaces of a dwelling depends on many individual factors and when there are
Transformation for income generation in old buildings, Dhaka

possibilities of economic return this transformation is even greater. The scope of transformation also depends on the types of residential unit because the transformation of a single unit house can be more flexible than an apartment building.

Transformation of the domestic spaces for income generation is one aspect that got enormous importance especially in the Third world cities because working in the house has an effective poverty alleviation measure, where even poorly paid out-working can make a real difference. The opportunity to rent out additional rooms is important for many households. Therefore, other positive side about transformation is it generates income through subletting extended rooms and using part of the house for informal productive and business activities (Tipple and Ameen, 1999). A vast study on the home based jobs in their domestic space showed that most suitable place for such activities are either their courtyards, rooftop or open verandas and in lack of such spaces, semi-private spaces such as paths or even their bed rooms are extensively used. This indicates that the working space and the living spaces are overlapped with their most necessary daily activities such as sleeping, cooking and eating (Kellett and Tipple, 2000).

In many studies done for post occupancy evaluation shows that through transformation, dwelling spaces along with services are substantially improved; more habitable spaces are created; and additional spaces can be used for economic activities. Thus the consumers of house become the producers of house to some extent (Mahmud, 2001). Shiferaw (1998) points out that despite the inefficiencies, transformation of existing house provides more shelter and in this way the spaces are more efficiently used than any other form of buildings in Addis Ababa today.

Al-Naim (1998a) pointed out that modern technology in the building materials and construction techniques played a very strong role in the transformation of the traditional houses in the Eastern province of Saudi Arabia. Now the social structure is changing and the climate is no longer problematic. After the introduction of air conditioning, assigning rooms for a few activities became possible and the quantity and diversity of furniture increased. Moreover, the perception of people that foreign materials are much better than local materials encouraged their extensive use in a traditional dwelling. However, the installation of electric wires, water supply, and plumbing had structural problems and could not consider the aesthetic quality. In addition, transformers are less crowded than non-transformers and with three to four habitable rooms now available, the children of opposite sex are able to sleep apart and the parents sleep away from children. Consequently several changes occurred in the house-such as the creation of the modern kitchen, closing the courtyard from the roof, and changing of the micro-climate of the traditional houses has been widely observed (Al-Naim, 1998b). After almost seven years Raymond's (2005) experience in Riyadh having similar advantages and disadvantages in case of housing provision and affordability, where he focused a large number of low-income class guest workers who preferred transformed houses in the city center with low monthly rental. In some cases the employer is providing the houses and they also preferring low-income rental houses which were transformed for more workers to accommodate.

From the above discussion, one can argue that, since transformation enables more people it may turn into an overcrowded slum in the city centers where it can be unhealthy living with inadequate facilities which indicates the disadvantage of transformation of the old dwellings.

1.2. Transformation for Reuse and Conservation for Saving Old Dwellings

Cantacuzino (1989) while giving the meaning of Adaptive reuse, he mentioned this as a process by which you preserve and adapt a building with necessary changes. However, historic preservation falls within the wider term “conservation”. Conservation is a planning issue death with policy planning and at the same time it is a cultural enterprise which need to be evaluated in the perspective of a i) a given cultural tradition; ii) a given society expressing as a nation or community (Cantacuzino, 1989). Three basic dilemmas for the preservationist working in a historic context which can also be applicable for Dhaka can be stated as

a. What should be kept the existing building stock in old Dhaka? (And conversely what should be destroyed?)

b. What should be done with buildings chosen to be kept in old Dhaka? (What changes should be made?)

c. What are the costs and benefits associated with the above two decisions for the case of Dhaka?

None of the policy will be successful unless there will be an effective ways of implementing it especially by the local authority (municipality) and for Dhaka a sound administrative structure; a sufficient members of qualified people; and to enact proper law-building code is necessary (Khan, A.M., 2012). Perhaps the most important issue here is how to convince the landlords to keep the same building and not to destroy or reconstruct for apartments or markets by financial encouragement in the term of grants, subsidies and tax relief (see Figure 8 and Figure 9). This policy especially in the 3rd world cities is never effective due to unethical deals with the municipality authority. It is crucial that proper laws should be enacted and these old buildings with architecturally and historically significant buildings should be identified and
protected. It is also necessary to aware the public and to develop consciousness to preserve our old buildings through media and with different activities.

1.3. The Organization and Different Activities in Domestic Spaces

As far as the domestic space organization is concerned the traditional dwelling units in a house illustrates different structures and forms that may not fit the conventional understanding of modern urban housing today. Chowdhury (1998) denotes that the urban houses are nothing but the replica of the traditional houses where male and female domain and privacy of women create a number of semi-private and semi-public spaces.

Bahammam (1998) pointed out that the traditional dwelling grows overtime to meet the ever growing needs of the family, and thus, it can be said that the traditional dwelling was never complete when built. Similarly in a traditional Muslim house, as the grown-up sons got married, the dar (the area or surrounding premises of the house) often had to undergo a division in order to accommodate a new individual unit. Also an additional storey can be added, new units were attached to the main house, or existing neighboring house were connected to the main house. Such architectural transformation that linked to the social evolution of families can be common characteristics in many Muslim cities (Bianca, 2000). Although the development of Dhaka in its initial phase was mainly dominated by Hindu rulers, it reasonably resembles the Muslim characteristics of the incremental development as well as the nature of its transformation process.

The relative independence of the individual sub-units, as well as their multi-functional use, was prerequisite for shifting domestic functions from one place to another- a need which could occur in various ways and for various reasons. There were also possible short-term shifts of the function of a space, depending on climatic conditions. The use of certain space can be different during summer and winter time, with a predominant occupation of the lower floor or the basement in the hot summer period and preference given to the sunnier upper rooms during the winter months. In other instances, the roof terraces were used for open-air sleeping during hot summer nights.

Many studies have evidence that the households of the traditional culture, despite geographical differences use courtyard or backyard as one of the most essential space in their dwellings. Especially in agricultural based societies, courtyards are the most important place for multi-purpose activities and for economic productivity, Rapport, 1969; Samizay and Kazimee, 1993.

The courtyard house was indeed the favored typology of Traditional and old cities and they are enclosed and introverted domestic space responded ideally to the requirements of the social order. However, the courtyard is one of the important elements in Bengali architecture as well. The traditional Bengali house has long consisted of rooms or inward-looking one-room huts around a court. In well-off households, one hut, fronted by an outer court, might serve as the formal setting for social activities. Other huts, preferably south- or east-facing, would be used as family bedrooms. Meanwhile, the kitchen and sanitary areas would be kept to the west, a little apart from the house proper. Hut structures would typically have pitched roofs and small windows, and sometimes be fronted by verandahs. Conceptually and functionally, such compounds were divided into zones, which defined progressive levels of privacy and accessibility. A central organizing principal was an opposition between domains: front and back, public and private, formal and informal, dry and wet, dirty and clean, etc. This bi-polarity served as a guide to the location of various spaces, and still plays an important role in determining house form (Rahman, M. & Haque, F.A, 2001). As the focus and facilitator of household and socio-cultural activities in such a dwelling, the court might play many roles: transitory space, religious space, social space, climate modifier, domain divider, etc. According to Erman (1995) the courtyards also provide a safe play area for small children where mothers while continuing with normal household chores can directly supervise their activities. Therefore, it is therefore the hub of the family that epitomizes the entire dwelling and its life in a house.

Veranda is another important domestic space and often regarded as semi-open space in a dwelling. Although this particular space is present in the modern urban apartment buildings the use of such space especially in traditional societies have less impact in using while in other societies this space is an essential one. A common observation in the most apartment buildings is this space is the most vulnerable for conversion if there is scarcity of space (see Figure 8).

Like courtyard, rooftop is also an important workable domestic space in society, depend on the climatic conditions. In some indigenous housing, rooftop becomes spaces of architectural significance as they complement the space of courtyard in use and social function. Roofops are also favorite places for the children to play different games and it may link to other roofs into a complex network accommodating another level of neighborly interaction (Bianca, 2000). Roof top space in Yemen for example is in contrast to other Muslim houses, as the male reception could also be located at the top of the house. The relatively recent habit of building a mafraj which is pavilion-like enclosed space for men’s social ceremonies, including the popular sessions in the late afternoon and evening, on the roof, with windows
of the houses.

Ahmed and Parry (2002) in studied Mubarak city (which was built western-built laws) and compared with existing low income housing in Cairo. They found that Mubarak city constitutes of blocks of flats that do not reflect people lifestyle and Islamic beliefs and traditions. Despite some disadvantages that exit in the low-income housing in Cairo, the researchers pointed out that residents were able to reach to best solution that would satisfy everyone. This is done through the corporation of residents with their neighbors upon making decisions regarding alterations or building new blocks. Such decisions would respect and consider the local traditions, beliefs and lifestyle of the resident as well as his neighbors. Therefore, the cultural and social makeover seriously impacts the physical environment and the reflection of their life style.

To decrease the conflict between traditional and modern life style some sort of compromise has been done to satisfy the users that is to say to live a fairly modern life and also not disregarding the traditional values and habits. The above discussion is to understand certain spaces that are important in the context of physical transformation in domestic spaces.

The privacy especially for female is the prime factor in the orientation of the domestic spaces and the intention is to provide the maximum privacy desired. The Islamic value of separation of male and female domain within the domestic space also played an important role in the organization and orientation of the houses.

![Figure 2: Explanation of common transformation of the traditional house applied for Dhaka](image)

A) conversion of the animal area to kitchen, bathroom or bedroom, or reconstruction of separate unit. 
B) Dividing some rooms to increase the number of rooms. C) Adding bathroom in the front to serve the guest area. D) Additional rooms on the upper floor, Source: Al-Naim and Mahmud, 2007.

2. RESEARCH METHODOLOGY

The potentiality of the traditional houses were examined by physical form to accommodate new functions, flexibility, location and the accessibility; the age and the quality of present situation, layout and size, function and relationship; and the open and covered spaces in terms of their changing function in Dhaka. How the process of transformation in such traditional houses can achieve a unique architectural form, expression and spatial organization which may be compatible with modern requirements has also been considered. In attempting to understand the spatial organization of the traditional houses and its transformation through time, an analysis of its basic spatial formation, components and elements has been accomplished and examined by means of questionnaires, in depth interviews and personal observations by the authors. For Dhaka case three neighborhoods (DalPatti, Sutrapur and Bangla Bazaar) near Shadargaht Area (centre for old Dhaka) has been chosen to find the traditional houses that has gone through some sort of transformation in its physical layout. This research has been carried out in this area in January 2011 to identify some residential units that are transformed into different commercial enterprises of income generation as well as subdivided for rental income. The basic layout and orientation of these houses although chosen from different neighborhoods are similar except for the materials used. The houses chosen in Dhaka are one, two and three storied respectively and all constructed in British time and under the occupation of Hindu families, author's analysis (Dhaka, 2003). First five houses from each neighborhood were chosen randomly and secondly for the simplicity of this paper one house from three distinctive neighborhoods have been chosen which were constructed by Hindu Jamindars. One major criterion to choose all the houses was to find the previous users to collect reliable information regarding the changes done during their tenure. Other important criteria is to consider these houses within the same time frame that is to say they were all built in the same period and constructed before 1940s.

The questionnaires aim to evaluate the daily interaction of the users with domestic spaces and the degree and the extent of transformation that is done by the owner as well as by the current tenants.

This paper attempts to explore the changes and the transformation of the traditional houses by the occupants during usage according to their social and cultural needs. One of the scopes of this research is to assess the extent of transformation by the occupants firstly by the landlords and secondly while these houses were subdivided by the owners for rental purposes in the old town of Dhaka. In order to evaluate the findings, percentage of the transformation has been quantified in terms of total built up areas of the houses. This research on transformation of the old dwellings and their conservation in Dhaka has been based on a number of assumptions such as cultural values and habits of the dwellers will change due to the limitations and users will adapt with the new environment; economic factor brings the flexibility to transform the traditional dwellings into new functions; subletting or subdivision of spaces and creating of rental units helps the owner for income generation that further
helps to keep the old dwelling is one kind of conservation.

3. DEGREE OF TRANSFORMATION IN THE TRADITIONAL HOUSES

Transformation of a traditional house is inevitable as they are dynamic and ever changing, however, such transformation varies according to the family requirements; their comfort; duration of living; and above all the tenure security. Brand (1994) proposes two categories of transformations namely add-In type and add-On type, where the former one is the changes done within the existing building and add-On type means the additional construction done on the building or within the premises which increase the floor area.

Beside these two types, for our case studies the transformation of the traditional buildings of Dhaka would be evaluated in four main categories namely slight adjustment; addition and division; total conversion; and the reconstruction.

In these four categories of transformation the total reconstruction is slightly controversial as it is questioned whether this fall in the category of transformation or not. However, here it means the transformation of the dwellings in the existing building or some parts of the building without destroying or demolishing the original building and can be considered as partial reconstruction.

Table 1: Four different categories of transformation as a tool for evaluation.

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<tbody>
<tr>
<td>Slight adjustments are usually done by functional change rather than the physical change of the spaces especially in their interiors. Most of the traditional houses were adjusted to be used similar to the new housing types and this changes is due to electricity and availability of modern household equipment such as refrigerator and automatic air cooler. It is a common practice in Dhaka that there is a need for bed rooms that are produced by transforming the function of drawing rooms or storage areas. For Dhaka case the introduction of multi entrances is also done by slight adjustments (see Table 1).</td>
<td>Transformation by addition and division are commonly used in the traditional houses. This kind of transformation enables to increase the numbers of the rooms in the houses to satisfy the needs of the dwellers as well as the owner who sublet their houses. Moreover, most additions are done to provide the services that are compatible with the modern lifestyle. Addition of bathrooms and kitchens within the premises are important as rental units are created. Similarly addition of rooms in the rooftop is common in Dhaka Division also encouraged for the protection of the maximum privacy while the space is shared by more than one families (see Figure 2 and 3).</td>
<td>The transformation by which the places were completely converted physically into another use may call total conversion. As the life style is changing the need for animal or servants area has also diminished and therefore, majority these areas have almost always converted into some kind of new space use. Total conversion mostly observed for economic production of the space such as rooms converting into shops or grocery, clinic or a barber shop (see Figure 2). While the courtyard is difficult to convert, it is possible if there were two courtyards for one of them to be converted to another function. (see Figure 5 and 6).</td>
<td>The demolition and reconstruction of the traditional house illustrates how much the people are influenced by the new housing type, materials, and technology in their decisions on their houses. At the same time, the effect of conversion of many areas into commercial uses increased the land values. The new streets and urban clearance in the traditional fabric were the main factor that encouraged these methods of transformation. However, the location of the house played an important role with regards to its ability to undergo reconstruction. The more the houses were closer to the main street, the more likely the transformation by reconstruction would occur. Other important factor is closer the house to the commercial area, the more likely to be reconstructed as a commercial facility.</td>
</tr>
</tbody>
</table>


3.1. Phases of Transformation in Dhaka

a. Transformation by the Hindu Owners

The houses that belonged to the Hindu owners in the old part of Dhaka were the most generous and aristocratic residential areas for higher income group. Majority of these houses were constructed during British time and ornamentation of classical style is visible by Greek or Roman columns and arches in the front façade (see Figure 4). These houses had three portions; the front portion namely bahirmahal belonged to the male guest. Much later, these rooms had been slightly adjusted and changed into offices or other business enterprises for the owner without changing any physical setting. The major changes occurred during the marriage of their sons who needed a more private area and a separate toilet or bathroom. In the initial phase, these houses had animal area and servant quarter which ultimately had to changed to bed rooms due to lack of spaces and for subletting purposes. One important feature of these houses is having boundary walls with empty spaces as backyards which in need can be developed incrementally as the family size are getting bigger.

b. Transformation by the Muslim Occupiers

A major transfer of the ownership of the traditional houses in old Dhaka to the Muslim families took place after 1947 during the separation of Indian sub-
In 1971 a second phase of such transfer of the title were experienced when many Hindu families finally decided to move Calcutta for good. The transformation during Muslim families were done gradually and in the initial phase, changes are done by converting Puja Ghar into bed rooms; altering the orientation of the toilets; and the position of the kitchens. A major transformation took place just in last two decades which were inevitable due to the increase in the family members and married sons who needed individual living units.

As family members of the second generation started to involve in varieties of jobs rather than having same family business, they started to move to the new development areas of the city and to rent their old dwelling units. Thus the vacant units were further occupied by the middle class or lower middle class tenants working within the proximity. The heavy demand of the rental units encouraged the owners to subdivide the house into individual family units. As a result some basic requirements such as separate entrances, toilets, kitchen and washing areas were created by converting or transforming other domestic spaces. There are also evidences that the landlord also residing in the same house and sublet some portion for extra rental income and also minimizing the maintenance cost.

Legend
A-Animal house, B-Bedroom, BR-Bathroom, C-Courtyard, CH-Chamber for law Office, CL-Clinic, D-Dining DR-Drawing room, FS-family space, G-Guest bedroom, GS-Grocery Shop, K-Kitchen, OL-Office and Library P-Pujaghar (room for worship), PP-Printing press, S-Shop, SD-Study room, SQ-Servant quarter, ST-Storage, T-Tube well, V-Veranda, WC-Toilet
Table 2.a. Transformation by Hindu Jamindars

<table>
<thead>
<tr>
<th>Dhaka Case:1, Gupta Bari (Dalpotti)</th>
<th>Adjustment</th>
<th>(%</th>
<th>Addition/Subtraction</th>
<th>(%)</th>
<th>Conversion</th>
<th>(%)</th>
<th>Reconstruction</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-bed room into chamber and study room for practicing law</td>
<td>4</td>
<td>-toilet and bathroom in the courtyard</td>
<td>2</td>
<td>-animal area into toilet</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-bedroom into family sitting in first floor</td>
<td>4</td>
<td>-tube well and chowbacheha (traditional way for water reservoir) in the bathroom 1st floor new apartment in the second floor</td>
<td>1</td>
<td>-kitchen into study room for children</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-bedroom into Puja ghar</td>
<td>2</td>
<td>-store room, kitchen and servant’s room at the back of the house</td>
<td>15</td>
<td>-Bedroom, guest room and Drawing room converted to printing press and office.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-animal area at the open backyard.</td>
<td>3</td>
<td>-portion of bed rooms into WC</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dhaka Case:2, SenBari (Sutrapur)</td>
<td>-Dining room into bedroom</td>
<td>4</td>
<td>-kitchen and servant room at the back of the house</td>
<td>6</td>
<td>-portion of bed rooms into WC</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-garden in the roof top space in the 1st floor</td>
<td>5</td>
<td>-extension of kitchen into dining space</td>
<td>3</td>
<td>-kitchen into servants quarter</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-addition of Puja ghar in the courtyard</td>
<td>2</td>
<td>-bedroom into kitchen and bathroom in the second floor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>-addition of bedroom, WC in the 1st floor</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dhaka Case:3, Lahiri Bari (Banglabazar)</td>
<td>-bedroom into puja ghar</td>
<td>2</td>
<td>-servants quarter and WC in the courtyard</td>
<td>3</td>
<td>-adding bathroom in the bedroom.</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-bedroom into family sitting in the 1st floor</td>
<td>3</td>
<td>-Veranda into storage</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>-converting a portion of drawing room into office and library</td>
<td></td>
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</tbody>
</table>

| Total | 27 | 41 | 16 | 0 |
Table 2.b. Transformation by Muslim Occupiers

<table>
<thead>
<tr>
<th>Dhaka Case: 1, Gupta Bari (Dalpotti)</th>
<th>Adjustment (%)</th>
<th>Addition/Subtraction (%)</th>
<th>Conversion (%)</th>
<th>Reconstruction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dahka</td>
<td>*Five rental units</td>
<td>3</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>- study room into printing press office</td>
<td>4</td>
<td>-bedroom and bathroom in the 2nd floor</td>
<td>3</td>
<td>- Demolishing the back part and reconstruction of the two-storied dwelling unit.</td>
</tr>
<tr>
<td>- veranda for binding books</td>
<td>3</td>
<td>-guestroom in the 1st floor</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>- guest room in the 2nd floor</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- tube well in the courtyard</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Dhaka Case: 2, Sen Bari, (Sutrapur)</th>
<th>Adjustment (%)</th>
<th>Addition/Subtraction (%)</th>
<th>Conversion (%)</th>
<th>Reconstruction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dahka</td>
<td>*two separate rental units</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>- kitchen and servant quarter into bed room</td>
<td>4</td>
<td>-bedroom into kitchen and storeroom by partition in 1st floor</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>- dining into guest bedroom</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- veranda for patient sitting and waiting</td>
<td>5</td>
<td>-puja ghar into kitchen</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dhaka Case: 3, Lahiri Bari, (Banglabaza r)</th>
<th>Adjustment (%)</th>
<th>Addition/Subtraction (%)</th>
<th>Conversion (%)</th>
<th>Reconstruction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dahka</td>
<td>* adjustment of three rental units</td>
<td>12</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>- rental car parking unit at the entrance</td>
<td>10</td>
<td>-bedrooms into departmental or grocery shops</td>
<td>3</td>
<td>-reconstruction of one storied separate housing unit for sublet at the backyard.</td>
</tr>
<tr>
<td>- new entrance from the side</td>
<td>1</td>
<td>-puja ghar into bathroom</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>-veranda into storage and living</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

* Rental units have been adjusted by modifying some spaces.

4. THE FINDINGS OF THE SPATIAL FORMATION AND ITS TRANSFORMATION

The influence of the Mugol and British architecture in Dhaka is very prominent in their traditional buildings that reflect in the façade if not in the interiors (see Figure 4). In the 19th century the imitation of the neo-classical style followed the Roman and Greek architectural style with arches and columns in the residential building façade of the elite class, which also became popular in the industrial age of British architecture, Raeburn, 1984. Thus, as compared to the Hindu families the way of living of the Muslim families have no significant differences in the old dwellings of Dhaka. Like Muslims the Hindus are also concerned about keeping privacy and particularly the position of women in their domestic spaces (see Table 1).

Traditional Hindu houses can be divided into three portions where the front is allocated for the business talks, strangers and guest mainly for male and as called Kachari located in Bahir mahal, the middle portion consists of a number of bed rooms faced the open courtyard or Uthan and the back portion is for the kitchen, toilets, storages and animal house (Hindu families also used to keep cows for fresh milk) which often called the Andar mahal.

Figure 4: The building façade shows the ornamentation and the architectural expression and influences of the Hindu and Muslim builders, Gupta Bari, Dalpatti, Dhaka
Like Muslims they also maintain specific spaces for male visitors at the *Bahir mahal* and family and friends at the *Andar Mahal*, and likewise distinct domains of opposite sexes. Privacy also maintained by the second story around the courtyard that makes visual obstacles (see Figure 7). In the traditional houses, courtyard is essential spaces for daily activities and also a space for production process for different kinds of income generation. The findings show that though the traditional houses of Dhaka were constructed during Hindu jamindars, due to the space limitation some spaces are used for additional bathroom or kitchen or spaces for water sources especially for tenants, who are sharing many common spaces. (see Figure 5).

Figure 5: Courtyard in the old traditional houses still the center for all domestic activities and the only spaces for further addition and subdivision, Lahiri Bari, Dalpatti, Dhaka

Figure 6: The conversion of doctor’s chamber and the adjacent veranda is a rare transformation in Sen bari, Dhaka by the owners shows the interior space; the conversion of the kitchen into bedroom shows the internal arrangement of the bachelor expatriate, Sen Bari, Sutrapur, Dhaka

Figure 7: The hanging balcony emphasis the courtyard and an scope for women to observe activities downward and control and this style was a symbol for aristocracy for Hindu families in the past, Gupta Bari, Dalpatti, Dhaka

Figure 8: a. Transformation by reconstruction of a number of old dwellings may bring better economic benefit and a bigger shopping mall, Sadar ghat

Figure 9. The majority street in old center is transformed into different shops and markets. In some traditional buildings no renovation has been made but converted in their ground levels while residence is still in the upper floor, Bangla bazaar Source: Author, 2007.
Difference usually made especially in the orientation of the kitchen and every family had a special Puja Ghar (prayer room) adjacent to the courtyard that had a Tulshi tree in the center. However, the Puja Ghar were immediately converted into other functions as soon as the Muslim occupied those houses (see Table 2). In Dhaka all those traditional houses have one or two paved courtyards with water sources and all the rooms were directed to the courtyard as the main center for all activities. Although taking bath in the open courtyard for men and women near Kuatola (well for water) is a practice for Hindu families, the same practice also been done by Muslim families, however, in some houses Muslims also introduced the concept of bathrooms with Chowbachcha (water reservoir) which is comparatively more private space.

The eating habits of the Hindus were also on the floor either in the kitchen or in the semi open space (usually an elevated veranda) adjacent to the kitchen, however, modern styles of using dining tables are introduced during Muslim occupiers. In the traditional houses common toilets (pit latrine) were located separately at the back adjacent to the water sources; the Muslim families introduced separate toilets by converting other spaces as a need for rental units. In some houses, there were probation for servant quarters at the back portion; Muslim families transform them into other functions as there was need for more habitable spaces and for rental units. In many houses, in order to maintain privacy separate entrances were also introduced from different sides of the house. Although roof top space were used for daily activities such as drying food and clothing’s, Muslims further constructed rooms on the roof top and thus many rooftop were diminished (see Figure 7). Having maid or servant is very common in Dhaka, and a middle class family would afford to maintain at least one. The servants in the Hindu families are adopted from the villages and they live with them as a family member and stay even after his marriage. The male servant looks after the domestic animals, cleaning, paying bills, shopping etc, and his wife does the interior works such as cooking, washing, laundry etc.

In Dhaka all four types of transformation (see Table 1) can be observed where the percentage adjustment 27% is equal for both Hindu and Muslim occupiers but the amount of addition and subdivision for Hindu households are more 41% because while Hindu families were living there were incremental development especially at the backyard or in the courtyard space due to the increase in the family size and requirements. However, a more distinct difference is while the Hindu families developed the house horizontally the Muslim dwellers developed them vertically due the lack of spaces. Regardless to say, the Hindu dwellers developed only for their family members to maintain extended family structure, whereas the Muslim families converted them into rental units for extra income. A controversy about the Muslim families is they compensated income with their privacy. By addition, division and conversion of domestic spaces the Muslim families were able readjust rental units but also started building slums or poor quality living.

The organizational principle of the traditional house in Dhaka is primitive in its formation and typically divided into three portions, the front portion for guest hall surrounded by rooms, the middle portion courtyard is also surrounded by rooms and the back portion the servant area/ animal area is again surrounded by rooms. Most traditional houses in Dhaka are two to three storey's and unlike other traditional societies (where houses are developed incrementally as family size getting bigger) developed the whole house during the construction time. Only some construction in the courtyard and in the rooftop is later addition for rental purposes. Therefore, the house prototype is a two-storied courtyard house and the female section is located in the deepest part of the house. In old Dhaka, expansion of the road for motor vehicle was not possible due to lack of spaces; however, very few houses have the AC outlet which are visible.

In Dhaka these rental units can be seen especially for middle income families and the owners are little reluctant to rent it for bachelors who are not married due to social pressure and other tenants who are living with families.

5. DISCUSSION AND CONCLUSION

This study helped to clarify the mechanism behind this transformation that lead to the revelation of the latent potentiality of the traditional houses in Dhaka. Moreover, the potentiality of the space transformation has shown that they are compatible and adaptable for new functions according to the current need of the dwellers in the old city of Dhaka.

When historically significant structures are adapted to new uses through either adjustment or conversion to a new function, there is an obvious price to be paid in terms of their historic, architectural and aesthetic value. This is perhaps true in our case as the notion of conserving the historic building in our old centers are not getting enough careful measures by the development authorities and no volunteers are patronizing either from public or from private sectors as far as the conservation of these valuable buildings are concerned. Unfortunately there is no control system has been implemented as for the rule of subletting or making rental units of these traditional houses in Dhaka. As a result, the landlords are neglecting the unique architectural and aesthetic values of these historically potential buildings. It also shows that the housing demand of the middle class in Dhaka is accommodated by the help of such transformation that solve the scarcity of housing to
some extent which is not possible by the public sector to handle alone.

With a rising population and increasing housing demand, apartment culture has grown up in Dhaka sharply. Twenty years ago there were fewer than five companies in Bangladesh engaged in developing apartments while today there are more than 250 developers. But there are many other companies/individuals engaged in such development in smaller scale or in informal sector. This has prompted many individual entrepreneurs to develop apartment buildings and due lack of empty land, these developers also reconstructing the old and historically important buildings as pointed out by Kamruzzaman, M & Oguran, N. (2011). Thus, one positive aspect of this practice of rental units in the historically and architecturally valued houses is preventing from the aggression of new developers which has become so alarming as these buildings are diminishing day by day.

Therefore, one positive aspect of subletting the house also discourages the demolition of the old dwellings and protect them from new aggression of the developers. Perhaps, the government may intervene at this point to develop some policies by which both the owner and society are beneficial. Some potential old houses also can be converted into other tourist attraction and can be preserved for which compensation to the owner is a must for the case of Dhaka.

This study also revealed that people will adapt with the current space formation if there is no freedom of choice to transform but he will also satisfy him by practicing his cultural, ritual and habitual attitudes within the limitations. The tenants of Dhaka represent a particular group of people with lower-middle income status, who may be not able to pay high rent in the new developed areas choose to live here despite the limitation in services and facilities, however, the rental cost may not be the only reason. Ownership perhaps plays the key role for major transformation in the domestic spaces. The results of the research also show that the percentages of all types of transformation experienced at the time of landlords in Dhaka rather than their tenants (See Table 2a & Table 2b).

The impact of globalization and economy are two interrelated terms that are important for transformation of the traditional buildings. Job opportunities that encouraged migrants to move to the urban centers also make enormous pressure in accommodating people. However, transformed houses in the old centers tried to solve this housing problem to some extent for these low-income people. In addition, it also helped some important spaces allocated for production and generating income for these households, which has many unhealthy and bad impacts. Besides, a number of causalities already experienced due to the chemical warehouse in these houses in old Dhaka.

A number of drawbacks are also a disadvantage for such qualitative research as nothing is so accurate and genuine. In the case studies, the numbers of samples are too low to evaluate and coming to a conclusion. In addition, the families have different requirements and demands, their sizes are also different and above all their physical setting and formation are not identical. Collecting information about previous dwellers and to trace them was difficult. As some data are solely depends on the current occupiers the reliability can be questioned. The percentages of the transformed spaces calculated is an approximate measure that has been quantified in order to compare different phases of transformation and also to understand the spaces that are vulnerable for transformation.

The characteristics of the traditional houses once formed with its socio-cultural and religious values have been drastically diminished as the context have changed as to accommodate the maximum number of families in Dhaka. The separation of male and female domain with Islamic values can also be challenged as for Dhaka’s case there are some contradictions as both sexes share the same space. This further opens a debate whether the ever changing social relationship in modern time and the transformation of the dwelling spaces are unable to provide the desired privacy once played the prime role. However, it is obvious that the socio-cultural factors were more influential than its climatic factors.

It has been understood that the traditional house of Dhaka indeed has great potentiality to accommodate changes. However, transformation has limitations beyond which the essential character of the traditional house ceases to exist. A controversy will still remain as it is possible to impose unlimited physical changes that may surface the characteristics of a traditional house. At this point, the question of reconstruction of the buildings can open a discussion whether it is going to be cost effective, may give another dimension of this study. However, such excessive transformation is not considered within the meaning of potentiality in this study.

REFERENCES

