A METHODOLOGY TO EVALUATE THE TRANSFORMATION OF TRADITIONAL BALINESE HOUSES AS A CONSEQUENCE OF TOURISM

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Abstract
Some traditional houses in Bali have been transformed to tourist facilities. As a cultural phenomenon, the transformation involves an interrelated complexity of aspects in the houses. There is a need for a holistic approach to contextualize the complexity of the impact of tourism on the transformation. Unfortunately, an instrument to identify the textures of the transformation, as a fundamental phase to explore the complexity, is not yet available. The objective of this study is to develop an inclusive methodology based on criteria as the fundamental stage in the multiple holistic methods developed. Using visual documentations of 749 traditional houses from four villages, the findings show that the transformation has been considered in various ways, both as the additive sum of the specific changes, and as a hierarchy of cultural traditions and activities. It was a process generally found to begin at the front part of the houses, followed by the backyard and pavilions, and in the final phase at the family temple. This method was able to systematically assess the physical configuration of the transformed house.

Keywords: Method; baseline data; the traditional Balinese house; transformation; evaluation

INTRODUCTION
Bali is a major tourist destination in Indonesia where its traditional culture has become a major component of the economy (Prameswari, 2005; Ardika, 2007). Tourism has encouraged villagers to transform their traditional houses that formerly were places for performing domestic and socio-cultural activities. The transformation has resulted in a variation of physical configurations and given rise to questions about the continuity of socio-cultural activities and environmental aspects inherent in the traditional house.

As a cultural phenomenon, different spatial configurations produced different impacts on socio-cultural practices (Waterson, 1993; Qian, 2007; Liu, 2009). Given the interrelated complexity of aspects of the house, the use of a mixed method approach, qualitative and quantitative, enables a thorough investigation. This mixed method was used in some previous studies of spatial configuration of traditional Balinese houses in urban and rural setting such as those of Sueca (2003), Sentosa (1994) and Runa (2004). Similarly, in order to examine the complex nature of the transformation as the impacts of tourism, a multiple holistic method, such as baseline data, interviews, questionnaires and architectural examination, was developed.

In this holistic method, identification of the texture and variation of these configurations was required. This identification was a fundamental phase to contextualize the socio-cultural practices in the house. Unfortunately, a generalised instrument to identify the variations and textures was not yet available. Previous studies used non-physical considerations such as occupants’ characteristics and the location of houses as basic information without considering the variation of physical configurations. Since the transformation has produced significant variations, it was important to develop an appropriate assessment method to identify such variations as baseline data. Therefore, this paper discusses the baseline data as a fundamental stage in the holistic
method. The baseline data was used as an inventory to explore the texture of the transformation through empirical and interpretive qualitative criteria.

Research in architectural fields often crosses between quantitative and qualitative methodologies. This can be found in clear divisions across the science and humanities-oriented spectrum of architecture research. What is often underestimated is the integral empirical approaches within architectural field work and the visual observational skills imparted in the education of architects. The method that will be outlined here provides a development of those observation skills into a more systematic research methodology tending towards an empirical base. Such an empirical base stands on its own as an outline of what is going on in relation to the transformation of the houses in Bali due to tourism activity. It can then be used in conjunction with the oral research methods provided by interviews and detailed spatial documentation for a deeper analysis and interpretation as to the impact on the very cultural traditions that are one of the attraction for tourists. Thus the paper argues that a discussion of the methodology in and of itself can contribute to a discourse about tourism and tradition, and can also be adapted, critiqued, built on for sites other than the houses in Bali.

The paper begins with an exploration of the transformation of the Balinese traditions as key information for the study. The development of a baseline survey instrument that established the criteria for data collection is then presented and explained. The ideal configuration of the house was used as the basis to develop indicators for the assessment of the physical transformation. Finally, the physical transformation in the transformed houses is presented along with some conclusions of the strengths and weakness of the method used.

**EXPLORING THE TRANSFORMATION OF THE BALINESE BUILDING TRADITIONS**

A tradition was classically defined as being static with little variation. However, nowadays, tradition is often not viewed as a static phenomenon but a process of gradual transformation (Eisenstadt, 1973) that is influenced by the interaction of a society with foreign cultures (Gusfield, 1967). The notion of tradition is very adaptable and might be transformed in the process of its intergenerational transmission. This transmission process focuses on the interaction intergeneration that is a “chain” and a “bridge” of communication to transfer traditions (Shils, 1971, pp. 125, 134).

In general, culture is a form of communal action representing a unique response to face new social circumstances (Williams, 1983). This unique response is an ongoing process and historically unfinished (Clifford, 1994). The Balinese culture is the result of interactions of the Balinese people with other cultures (Geriya, 2007; Mantra, 1993). This ongoing process of the renewal of the Balinese culture is influenced by a broadly Indian worldview, the Balinese authorities to express their superiority, and by the establishment of Javanese kingdoms, colonial and postcolonial orders (Nordholt, 1986; Vickers, 1989; Agung, 1991). The transformation does not imply that the new traditions were totally adopted. Nor were the old traditions rejected, abandoned or replaced. Rather the transformation consists of selective adoption, where the new is filtered, adjusted and modified to meet the needs and conditions of the Balinese communities.

However, the new creations still are within the framework of their traditions, or, as suggested by Shils (1971), entail attachments of past time representing the high quality of the past, so it can be accepted by their society as an identity. It is transformed through interaction, both inside and outside of the group community, and thus is understood as a continuous process that involves not only the socio-cultural conditions of a group, but also the impact of external forces (Hall, 1990; Logan, 1994; Lim, 2004; Liu, 2009; Oktay & Bala, 2015).

The use of many images adopted from other cultures as ornaments and the application of advanced building materials and technologies in Balinese architecture shows that Balinese societies have accepted new ideas to enrich their culture. In this context, the traditional architecture is undergoing a continuous evolution and adaptation (Vale, 1992; Haddad &
Fakhoury, 2016; Kamalipour, 2016). The use of images of modernity that is shown through new materials and shape express a new identity (Rapoport, 1983). This transformation process is called an architectural hybrid related to the use of modern architectural aspects in the traditional Balinese architecture or vice versa (Wijaya, 2003). Bale bandung/ loji in the traditional Balinese house shows that the traditional Balinese architectural hybrid adopts other cultures as a part of the Balinese identity.

As a part of cultural phenomenon, the traditional Balinese houses, which consists of many pavilions, a courtyard and the backyard, have undergone continuous renewal to accommodate the current demands of the occupants (Sueca, 2003; Sentosa, 1994; Runa, 2004). As suggested by Sueca (2003), the transformation was influenced by many factors such as household type, income and the number of household members. He noted that demands and an increase in family size in urban dwellings of Bali are significant factors in house transformation. Newly married couples may require only one space, but they need more when they have children. In this time, the couple may have a small space and inadequate privacy. They also live in crowded conditions associated with the proportion of space per person and person per room (Tipple, Master & Garrod, 2000; Tipple, 2000). In order to respond and adapt to these new conditions, people have then extended their current houses (Kamalipour, 2016). New structures, constructed adjacent to existing pavilions or by demolishing the old pavilions, have caused the changes of the traditional setting of the house. This transformation has changed the configuration of the house and influences the functions, the expression, the structures and the materials of the pavilions (Widja, 2002).

DEVELOPMENT OF THE ASSESSMENT TOOL
The baseline data survey was developed as a research methodology that is based on the observation of the architectural characteristics of the traditional houses. Specifically, this study focuses on delivering an assessment tool that helps to use the collection data to explore the texture of the physical transformation of the houses. The tool proposed in this study is based on indicators derived from the cultural meanings of the spatial divisions of the traditional Balinese house. Therefore, the methodology of this study consists of four stages:

2. Determine baseline data approach and indicators. In this stage the indicators were based on spatial divisions of the traditional Balinese house that consist of a ‘head’, ‘body’ and ‘legs.’
3. A table or matrix was then designed to record the status of each indicator of the houses during the observations.
4. Using this table, the baseline survey was carried out to develop an inventory and the record the detail of the transformation.

The explanation of the baseline data as the assessment tool is demonstrated and discussed in greater detail below.

Village selection and the houses transformed for tourist facilities
Many villages in Bali were identified by researchers as interesting locations for study and contributed to the reputation of the island as a tourist destination. Up until the 1900s, Kubutambahan and Singaraja Buleleng (the main seaports of the Bali Island); Gelgel and Klungkung (the biggest kingdom in Bali) as well as Sanur and Kuta (the entry seaports in southern Bali) were the villages of interest for visitors or researchers (Agung, 1991; Sprague, 1970). In subsequent years, other villages - Padangkerta, Tihingan, Kedaton, Kamasan and Candidasa – became popular. In the new millennium, however, Nusa Dua, Sanur, Kuta and Ubud are the main resorts and have attracted more attention (Picard, 1996).
Nusa Dua was formerly a sparsely populated area and inhabited by only a few people for cultivating un-irrigated fields. Only kubu - temporary structures – existed on this site and no traditional houses were built. On the other hand, as a historical seaport and the entry point for the Dutch invasion in Badung Kingdom, Sanur was a traditional settlement and in the 1960s emerged as the biggest resort with large investments, financed and managed by foreigners, and relatively closed to the local communities (Picard, 1996). Kuta was well-known as a significant slave market and a traditional seaport. Although later emerging as a tourist destination in the 1960s, it had few visitors. Its economy was labour-intensive, financed and managed by local people, as well as being relatively integrated into the local communities where the villagers opened their houses for tourists. However by the 1970s, Kuta became the favourite tourist destination after being introduced as a beautiful and inexpensive beach resort for backpackers (Picard, 1996). Ubud was a traditional settlement known as an authentic Balinese village where the local people were actively involved in the tourism sector (Picard, 1996). Many foreigners including the artists such as Rudolf Bonnet and Walter Spies who introduced a new traditional painting style, stayed in Ubud (Picard, 1996; Johnsen, 2007). From the 1980s, the number of tourists increased sharply and Ubud became an alternative tourist destination. In contrast to the three previous resorts, Kamasan is frequented by few visitors. Kamasan was an important village in pre-colonial Bali (Vickers, 1996) and now has become a significant tourist village in Klungkung Regency where a traditional style of painting and silver handicrafts have become a major economic activity.

These four villages (Sanur, Kuta, Ubud and Kamasan), which have complex and complementary historical backgrounds and specific reputations in Bali, were selected as the locations of this research. The four villages have a high concentration of the traditional Balinese houses as well as houses transformed for tourist facilities. The houses have been examined through a framework that emphasises their transformation caused by tourism as a dynamic process.

Generally, the traditional Balinese houses in tourism areas were divided into two basic conditions: (i) houses for servicing tourists and (ii) houses not used for tourism. Following a visual inspection from the street in the baseline data survey, this second type was noted in the documentation but was not analysed further. This second type consisted of houses either having no business facilities or having traditional kiosks called warung that are not designed to serve tourists. They could be identified from their facades and merchandise. The buildings were often not well maintained or presented, and the arrangement of commodities was disorganized and untidy.

The houses for servicing tourists were identified by the following characteristics: the presence of a signboard indicating tourist facilities such as a restaurant, home-stay, cafe, art shop, and bungalow, and merchandise associated with the tourist demand, including clothes, paintings and sculpture. These attributes revealed the tourist function although there may not have a signboard. Based on these two types of traditional houses, 345 (46%) of the 749 surveyed were found to be houses transformed for tourism, and the remaining 404 houses (54%) were deemed to be houses that had no tourist role. Since the study focuses on the impact of tourism on the traditional Balinese houses, the houses for servicing tourists were observed and documented from the street as before but also from within their compound, using baseline data instrument.

**Baseline survey approach and indicators**

The evaluation indicators were derived using the cultural meanings of the spatial divisions in the traditional Balinese house, which is made up of a ‘head’, ‘body’ and ‘legs’ (see Figure 1). The head consists of merajan (the family temple) and is the most sacred area (A); the body consists of many bales (pavilions) and a natah (courtyard) (B). The legs, being a profane area called lebuh, consist of the teba (backyard) (C) and the front part of the house (D). In order to identify
changes, the ideal configuration of the traditional Balinese house was used as a reference. While from a cultural theory perspective this is questionable and can be argued to be fraught with ambiguity and contradiction, the ideal configuration is also an operative model in policy and has been disseminated in Bali through various national and international media. In addition it was established as a unified model and reference for tradition as a part of the historical process of the making of Bali. The indicators for visual observation were established around the key components, which are found in traditional Balinese houses. Each indicator was evaluated by several assessments that emerged as ways to represent the condition of the house. The main theoretical considerations and details of the individual indicator and assessment of the transformed houses are described in the following sections.

Figure 1: The divisions of the traditional Balinese house illustrating traditional cultural meanings and sacred association (Source: Authors).

The head: Merajan– the family temple.
The family temple is located in the kaja-kangin corner (see Figure 2). For southern Bali, the location of the four villages, kaja, which is in direction of the holy Gunung Agung, the highest mount in Bali, is to the north and kangin is to the east. It is the most sacred zone where members of household pray and keep contact with God and their ancestors. Physically, it is surrounded by walls and organised around at least three shrines and a supported pavilion called piyasan. A roofed shrine with three side-by-side compartments called kemulan is generally on the kangin (the east) side facing the pavilions of the house. Next to the kemulan is a padmasana, the highest shrine in the family temple without a roof. It has an empty chair on the top, the seat of God called Sanghyang Widhi (Eisman, 1989). In between the padmasana and the piyasan, the other roofed shrines are taksu facing kelod (the south). In the middle, surrounded by shrines and the piyasan, is a natah merajan, which is the courtyard of the family temple, where the people sit for praying.

The ideal configuration was used as the basis to develop indicators for the assessment. Some family temples had incomplete shrines and non-ideal configurations. Others were relocated to the upper storey of the building or relocated to other parts of the house. This phenomenon was translated into a set of assessments consisting of (1) changed ideal configuration and form, and (2) changed location. For the second case, the transformation consists of: a family temple, which is relocated vertically or horizontally. If a merajan was located to the second or even higher storey, the transformation was categorised as “relocated vertically into upper storey.” If a merajan was not located in the sacred zone, it was categorised as “relocated horizontally to other part.”
The body: Bale and natah – the pavilions and their surrounds

The ‘body’ of the traditional compound is a place where the people perform daily and ceremonial activities. This area is divided into two parts: pavilions, consisting of bale daja, bale dangin, bale dauh, paon and jineng, where people perform indoor activities and a natah, the courtyard, where people perform outdoor activities (see Figure 2).

Traditionally, pavilions were designed as multi-purpose spaces so that they were able to accommodate many activities. Cooking was carried out in the paon. In this pavilion, the people also performed a ritual for purification after attending a funeral ceremony. It was located near the jineng, the rice barn. In front of the paon were the bale dauh (western pavilion) and the bale daja (northern pavilion). The interior spaces of these pavilions functioned as sleeping rooms while the verandas were used for both a living room and a dining room. In the eastern part of the compound was the bale dangin (eastern pavilion), the space where people performed ceremonial activities. In the middle, surrounded by all pavilions, was the natah. It was the centre of the pavilions where many outdoor domestic and ceremonial activities were performed.

In the tourism villages, three ways have been identified in which the pavilions in the house compound space have been transformed: the existing pavilions are demolished; new structures are built adjacent to existing pavilions; and transformation of the natah.

The pavilions in the house have undergone transformation. The first case occurs if the house still had at least one existing traditional pavilion as an attribute of the traditional style, the transformation was categorised as “some pavilions have been demolished”. The second case occurs if all pavilions have been demolished and new structures have been built in a different setting and form so that all traditional attributes of the compound have vanished from the house. If the pavilions still preserve the ideal setting and form, they were categorised as “no change”.

The transformation of pavilions has affected the natah. Since this is a place to perform ceremonial activities, the available space to perform such activities was used as the assessments of this indicator. The first case was if the natah had changed, but still had space for performing ceremonial activities. If the house was deemed to have inadequate space to perform socio-cultural activities, the house was placed in the second category. The last case (no change) was if the transformed house has the same natah setting compared to the ideal.

The legs: Lebuh – the front part of the house and backyard

The legs of the house are the teba, the backyard, where traditionally the people planted trees, raised animals and processed household garbage. This was also a place for the preparation of food and offerings. Space availability for these functions was used as an indicator of the transformation of the teba. This transformation was categorised by three cases: (1) still has undeveloped space; (2) has no enough space for traditional activities; and (3) no change. In the first instance, new structures had been built but the teba still had enough space for accommodating its traditional functions. In the second case, there was no space for traditional functions. In the third case, the owners had not built new structures in the teba.

Another part of the house that has experienced massive transformation is the front part of the compound: the front wall, the traditional gate and the telajakan. Traditionally, the wall called tembok penyengker, being a border of the house, was built from stone, brick or mud (Vickers, 1996). In some houses, the border was made using a simple hedge called a pageh turus idup (see Figure 3). The wall was broken at regular intervals by a narrow gate called the angkul-angkul, being two pillars supporting a roof (Covarrubias, 1974). Next to this was the ailing-aling. It was a part of the gate being a small wall behind the gate screening off the interior and preventing the entry of evil spirits. In front of the wall lay the telajakan, the space between the wall and the road (see Figure 2).
These three elements, the *tembok penyengker*, *telajakan* and *angkul-angkul*, were observed in order to determine the character of the front part of the house. The two first elements were examined in relation to their proportions, which was the ratio between the widths of the plot to the length of the remaining wall or *telajakan*. The more the houses have these elements, the more they are able to express their existence. The transformation of the *tembok penyengker* was recorded as follows: (1) indicated at least 50% traditional wall; (2) indicated less than 50% traditional wall; (3) indicated a non-traditional style of wall; and (4) indicated that all the wall has been changed into a new building. On the other hand, the transformation of the *telajakan* was recorded as: (1) indicated at least 50% *telajakan*; (2) indicated less than 50% *telajakan* and (3) indicated no *telajakan* existed (i.e. changed into new structures).

An *angkul-angkul* and an *aling-aling*, the other front elements, were investigated in relation to their form and setting. These elements were combined into a single category because of their transmutations.
common purpose. Changes were recorded as follows: (1) has an angkul-angkul and ailing-aling, (2) has an angkul-angkul but no ailing-aling, (3) has neither ailing-aling nor angkul-angkul and (4) has an ailing-aling but no angkul-angkul, and (5) has a non-traditional style of angkul-angkul and/or ailing-aling. From the first to the fourth, the houses were classified by whether the houses had angkul-angkul and ailing-aling elements that met with the characteristics of Balinese architectural style, in which the traditional gate applied the tri angga concept and used a number of natural materials. The tri angga concept is related to the form of structure divided into the three parts, namely a head, a body and legs. If the angkul-angkul and ailing-aling did not apply these requirements, then the house was categorised as the fifth scale (see Figure 4).

![Figure 4: The tri angga concept on the angkul-angkul (Source: Authors).](image)

**Embodied spirit**

In addition to assessing the physical changes, the traditional Balinese house was also evaluated with respect to the 'spirit' that the configuration of buildings evoked. The principles of Balinese architecture are applied to traditional houses. The first concept relates to the form and division of the pavilions. The house, inspired by the tri hita karana philosophy, was divided into three parts called tri loka where the upper world was for God (swah loka), the intermediate world was for human beings (bwah loka) and the lower world was for demons (bhur loka) (Meganadha, 1990; Hobart, Ramseyer & Leemann, 2001; Eiseman, 1989). The concept translates the idea of tri angga into a human physical dimension. Based on this, the world was divided into three traditional values such as utama, madia and nista. Utama or a head means high, lofty or of the most sacred value, madia or a body means middle or neutral, and nista or legs means below or most profane value (Gelebet, 1986; Meganadha, 1990; Hobart, Ramseyer & Leemann, 2001; Eiseman, 1989). This concept was then applied in the form of the pavilions in the compound.

The second concept was related to the physical forms of building structures where they were always exposed without any hidden elements called the honesty of the structure (Covarrubias, 1974). Elements of the roof, columns, frame of the structures and other parts display and express their purpose and the construction materials. The functions were not only as structural components but also ornamentation. The beauty was not created by decoration, but through displaying an arrangement of elements according to their functions and roles to support the construction (see Figure 5).
The third concept was related to the procession of entering a house that was arranged by the hierarchy of daily life and cultural activities. In this concept, one walked in a procession from an *angkul-angkul*, a granary, a *paon*, a *natah*, pavilions and finally onto a family temple. This pattern presented a hierarchy from a profane area into a sacred area (Ferschin & Gramelhofer, 2004) (see Figure 6), where it was related to a protection and purification process for the occupants. An *angkul-angkul* and an *aling-aling* were the first protection and prevention of bad evils entering the house (Covarrubias, 1974). Stepping over to the inside, someone passed by a kitchen, where based on Balinese belief, this was a place for a spiritual purification. Physically, when one entered into a house, the *paon* (kitchen) was always passed before reaching the *natah* and other pavilions. It was a control room for the occupants where they were easily able to recognize everyone entering the house. From the kitchen, parents also easily kept an eye on their children’s activities in the *natah*.

The previously mentioned characteristics of the traditional Balinese house and phenomena of transformation provide a framework for a physical assessment in a baseline data survey. Each house division (the head, body and legs) and the embodied spirit of the house were broke down...
in some various indicators. The head had one indicator, the body had three indicators, the legs had four indicators and the embodied spirit had one indicator. In total there were nine indicators, where each was represented by several assessments showing the conditions of the houses that were used in a scoring system to determine the degree of transformation in the physical configuration (see Figure 7).

<table>
<thead>
<tr>
<th>House Divisions</th>
<th>Indicators</th>
<th>Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The head</td>
<td>The family temple</td>
<td>1 Change form and configuration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Location</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2a Vertically to upper storey</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2b Horizontally to other part</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 No change</td>
</tr>
<tr>
<td>The body (compound)</td>
<td>The pavilions</td>
<td>1 Some pavilions have been demolished</td>
</tr>
<tr>
<td></td>
<td>Demolish pavilions</td>
<td>2 All pavilions have been demolished</td>
</tr>
<tr>
<td></td>
<td>Build new structures adjacent to existing pavilions</td>
<td>1 Has built structures adjacent to some pavilions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Has built structures adjacent to all pavilions</td>
</tr>
<tr>
<td></td>
<td>The natah</td>
<td>1 Still has space for traditional functions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Does not have space for traditional functions</td>
</tr>
<tr>
<td>The traditional Balinese house</td>
<td>The backyard</td>
<td>1 Still has space for traditional functions</td>
</tr>
<tr>
<td>The legs (lebuh)</td>
<td>The front part</td>
<td>2 Does not have space for traditional functions</td>
</tr>
<tr>
<td></td>
<td>The wall</td>
<td>3 No change</td>
</tr>
<tr>
<td></td>
<td>The telajakan</td>
<td>1 Has at least 50% front wall</td>
</tr>
<tr>
<td></td>
<td>The traditional gate</td>
<td>2 Has less than 50% front wall</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Has non-traditional wall</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 Does not have the front wall</td>
</tr>
<tr>
<td></td>
<td>The embodied spirit</td>
<td>1 Has at least 50% telajakan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Has less than 50% telajakan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Does not have a telajakan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Has an angkul-angkul and aling-aling</td>
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<td></td>
<td></td>
<td>2 Has an angkul-angkul but no aling-aling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Does not have an angkul-angkul or aling-aling</td>
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<tr>
<td></td>
<td></td>
<td>4 Has aling-aling but no angkul-angkul</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 Has non-traditional style of angkul-angkul</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Has three divisions of the building form</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Has an honesty of structures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Has a traditional procession of entering a house</td>
</tr>
</tbody>
</table>

**Figure 7: The diagram of criteria and indicators of assessment (Source: Authors).**

**The baseline data matrix for assessment instrument**
A key component of this assessment was the established traditions of architectural documentation, including maps, plans, sections and photographs. Architectural documentation was not merely an artificial and additional component rather it was a way of investigating the
architectural challenge in the transformation of the traditional Balinese house. Therefore, in this assessment, a table/matrix was designed to record the observations and to use this to effectively compare transformations. This involved both a translation of observation into a quantitative method of measurement, and yet contained a complexity of assessment that reduced the danger of drawing conclusions which were too simplistic. It tried to use the best of objective methods with the rigour of interpretive methods. The assessment was designed in the form of a table to visually evaluate the physical configuration (Table 1). The X-axis of the table was used to record the house information, the transformation criteria and any comments. The house information was recorded in the first three columns: the row number (Column 1), the address or an identity of the house (Column 2) and the numbers of photographs taken (Column 3).

The condition and/or form of the family temple was recorded in Column 4. If the form and configuration of the family temple was transformed, then this was marked with number “1”. “2a” was noted if the temple was relocated to an upper storey or “2b” if it was horizontally relocated to another part of the house (see also Figure 7). The front tembok penyengker (wall) (Column 8), for another example, was assessed on a scale of 1-4 where “1” means the house had at least 50% of a front wall; “2” means it had less than 50% of a front wall; “3” means the front wall had a non-traditional style; and “4” means the house had no front wall. Similarly, other indicators including the transformation of a pavilion by demolishing an existing pavilion (Column 5), transformation of a pavilion by building new structures adjacent to it (Column 6), transformation of the natah (Column 7), transformation of the telajakan (Column 9), transformation of the traditional gate (Column 10), and transformation of the teba (Column 11) were also visually evaluated. In addition, in case the ideal configuration and form still existed, a dash symbol (-) was recorded.

While the above indicators used a single corresponding assessment, the embodied spirit (Column 12) might require more than one assessment. If a house applied the concept of three divisions of building form, those were marked with number “1”; if houses applied the concept of the ‘honesty’ of the building structures, they were marked with number “2” and if houses applied the ideal procession of entering a house, those were marked number “3”. A house could score all three assessments if they satisfied all concepts. In contrast, it was possible for a house to not score in any categories if it did not satisfy any concepts. Columns 13 (Others) and 14 (Comment) recorded any other relevant information such as the difficulty to obtain consent, the house was not used for tourism or any other pertinent issues.

Table 1: Baseline survey checklist (Source: Authors).

<table>
<thead>
<tr>
<th>No</th>
<th>House identity</th>
<th>The head</th>
<th>The body</th>
<th>The feet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Photograph number</td>
<td>Family temple</td>
<td>Existing pavilions is demolished</td>
<td>New structures are built adjacent to existing pavilions</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**RESULTS OF THE PERFORMANCE ASSESSMENT OF THE METHOD**

Tourism development has influenced the transformation of the traditional houses. People have built tourist facilities in many parts of their house. The front part where it has an economic benefit
has undergone a massive transformation. This part is often used for art gallery, restaurant, café or an art shop. Similarly, the backyard that traditionally was an undeveloped space has been the location for new structures both for domestic activities and servicing of tourists. In other cases, the transformation has impacted on the pavilions where the people have built new structures either adjacent to or by demolishing existing pavilions. In this case, the transformation influenced the setting and spaces of the compound as well as the natah. Therefore, all parts of the house have been transformed to accommodate an increase in both family size and tourists.

Using visual examination, the phenomena of transformation have been investigated using several criteria. This method was able to systematically assess the physical configuration of the transformed house so that the level of transformation could be compared across the houses and in the villages (Figures 8-10). Below is a discussion about each of the key components and their level and nature of transformation, starting with the family temple.

Figure 8 shows a comparison of the condition of the family temple transformation across the four villages. Of the 345 houses transformed for tourism, the family temple underwent the least transformation and only then in three of the four villages. A few family temples - Kuta (8%), Sanur (8%) and Ubud (5%) - were relocated to the second floor. In Kamasan, all family temple were unchanged.

By contrast, other key components of the house experienced greater transformation. The natah underwent change in three of the four villages. Most of those in Kuta (89%), Sanur (63%) and Kamasan (88%) have been changed but still had some space for performing socio-cultural activities. However, most natahs in Ubud (84%) were unchanged (see Figure 9).
While some natahs and most family temples were still maintained, most pavilions in the house compounds had been transformed. In 98% of houses in Kuta, 100% in Sanur, 65% in Ubud and 92% in Kamasan, transformation had occurred by demolishing some pavilions and building new structures (Table 2).

Table 2: The transformation caused by demolishing old pavilions (Source: Authors).

<table>
<thead>
<tr>
<th>No</th>
<th>Village</th>
<th>Demolish pavilions for new structures (%)</th>
<th>No change</th>
<th>In some pavilions</th>
<th>All pavilions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kuta</td>
<td></td>
<td>0</td>
<td>98</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Sanur</td>
<td></td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Ubud</td>
<td></td>
<td>35</td>
<td>65</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Kamasan</td>
<td></td>
<td>8</td>
<td>92</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td></td>
<td>11</td>
<td>89</td>
<td>0</td>
</tr>
</tbody>
</table>

The angkul-angkul is a sign and displays the identity of the traditional house. Overall, 41% of the traditional houses had no angkul-angkul and aling-aling. With respect to the individual villages, Kuta showed the biggest loss (64%), while Ubud experienced the smallest loss (16%). Interestingly, Kamasan, which is visited by relatively few tourists, experienced a relatively high percentage loss (38%). This indicates that the arrival of more tourists does not guarantee that more angkul-angkuls will disappear. This can be seen in Ubud and Kamasan. Ubud, which is visited by more visitors had more angkul-angkul than Kamasan. In Ubud, 57% of houses had angkul-angkul with aling-aling and 22% angkul-angkul without aling-aling, while in Kamasan, the figures were just 13% and 21% respectively (see Figure 10). The people in Ubud attract tourists through the traditional elements of the house, and this in turn enabled them to reconstruct and repair the old structures. In this phenomenon, the existence of traditional spatial setting was used to develop the identity (Oktay & Bala, 2015), and the economic activities were used to preserve the identity (Gharib, 2014). Re-establishment of the traditional architectural identity is important if sustainable cultural tourism areas are to be developed (Haddad & Fakhoury, 2016). On the other hand, the people in Kamasan generally appeared not to be willing to build/repair in the traditional style and as a result used non-natural materials to repair the old structures.
In Kuta and Sanur, however, different motivations are evident. Based on the number of tourists in Kuta and Sanur, they should be able to afford to build the traditional Balinese angkul-angkul in their house, but the angkul-angkul were few in number - only 1% in Kuta and 2% in Sanur. In this case, the different nature of the tourism development in these villages is evident. Ubud has focussed on cultural tourism while Kuta and Sanur has focused on beach tourism. While Ubud has tried to maintain and preserve their culture including the elements of the traditional houses, Kuta and Sanur have used the beach to attract tourists. In this case, since the transformation only focuses on economic benefits, the architecture tends to lose its identity (Beyham & Gurkan 2015).

Figures 8-10 demonstrate the variations in the transformation and enable some comparison between the villages. The process of the transformation also can also be revealed. As noted above, many new structures were built in the front and backyard but maintained the natah and existing pavilions. This occurred when the houses still had enough space to build new structures without changing the existing pavilions. A few houses (5% houses in Ubud and none in three other villages) were this category.

The limitation of available land and an increase in space demand stimulated people to build new structures adjacent to or by demolishing existing pavilions but without changing the natah setting. The new were built next to the old in such a way that their roofs were often simply connected with some guttering. Therefore the pavilions no longer enjoyed cross-ventilation and daylight, which traditionally were characteristics of the pavilions. Most houses in Ubud (80%) were included in this category. This is different from Kuta and Kamasan where just a few houses (8% and 13% respectively) were in this category.

The majority houses in Kuta (82%) and Kamasan (86%) and many of those (55%) in Sanur have transformed the natah, pavilions, the backyard and the front part. This occurred when the people had limited undeveloped spaces, and as a result they demolished the pavilions and built new structures to meet their demands. However, not all of the pavilions were demolished. There are variations of the pavilions that still exist in the houses. Some houses still maintained a bale dangin, some others preserved a bale saja and bale dangin, or others preserved bale saja, bale dauh and bale dangin or other variations. The bale dangin or bale adat, being a place for performing ritual activities, was a pavilion that generally existed in the house.

The final stage of the transformation process was changing the family temple, which is the most important element for the Balinese. It is a place for God, the owner of the ground and ancestors. It would be the last choice in the transformation process of the house where there was no available space to accommodate their activities. This is illustrated by the low numbers, even in Kuta and Sanur, where only 10% of houses in Kuta and Sanur, 5% in Ubud and none in Kamasan fell into this category (Table 3).

Table 3: The model of the traditional Balinese house transformation (%) (Source: Authors).

<table>
<thead>
<tr>
<th>No</th>
<th>Village</th>
<th>Natah pavilions and teba and part of the house change</th>
<th>Natah exist, pavilions, teba and front part of the house change</th>
<th>Natah, pavilions, teba and front part of the house change</th>
<th>Change family temple</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kuta</td>
<td>0</td>
<td>8</td>
<td>82</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Sanur</td>
<td>0</td>
<td>35</td>
<td>55</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Ubud</td>
<td>5</td>
<td>80</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Kamasan</td>
<td>0</td>
<td>13</td>
<td>79</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>2</td>
<td>40</td>
<td>50</td>
<td>8</td>
</tr>
</tbody>
</table>
The variations in and the process of transformation described above were discernible as a result of the assessment method used. It has thus proved to be an effective method that could be carried out efficiently and comprehensively. The observations covering all parts of the houses in four villages could be achieved in a relatively short time (2-5 minutes) for each house. The houses were documented from the street and within the compound. The investigation began in the street with an observation of the *telajakan*, wall, *angkul-angkul,* as well as the family temple in some cases. A further investigation was carried out within the compound to observe the condition of pavilions, the *natah,* the family temple and the *teba.*

However, the assessment form (Table 1) did not provide scope to record which pavilions had been transformed. This data provided information relating to whether the transformations were associated with domestic or socio-cultural activities. To record this during the survey, additional information was noted in an appropriate column. For example, to record information that the *bale dauh* has been demolished, word "dauh" was noted as additional information in Column 5.

Some difficulties were experienced during the survey. Since the front wall, gate and *telajakan,* the principal identifiers of a traditional house, have enormously changed, the existence of the houses was sometimes hard to recognize from the street. In this case, prior to investigating the houses, further observation of the compound and discussion with the owner were the only ways to identify a traditional house. By observing the composition of pavilions, the *natah,* and especially the family temple within the compound, the house could be evaluated. The houses having some traditional attributes including the ideal configuration of the family temple, the form and composition of the *natah* and pavilions could be categorised as traditional Balinese house. In the cases where the house had experienced massive transformation, such that most traditional attributes had vanished, discussion with the owner was the only way to decide whether it had been a traditional Balinese house or not.

Obtaining consent from some owners for the inclusion of their house in the baseline survey was another difficulty experienced during this research. Some owners refused to give consent because of perceived fears about taxation issues, criminal risk, being busy, wasting time and other unexplained reasons. The consent was also difficult where there were elderly people in the houses. They did not give consent and suggested returning at another time when their sons were at home. By using 'high' Balinese language (*bahasa Bali halus*), together with further explanation and clarification about the research, consent was sometimes obtained, although sometimes not - especially in Kuta and Sanur. In these cases, the photographs were not taken within the compound and the assessment was made from the street only and by quick observation and identification when conversing with the owners.

CONCLUSIONS
Tourism development in Bali has stimulated people to transform their house for servicing tourists. In four selected villages (Kuta, Sanur, Ubud and Kamasan), new structures have been built in parts of the house transforming their architectural and physical configuration. This transformation has been investigated by developing a baseline survey method for research into the impact of tourism on the traditional house. The baseline survey was developed by considering the changes with reference to the ideal traditional house and especially changes to its three main components. It consisted of nine criteria based on the characteristic of the changes to key architectural elements. These are: (i) the transformation of family temple; (ii) transformation of pavilions by demolishing existing pavilions; (iii) transformation of pavilions by constructing (a) new structure(s) adjacent to existing pavilions; (iv) transformation of *natah*; (v) transformation of wall (vi); transformation of *telajakan*; (vii) transformation of traditional gate; (viii) transformation of *teba*; and (ix) embodied spirit. For each criterion, a set of indicators was developed in order to represent the level and variation of the physical extent of the change to that component of the house. The transformation of the traditional Balinese house has been considered in various ways,
both as the additive sum of the specific changes, and as a hierarchy depending on the extent that a particular change has on the cultural traditions and activities that take place in the house compound.

Using this method, the variations in the transformation of 345 traditional houses in four villages in Bali have been observed and documented. The investigation found that the transformation is not restricted to particular parts of the house, where there are the potential economic benefits such as the front of the house. Rather, the transformation has spread to all parts of the house, including the areas where people perform domestic activities.

Every division has undergone different levels of transformation. This variation is due to each division having different cultural values and functions. The head constituting the most sacred space underwent fewer and more limited transformations. On the other hand, the expansion and multiplication of new structures has occurred in the body of the house, causing a reduction of open spaces including the backyard.

Using this assessment tool, the different nature of the tourism development influencing the degree of transformation is also investigated and documented. Ubud, which focuses on cultural tourism, has given more attention to preserving elements of the traditional houses than Kuta and Sanur, which focus on beach tourism. The people in Ubud attract tourists through the traditional elements of the house, and this in turn enabled them to renovate the old structures. On the other hand, the people in Kamasan (a less popular tourist destination), which also focuses on cultural tourism, generally appeared not to be able to rebuild in the traditional style and applied non-natural materials to repair the old houses.

The method used has also indicated that transformation of the traditional Balinese houses was a process that was generally found to begin at the front part of the house as the most immediate interface with tourists and tourism, followed by the backyard which was used as space for further construction. This was followed by changes to the pavilions and natah, and in the final phase at the family temple. The method described proved to be an efficient way to make a large number of observations covering all parts of the houses, and provided a way to consider the complex nature of transformation in architecture as it mediated changes to cultural activities. This method can be integrated with interviews and spatial documentation for a deeper analysis and interpretation. This methodology can contribute to studies about tourism and tradition, and can also be adapted and developed for the houses in other locations.

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