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# ILLUMINATING URBAN ZONES OF EXTENDED ACTIVITY: AN EXPLORATION INTO TEMPORAL PROFILES OF URBAN FUNCTIONS, PUBLIC TRANSPORT AND ARTIFICIAL LIGHTING. ARTIFICIAL LIGHT AND THE COLONIZATION OF THE NIGHT

Josiane Meier, Henckel Dietrich

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**ILLUMINATING URBAN ZONES OF EXTENDED ACTIVITY:  
AN EXPLORATION INTO TEMPORAL PROFILES OF URBAN  
FUNCTIONS, PUBLIC TRANSPORT AND ARTIFICIAL LIGHTING**

**Artificial light and the colonization of the night**

In his seminal book “Night as frontier. Colonizing the world after dark”, Melbin (1987) describes the conquest of the night in analogy to that of the American West, first by pioneers, and by and by for larger parts of society and an ever-growing array of activities. The availability of cheap and uncomplicated artificial light is an indispensable prerequisite for this process: it allows us to turn night into day at the flick of a switch. Though the colonization of the night and the availability of cheap light are fairly recent developments, the incessancy of many activities meanwhile seems widespread and, together with brightly-lit urban nights, accepted as normal. Despite their close interdependency, empirical research of the temporal extension of activities in cities has, so far, neither granted lighting nor the relation between nighttime activities, outdoor lighting and urban rhythms much attention (Henckel et al, 2013).

Against this background, our work aims to combine three – so far largely unconnected – research strands: the colonization of the night, the temporal structure of cities, and the use of outdoor artificial light. It contributes to understanding the temporal profiles of the nighttime city, and the potential lighting offers as a source of information to this end. As the temporal profiles of urban lighting are largely uncharted territory (noteworthy exceptions are Bülow, 2013 and Dobler et al., 2015), we are testing new ground methodologically by using time lapse videos as a tool.

**Research approach**

This chapter presents a first step in our effort to address these research gaps. It analyzes and contrasts empirical data on the

weeknight temporal profiles of urban functions, transport and lighting – key framework conditions for nighttime activity – at Potsdamer Platz, one of Berlin’s urban centers.

As a city with a high level of temporal flexibility, Berlin offers rich grounds as a case study: Hallmarks are the long-established absence of curfews for gastronomy, the more recent successive liberalization of shop closing hours, as well as uninterrupted public transport at night. While the city’s lighting concept formulates recommendations regarding the temporal extension of lighting, there is no hard regulation to this end. Centrally located Potsdamer Platz – a master-planned post-reunification development featuring glitzy high-rise architecture – can be defined as a zone of extended activity (Eberling & Henckel, 2002; ISR, 2000): it is a high-density mixed-use urban area, a node of nighttime public transport and a hot-spot of day- and nighttime hustle and bustle.

The temporal profiles of the area’s urban functions, transport and lighting are captured via their on/off patterns, i.e. their availability or non-availability as described by opening hours, connections and illumination.

A two-pronged research approach was applied to gather the empirical data:

- On-site and online surveys were conducted to identify the existence and location of various urban functions and transport options as well as their respective schedules.
- A time lapse video furnished with time stamps (see Figures 1 and 2) serves for the identification of the main light sources – counted in functional units rather than individual light points (e.g. the street lights are counted as one collective light source) – and their schedules. Composed of photos taken every 30 seconds from an elevated location on the night of Tuesday, July 1, 2014, it covers the time from before dusk until after dawn.



Figures 1 and 2 – Potsdamer Platz during the night of Tuesday, July 1, 2014 at 23h and at 3h

The diverse category of urban functions was subdivided into four categories: retail, gastronomy, offices/services, and culture/leisure. Similarly, the light sources were classified according to the functions they fulfill: infrastructural, architectural, advertisement and indoor lighting. As a comparative basis, the on-ratio relative to each category's potential maximum was calculated in hourly intervals for the time between 20-6h (see Figure 3, which shows two-hours intervals).

### The on/off patterns of urban functions, public transport and lighting at Potsdamer Platz

The basic empirical data and our findings regarding the temporal profiles of the inspected elements are outlined below.

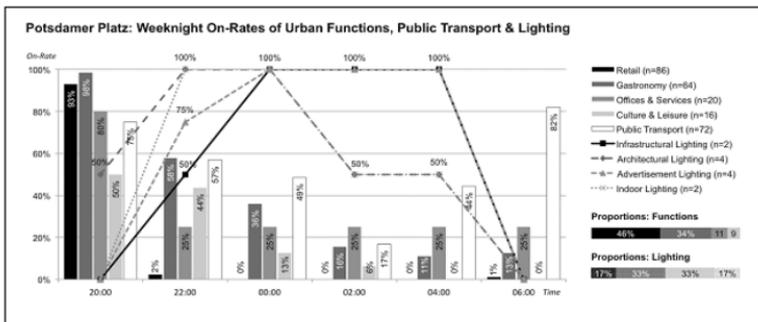


Figure 3 – Weeknight ON-rates of urban functions, public transport and lighting at Potsdamer Platz

**Urban functions**

The range of urban functions at Potsdamer Platz is dominated by retail and gastronomy, which together account for 80% of the 186 identified units. While retail is considerably stronger than gastronomy (46% vs. 34% of the units), the far smaller categories of offices/services and culture/leisure represent roughly similar shares (11% and 9% respectively).

The urban functions' temporal profiles reveal that their overall availability is reduced considerably during the night. Two phases can be distinguished: A dynamic phase of reduction during the first half of the night, during which the overall on-rate of urban functions drops from 90% at 20h to 12% at 1h, is followed by a nearly static phase of minimum availability that stretches throughout the second half of the night and into the early morning, the overall on-rate hovering around 8%.

This general pattern of decreasing availability applies to all four types of functions. However, marked differences exist in terms of timing, speed and extent of the reduction. While the vast majority of shops is still open at 20h, the on-rate for **retail** drops steeply after 21h from 90% to a (near-)complete off-state, which is maintained throughout the night and into the early morning hours. **Offices/services** display a similar basic pattern of a rapid decline followed by night-time stability. However, a remarkable portion of 25% remains "on" nonstop. By contrast, gastronomy and culture/leisure both decrease more gradually as the night progresses – albeit again in different increments and to different extents: **Gastronomy** declines steadily over a seven-hour period (from 20h to 3h) and remains available to at least 11% for the rest of the night. **Culture/leisure** options exhibit three phases: a step-by-step reduction takes place in the hours before midnight, from when on the rate hovers around 10% until 3h, followed by a complete off-state as of 4h.

Two functions thus never drop to a full off-state and thus carry Potsdamer Platz through the night: gastronomy and of-

ices/services are temporally most extended. They contrast particularly with retail: Its stark on/off pattern arguably makes it the most traditional function in temporal terms.

The differences between the four functions' temporal profiles result in changing relative availabilities of functions during the night. In the later evening (until around 21h), a multitude of options exists in all categories: for shopping and dining, for work and play. Being nearly fully "on", retail, gastronomy and offices/services dominate in absolute and in relative terms. The composition shifts considerably as of 22h, when gastronomy and culture/leisure are strongest. A further shift takes place as of around midnight: culture/leisure options dwindle, leaving the small hours of the night to a handful of gastronomy enterprises and offices/services.

### **Public transport**

During peak hours (7-8h and 15-17h), Potsdamer Platz is served by bus, subway, light rail and train lines that provide a total of 72 local and regional public transport connections.

The temporal profile of transport services resembles an asymmetrical V-shaped curve. In a first phase, the number of available connections is reduced at a fairly steady rate from 75% at 20h down to 17% at 2h. This minimum marks a clear turning point: From 3h onward, transport availability increases steeply – approximately doubling in two-hour segments – until it reaches an on-rate of 82% at 6h.

### **Lighting**

There are 12 main visible units of lighting at Potsdamer Platz: four are architectural or advertisement lighting, two fulfill infrastructural functions, and two are indoor lighting that shines out through skylights.

Potsdamer Platz' lightscape exhibits significant changes during the course of the night, most of which occur in temporal

clusters. The bulk of the light sources go on around the time the sun sets (21h31), namely within the hour before 22h, and all are lit shortly thereafter. This full on-state remains stable until approximately the first hour after midnight, during which three sources are extinguished. A second, more extended phase of stability extends from around 1h until 4h30, as of when the lights successively and completely phase out within one hour as the sun appears above the horizon at 4h49.

The functional types of lighting can be divided in two groups in terms of their temporal profiles. Firstly, the profiles of the area's **infrastructural and advertisement lighting** are nearly identical: none of the light sources in these two categories are on at 20h, and, following a slightly differentiated part-on state at 22h, they remain fully on all night until daylight arrives in the early morning. Secondly, Potsdamer Platz' **architectural and indoor light sources** behave similarly uniformly: by 22h, they are fully on and remain so until after midnight. A reduction to 50% has occurred by 2h and remains in place until after 4h, and all six sources are off by the time daylight sets in. The exception to the rule is evident at 20h, when two sources of architectural illumination are already on, while all other lights in these two categories are still off. While the second group enters a complete on-state earlier in the evening, it is reduced significantly during the small hours of the night – in contrast to the first group, which reaches its full on-state later, but does not decrease at all until the early morning.

## Conclusions

The on/off patterns of urban functions, public transport and lighting stand testimony of Potsdamer Platz' nature as a zone of temporal extension: none of the three categories enters a complete off-mode at any point in time. However, far from everything is “on” at all hours. Rather, what is possible at Potsdamer Platz, how accessible the area is and how it is illuminated changes significantly throughout the night – and thus also the area's character.

Despite the – in part – remarkably different temporal profiles of the observed elements, two phases of the night at Potsdamer Platz can be identified. The first covers the time until around 1h and exhibits comparatively high on-rates and considerable dynamics: a fairly broad palette of urban functions remains available, changing markedly in its composition, its weight shifting toward gastronomy and leisure as time progresses; transport options are slowly reduced, nonetheless offering many possibilities to get there and away; and all types of lighting come on to illuminate the night, providing visibility, drawing attention and setting the scene. The second phase covers the small hours of the night and is a time of reduced intensities and less change: the availability of urban functions is at its lowest, its composition changing only marginally; public transport reaches its minimum, briefly pausing there before it begins its steep ascent; and the light sources that are switched off during the night have gone and remain off. The duration of this phase of relative calm is, however, not uniform: while the on-rates of urban functions remain nearly unchanged into the early morning hours, and lights are switched off nearly unnoticeably as they are washed out by daylight, transport is already surging to bring people from one place to the next – thereby anticipating the dynamic rise in on-rates of urban functions that is to follow.

As a lens through which to analyze the urban night, the on/off patterns can help decrypt the changing character of urban areas at night by shedding light on the variability of key factors. Beyond this, they also make visible the decisions by actors, from policy-makers to private individuals, that determine the composition of these elements as well as their on/off patterns – and thus central framework conditions that shape the palette of possibilities in the nighttime city. As such, they provide an important informational basis for policy and planning for urban areas at night. However, this first investigation has only been able to only scratch the surface, and many questions remain. Just as more detailed studies of the profiles themselves would be worthwhile (e.g. by identifying sub-groups within categories and taking spa-

tial differentiations into account), so would be the prospect of gaining a deeper understanding of the actors and what determines their decisions that shape the temporal profiles of urban nights.

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