THE IMPACT OF NIGHT-TIME ECONOMY DISTRICTS ON VIOLENCE AND PERCEPTION OF SAFETY AT NIGHT.

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Abstract

This project aims to advance the understanding of the impact of Night-Time Economy (NTE) districts on violence and perception of safety at night in UK cities.

NTE districts have been long recognised by academics working in the field of the night-studies. However, there is a scarce number of studies focusing on assessing their characteristics, like different mixes of economic activities, offers, the level of disorder, infrastructure and services.

Following the environmental criminology theoretical framework, the combination of these factors can lead to a set of opportunities for crime as they influence what kind of NTE visitors are attracted and which kind of activities are encouraged and allowed. A better understanding of how these contexts can impact violent crimes and perception of safety at night should help design urban strategies aiming at improving NTE districts.

In this study, statistically significant clusters of NTE activities are identified in different UK cities using the Point of Interest (POI) dataset in combination with the *Optimised Hot Spot* spatial analysis on AcrGIS. Then, the researcher employs Google Street View to assess the environmental characteristics of individual NTE districts. Finally, the researcher uses a combination of statistical models to test the possible significant correlations between individual environmental characteristics with different levels of violent victimisation and perception of safety at night. Factors considered include the mix of activities offered by NTE venues, alcohol promotion strategies, the density of NTE venues and retail, infrastructure, elements of disorder, alongside socio economic and routine activity characteristics of the population. Data about violence and perception of safety at night are extracted and manipulated from the CSEW at the MSOA level.

Using this combination of approaches, the research proposes a new time-saving protocol for identifying, visualizing, understanding, and monitoring NTE clusters in relation with violence and perception of safety trends. The results show that different types of NTE activities cluster in the urban environment, therefore forming identifiable NTE districts.

In the NTE districts identified, there are features which are more common than others - like the presence of alcohol promotion signs, entertainment activities, graffiti and litter on the street. In terms of violence and perception of safety at night, at the city level, a higher level of deprivation seems to be the main predictor for increased violence and decreased perception of safety at night. On the other hand, the routine activities and demographic characteristics of the population show the presence of complex interactions with the phenomena of interest. When zooming on those areas overlapping with NTE districts, it emerges that the presence of activity nodes and increased footfall can significantly predict a higher level of violent victimisation at night. Also, the number of people aged under 30 years old remains correlated with a higher level of violent victimisation at night. Interestingly, at this level, the least deprived areas are not found to be safer at night in terms of violent crimes. Results in relation to the impact of NTE districts on the perception of safety at night are more inconsistent and more research needs to be conducted in this field.

Contents

1 Introduction

This section aims to provide context for the extensive research conducted to explore the complex interactions between Night-Time Economy(NTE) districts, violence and perception of safety at night. This study takes part in the long-standing academic discourse about urban NTE and crime and focuses on the possible interactions between different environmental factors which can affect night-time experiences. Over the past thirty years, the Night-Time Economy has managed to gain a more prominent position in the political agenda of many cities in the UK and the rest of the world. However, the topic still remains secondary to most scholars and policy makers. The present thesis aims not only to pave the way for improved NTE environments but also propose new ways to advance night studies through the application of new methodologies and approaches. This section introduces some of the discourses around NTE and crime, and presents the main aims, motivation and objectives of the study.

1.1   The city at night

The city is an entity composed of a variety of groups based on basic needs and purposeful relationships (Mumford, 1937). According to LeGates and Stout these social interactions are among the key factors allowing for the very existence of cities. "The city in its complete sense, then, is a geographic plexus, an economic organization, an institutional process, a theatre of social action, and an aesthetic symbol of collective unity" (LeGates & Stout, 2011, p.112).

The physical layout of the city can either relax or frustrate this "social drama", or it may, through the conscious efforts of art, politics, and education, foster a balanced and harmonious urban stage.

"The city fosters art and is art; the city creates the theatre and is the theatre." (LeGates & Stout, 2011, p.112). And in such social theatre, over the past three decades "social drama" happening at night has been gaining increasing prominence in the social, economic, academic and political stage in western – and more recently also eastern - countries. It is probably the complexity, the sometimes extraordinarily, and the colourfulness of the social actions taking place in the urban theatre at night that have been fascinating academics, practitioners and individuals, especially in the UK. Indeed, as the former Mayor of London Ken Livingstone declared: "The reason London overtook Frankfurt as the financial capital of Europe is simple. Have you ever been stuck in Frankfurt on a Friday night?" (BOP Consulting et al., 2021, p.12). As explained in the second chapter of this thesis, NTE in the UK has managed to achieve important recognition both at the local and national level. Many cities in the UK now recognize the benefits that a vibrant NTE offers to both the economic, social and cultural urban vitality. New actors and institutions have become responsible for managing the city life at night by trying to intermediate between multiple stakeholders and complex eco-systems with their needs, opportunities, and criticalities. Those actors include now night mayors, night managers, nightlife associations, and a wide variety of nightlife advocacy formal and informal bodies (Seijas & Gelders, 2021). Even though there has been a steadily improvement in terms of the recognition of the NTE tangible and intangible values in the political agenda, it is worth highlighting how the night still suffers from a complex combination of bias, misinformation and lack of resources which has recently become even more

evident during the Covid-19 emergency. Indeed, during the Covid-10 pandemic, the 24-hour city model experienced the first significant disruption in thirty years. Curfews and other interventions have been introduced by city authorities all over the world, including in renowned nightlife centres like Berlin, which had its first curfew in seventy years (Nighttime, 2020). These steep policies were mainly based on the general belief that fewer social activities would equal to less exposure to the virus.

However, despite the obstacles encountered over the emergency, the reaction by NTE strategic and creative problem solvers has been strong and hope-giving. Collaborative projects like the Global Night-Time Recovery Plan (Nighttime, 2020) have been able to produce a wealth amount of open-source knowledge around possible solutions and adaptations to the ongoing crisis. Despite all these efforts, the Night Time Industry Association estimates now that from 2020 to 2022 around 30% of the nightclubs have shut down in the UK, alongside 11% of licensed premises (Night Time Industry Association, 2023).

In the wake of the post-Covid recovery, concerns around inequality, social exclusion, crime and perception of safety at night are starting to regain prominence in the political and media discourses. For instance, recent news on the increase in drug spiking episodes (Weaver, 2022), sexual harassment at night (Topping, 2022) and binge drinking (Wilt, 2022) are restarting to appear in the UK media, putting again crime and social issues at the centre of the NTE discourses. As part of this refuelled interest in Night-Time Economy issues, also big brands like Mastercard have started to show interest in the field (Borise, 2022). In a series of online talks, the second-largest payment-processing corporation in the world invited different experts to discuss how cities can remain vibrant, inclusive and safe at night.

The conversations around safety at night and what are the main causes for crime at night have been at the centre of night studies in the UK for several years now. The current UK licensing framework, i.e., the Licensing Act 2003, which gave local governments control over liquor licensing, was heavily motivated by research arguing that certain NTE operators and normal closing hours were the main cause for poorly managed NTE districts, street congestion, and violence at night.

Yet, the present study argues that this approach overlooked the complexity of environmental interactions in NTE districts that can be responsible of more violence and perception of unsafety at night. The current licensing framework does not provide any guideline or blueprint for fostering more diverse and inclusive night-time economy; neither it suggests how local councils should monitor and react to constant changes in the configuration of NTE districts in cities.

For this reason the present study engages with the multidimensionality of urban NTE districts and uses environmental criminology as the main theoretical framework to understand the complex relationships between contextual features and violence and perception of safety at night. In this way the study aims to progress the understanding of NTE districts, and provide recommendation how to prevent violence and foster a improved perception of safety at night.

1.2   Measuring and assessing the Night-Time Economy

Assessing urban phenomena is a widespread approach applied to many different research fields, encompassing sociology, urban studies, psychology, health and wellbeing and urban economy (Baynes & Wiedmann, 2012). The study of the Night-Time Economy(NTE) is a relatively recent field of research and still lacks consistent and robust approaches for assessing and exploring complex social phenomena like violence, crime and perception of safety at night.

The focus on the negative impact of the expansion of venues licensed for selling alcohol on crime has been motivated mainly by studies finding a strong correlation between the number of licensed venues and crime, and between certain demographics and drinking habits with violence and anti-social behaviour (Norström & Skog, 2005; Babor, 2010). The seminal school of the barroom environment (Graham et al., 2006) has paved the way for the assessment of physical and social nocturnal contexts in relation of violence and anti-social behaviour at night. While those authors included in their study a great number of contextual factors, their research and most of those that followed, employed direct in-person observations of a limited number of venues in specific cities, making the approach difficult to transfer and replicate (Graham et al., 2006).

Even though cities around the world are gathering more data on aspects like parking, noise, transit, economic activity, and the public space also in relation to nightlife, a more holistic assessment of NTE districts is still limited. As a matter of fact, despite UK licensing authorities need to regularly produce a Cumulative Impact Assessments to establish whether certain areas are excessively affected by the concentrations of licensed drinking venues, "many of the statistical analyses in the Cumulative Impact Assessment (…) should also be carefully scrutinised" (GNRP, 2020, p. 46).

More recently, the BOP consulting agency (BOP Consulting et al., 2021) conducted an 'health check' study of Night-Time Economy in New York, Tokyo, Amsterdam, Melbourne and Nanjing and developed a 'Night-Time Economy Index'. They measured five indicators drawing on thirty variables which include audience participation, environmental characteristics like night transportation and services, the number of venues, the attractiveness of the city in terms overnight tourists, public festivals and manifestations, and the presence of NTE specific strategies, policies or dedicated governing bodies. Another recent study on "night-time vitality" aimed at empirically identifying the characteristics of Korea's NTE while deriving an indicator based on the night-lighting consumption, number of entertainment facilities, transports and credit-card sales (Kim & Kim, 2022). Both studies not only highlighted the importance of NTE in different eastern countries, but they also paved the way for new advancements in the current methodological approaches to explore NTE activities. However, it must be noted that they both mainly relied on the analysis of the economic dimension of night-time activities. Some researchers have pointed out how the current focus on NTE employment and gross profit value (Graham et al., 2006; Night Time Industry Association, 2021) might have contributed in reinforcing a purely market-led development of NTE districts at the expense of those venues offering more intangible and social benefits (Chatterton & Hollands, 2003).

However, it is likely that in the next years new methodologies will advance allowing for a more holistic

understanding of NTE phenomena in cities. In line with this need, the present study tries to use a mix of digital methods to remotely identify and assess NTE clusters in different UK cities and study how they might impact violence and perception of safety at night. This approach – albeit highly perfectible – has been forced by the outbreak of the Covid-19 emergency which limited personal travel and physical observations for almost two years. However, these obstacles offered an opportunity to test and apply new methods of investigation that allowed the researcher to gather data and information from NTE districts of several UK cities which would have been very complex and time-expensive otherwise.

In the next subsections the theoretical principles behind modern crime prevention strategies are introduced to frame the final description of the aim and objectives of the study.

1.3   Modern crime prevention

The principles behind modern crime prevention techniques have been largely informed by environmental criminology theories, like the crime opportunity theory, the crime-place theory, Newman's defensible place principles and the broken windows theory (Armitage & Monchuk, 2011; Larimian et al., 2013). The exploration and improvement of the physical built environment in relation to crime phenomena have been the main aims of these approaches.

For instance, the Crime Prevention Through Environmental Design (CPTED) is a very popular approach in the UK and has been extensively applied in relation to acquisitive crime (e.g., burglary) theorising that "the proper design and effective use of the built environment can lead to a reduction in the fear and incidence of crime, and an improvement in the quality of life.'' (Crowe, 2000, p. 46). However, recent formulations of crime prevention theories have been influenced by social design theories (Whiteley, 1997) prompted by the need to address complex and "wicked problems" (Waddell, 2016, p.424), characterised by the involvement of many actors, the interconnection with other problems and which require holistic approaches.

Indeed, crime prevention approaches cannot only rely on the modification of the built environment by increasing target hardening, controlling techniques and barriers. They should also consider soft approaches which take into account people's habits, socio-cultural values and the use of space by communities.

Urban NTE districts are inherently complex, as multiple actors and phenomena are involved, and they are in constant evolution (Seijas & Gelders, 2021). However, very few studies have tried to assess the plethora of interactions happening at the level of NTE districts, while most of existing literature has been focused on individual venue-level characteristics assessed through on-site observations. These approaches have found justification in crime-pattern and crime-place theories, which posit that a few places are responsible for most of the crime. In the researcher opinion however, it is becoming increasingly evident the importance of studying how Night-Time Economy activities congregate and how the resulting districts can have an impact on social phenomena like violence and perception of safety at night. Indeed, the focus on NTE districts is justified by the ongoing tendency of NTE venues to form cluster of activities in the urban environment, in line with other economic activities like retail, fashion and even the creative industries.

Examples of popular NTE districts can be recognised in many European cities, like Manchester - Northern

Quarters, Barcelona - la Rambla and Turin - il Quadrilatero Romano (Giovanetti, 2000; Montgomery, 2006; Rouleau, 2016).

The proliferation of NTE districts have impacted the way how people experience urban nightlife.

It is becoming clearer that night-time visitors are not only attracted by individual NTE venues; but they might pursue a less defined set of contents and experiences made possible by the ecosystem of activities, themes and services that NTE districts provide.

In NTE districts the density of certain stimuli, like drinking offers or entertainment activities or different levels of infrastructure, like the presence of bus stops, bike racks, public benches or the presence of signs of vandalism and disorder, all concur to shape the way how people perceive and experience the areas.

Following the environmental criminology theoretical frameworks, these stimuli also concur in either facilitating or preventing the manifestation of certain crimes and perception of unsafety.

It is the exploration and the assessment of such complex group of environmental characteristics, infrastructures, economic and cultural offers, demographic and routine activities of the population in relation to violence and perception of safety at night that this study aims to undertake.

In the final subsection the research aims and questions will be therefore outlined.

1.4   Research Aims and Questions

The present research aims to explore the link between environmental features of NTE districts and violence and perception of safety at night, to identify areas of improvement for future prevention and policy implementation. This is particularly pertinent within the UK context, considering the regulation history of the country which is already featuring NTE specific regulatory policies aimed at fulfilling the main principles of the Licensing Act 2003. Despite local authorities have put in place strategies addressing night-time related issues, on the national level there is a lack of consistency as to how NTE districts should be identified and assessed, and how they should be configured to limit such issues. Furthermore, inter-cities comparative studies aimed at highlighting possible similarities and differences between NTE districts in UK cities are currently absent. Given that the existing literature shows a trend towards homogenisation in NTE districts configuration, it is becoming crucial to create new tools and protocols to allow practitioners and researchers to compare NTE districts at national and transnational levels (Chatterton and Hollands, 2003). This analysis does not only provide additional evidence to the existing body of literature; rather, it provides fresh findings that fill in some of the gaps found in previous research. Although not devoid of limitations, the objective of the present research was fulfilled by investigating night-time areas applying novel methodologies to the study of crime and social phenomena.

In the following sections the two main aims of this research will be further explained and the research questions outlined.

Research Aim One

One overarching aim of the research has been to explore how NTE districts can be identified in urban ecosystems and to highlight environmental features like activity mixes, infrastructure and the level of the area disorder. In the past, NTE districts have been classified using vague or general concepts like "entertainment zones" (Campo & Ryan, 2008) "entertainment districts" (Babor et al., 2010; Mazerolle, et al., 2012), "late night economy areas" (Van den Nouwelant & Steinmetz, 2013) or "night-time entertainment districts" (Miller et al., 2013; Devilly, 2022).

On the other hand, existing literature link the presence of urban districts of different economic sectors - e.g., fashion, creativity, culture, innovation etc. – with clusters of complementary activities (Cainelli et al., 2007). Therefore, the researcher decided to find a transferable way to spatially identify and map NTE districts in urban ecosystems. The researcher has used a spatial analysis and mapping technique to identify areas where NTE activities are more co-located in six different UK cities. This allowed the researcher to explore how and where different NTE activities cluster in separate parts of the city.

Then, by using the environmental criminology framework the researcher has investigated the characteristics of the NTE districts identified. The researcher reviewed previous literature to make a list of environmental factors which can possibly impact violence and perception of safety at night. The research employed a combination of remote analysis techniques and descriptive data analysis to explore the NTE districts.

Therefore, research Aim One sought to answer to the following questions:

1) Is it possible to spatially identify NTE districts in urban ecosystems?

2) Do NTE districts concentrate in one area of the city or do they locate in multiple areas?

3) In terms of environmental characteristics, are NTE districts homogeneous or diverse?

Research Aim Two

The second overarching aim of this study was to rigorously identify the link between specific environmental characteristics of NTE districts and violence and perception of safety at night. First the research aimed to understand whether the proximity with NTE districts would impact phenomena of violence and perception of safety at night. Then, the research studied the role of environmental characteristics of NTE districts in either facilitating or preventing violence and perception of safety at night. Indeed, identifying NTE districts level risk-factors can lead to long-term strategies for designing more crime-proof and safer NTE districts.

Therefore, research Aim Two sought to answer to the following questions:

4) Does proximity with NTE districts influence the level of violence and perception of safety at night in urban areas?

5) What are the main environmental factors of NTE districts, and the demographic and routine activity characteristics of the population that can impact violence at night in urban areas?

6) What are the main environmental factors of NTE districts, and the demographic and routine activity characteristics of the population that can impact perception of safety at night in urban areas?

1.5   Chapters Outline

The **Chapter Two** outlines the evolution of the urban NTE districts in the UK. Aspects of negotiation of space and needs at night, regulating strategies and policies are featured to present the underlying complexity of the topic. Even though there is not a clear definition of Night-Time Economydistricts, the research draws on existing literature on economic districts to transfer existing approaches to the study of NTE districts.

The importance of the link between contextual factors and the manifestation of crime in urban areas is pivotal for the present research. Several theories have pointed out how the tangible and intangible characteristics of the urban environment are interconnected with crime phenomena: from the Chicago school of human ecology, the environmental crime, the opportunity crime and the routine activity crime theories function as the theoretical backbone of the study (Park & Burgess, 1925; Jacobs, 1961; Jeffery, 1971; Brantingham & Brantingham, 2016). Inspired by these theories, several strategies have been deployed to fix NTE related issues. The main preventive approaches found in the literature are presented to outline which aspects of the NTE environments have been linked with criminogenic phenomena.

The final sections explain how distinct characteristics of public space at night contribute to shape individual and collective perception of safety and insecurity at night.

Chapter Three presents the methodologies adopted by the present research and justifies the selection of the data sources to meet the research aim and objectives.

The hot spot analysis is a spatial analysis and mapping technique employed in the identification of spatial clustering (Williams & Currid-Halkett, 2011). Therefore, the *Optimised Hot Spot* analysis using the Points of Interest dataset was used in the ArcGIS software to identify different NTE districts in six UK cities.

Unfortunately, due to the Covid-19 pandemic, NTE activities were either closed or restricted over most parts of 2020 and 2021 (Night Time Industry Association,2021).

Alternative methods for assessing the urban environment were therefore considered, and the exploration of NTE districts was conducted using Google Street View. This allowed the researcher to remotely audit a great number of environmental characteristics of those areas. Also, certain characteristics related to the density and types of NTE venues were also explored using the Point of Interest dataset.

Based on the existing literature, each individual characteristic is presented and contextualised in relation to the possible correlation with violence and perception of safety at night. These features are used as the explanatory independent variables in the final regression models to test the correlations between environmental characteristics and violence and perception of safety at night.

For this reason, the Crime Survey for England and Wales (CSEW) was harnessed in order to explore violence and the perception of safety at night. The reasons behind exploring night-time violence through the number of violent victimisation events captured by the CSEW, instead of employing other sources of data, are also outlined. Furthermore, the methods employed to overcome the different geographical levels of the dataset used, i.e., the environmental characteristics of the NTE districts and the CSEW data at the MSOA level, were explained.

The statistical methods employed to test the correlation between the environmental characteristics observed and violent victimisation and perception of safety at night are presented. The selection of the regression techniques as well as the different steps taken to overcome multicollinearity among the independent variables are also presented. These methods served to identify and isolate the independent NTE predictors of increased violent assaults and perception of safety at night.

The presentation and discussion of the results of the analysis is divided into two separate chapters.
Chapter Four presents the findings and discussions on where NTE districts are located and how they are configured in urban ecosystems. First descriptive analysis was conducted to analyse the Point of Interest data in relation to the NTE districts to highlight difference in the composition of NTE activities, coexisting land use and how NTE districts overlap with each other. This time-saving approach provided a general overview of the main activity characteristics of each NTE district, allowing for a quick comparison between different cities and showing recurring attributes. Then, the results of the visual exploration of the NTE districts environment using Google Street View and of the analysis of venue compositions using the Point of Interest are presented. The distribution of these features shows the presence of certain similarities across the NTE districts especially in terms of NTE offer, the density of venues, the presence of corporate-owned venues and infrastructure.

Chapter five delves into the findings emerged from the regression models which used the number of violent victimisation and of people feeling safe at night as dependent variables. The process involved two steps: Step I focus on the possible effects of the proximity to NTE districts and consider the entire MSOA sample of the six cities. In Step I it is tested whether those MSOAs overlapping with NTE districts present increased or decreased levels of violent victimisation and of people feeling safe at night. Step II focus only on those MSOAs overlapping with NTE districts and check whether the environmental characteristics can independently predict different levels of violent victimisation and perception of safety at night. The results of Step II also show how some characteristics tend to be correlated with each other, and therefore the multicollinearity among variables will be also discussed.
Some of the findings contrast with the existing literature while others support previous research, and the possible interpretations will be discussed while presenting the results.

Before moving to the conclusion, in **Chapter six** the researcher outlines the main limitations linked with the dataset used - the Point of Interest and the CSEW – and with the methods employed. Some considerations around how the limitations were overcome and suggestions for future improvements are also presented.

Chapter Seven sums up the results of the present study, linking back to the literature and the theories discussed in the Chapter Two. Violent victimisation and perception of safety at night are the result of complex interactions between different characteristics. This complexity probably makes it very difficult for policy makers and local authorities to imagine and adapt interventions and strategies to contrast violence at night and improve the perception of NTE districts in the UK.

However, these findings also suggest possible areas for improvements in terms of prevention, data collection, policy implementation and monitoring at the local level.

Some of the features used in the present research might be included in the assessment of NTE districts and might serve to monitor the impact of certain policies. In the future, licensing authorities might include in the evaluation of licensing applications those criteria which have been found to prevent violent victimisation and improve the perception of safety at night.

Finally, advancements in digital technologies are impacting how sociological and criminological investigations can be conducted and should be considered to better understand NTE phenomena. Future research might try to harness big data and new data sources- like footfall, mobility data, sentiment analysis using online reviews - to complement more traditional data collection approaches based on physical assessment of the urban environment.

2 Existing Theories

The Night-Time Economy is now recognized as an essential sector in many western countries, and it's deemed to bring economic and social benefits to urban contexts and nations. In the UK alone, it is estimated that the Night-Time Economy(NTE) was worth £ 66 billion and employed 777.880 people in 2015, with culture and leisure counting for 274.800 jobs (Greater London Authority, 2017). A recent report released by the industry of the Night Time Industries Association, states that 13 million tourists visit pubs every year in the UK (Night Time Industry Association, 2021). Spending on night-time related activities represented 21 per cent of the 52 billion spent on day visits the year before the report was released. The UK NTE contributes 5.1% and £112.8bn of the national GDP (ibid.).

In the following sections the origins of Night-Time Economy districts will be discussed by looking at the link between cultural, social, and economic phenomena in the UK. It is evident that market forces have been pushing towards the clustering of nightlife economic activities in a similar way to retail, fashion, and creative sectors. The concept of NTE districts is still not clearly defined in the literature, as previous researchers used various definitions as "entertainment districts" or "night-time entertainment districts" (Campo & Ryan, 2008; Van den Nouwelant & Steinmetz, 2013). The present research draws on the most recent definitions of NTE activities provided by the Night Time Industry Association to define those economic activities that should be taken into account to identify NTE districts.

The differentiation of NTE clusters will be explored in relation to dynamics of power, market, and the commercialisation of nocturnal experience. Indeed, the urban space is produced by social relations as well as shaped by regulations, governance, and policy strategies. Even though market dynamics push towards homogenisation (Chatterton and Hollands, 2003), there is still room for alternatives and complexity in nocturnal experiences and venues.

In the subsequent parts, specific dynamics of the current neoliberal economic system will be examined in order to highlight how the governments, economic actors and other mechanisms influence and shape how the

Night-Time Economy unravels in time and space. Here the focus will be put on the UK's most recent legislation affecting the NTE and its configuration: the Licensing ACT 2003. Different critical points of view coming from previous literature will be gathered, underlining how some of the basis of this legislation should be questioned and the licensing system revised.

The Licensing Act 2003 is based on four key principles revolving around the prevention and the minimization of side effect related to NTE activities and alcohol consumption (Department of Culture, Media, Sport, 2008).

As the following sections will show, most of the interventions and strategies envisioned to prevent and tackle crime in the NTE have tried to impact the context where nocturnal experiences take place. The main areas of intervention found in the literature are summarised and discussed.

Analysing what factors and characteristics of NTE districts contribute to either facilitating or preventing offences and which features make people feel safer at night is therefore fundamental in order to tackle crime and perception of insecurity at night and improve how the NTE is planned, managed and regulated by city councils and local authorities.

Therefore, environmental criminology theories are selected as the framework of this study. The main authors behind environmental criminology theories will be discussed, framing a central theme in the following chapters: the importance of the environment in creating criminogenic places. Indeed, even though for many years environmental criminology have been applied to investigate acquisitive crime, e.g., robberies, thefts, pickpocketing etc., recent literature affirms that the same lens can be applied to study violent crime (Felson & Clarke, 1998; Felson, 2012; Hayward, 2007).

Previous scholars applying those theories to the study of violence and perception of safety at night will inform which characteristics of the environment should be taken into account in relation to the study of NTE districts. Since environmental theories do not focus only on the built environment, routine activities and demographic characteristics will be also explored in relation to NTE crime phenomena. Based on previous literature, this study will reflect on the complex mix of environmental characteristics that can facilitate violent episodes at night and shape how the public spaces are perceived after dark.

2.1 The evolution of the Night-Time Economy in the western world

In the past decades a wide body of academic research has examined the NTE from a range of different disciplinary fields, including: urban studies (Roberts & Eldridge, 2012; Talbot, 2007; Roberts & Eldridge, 2009, 2012; Nicholls, 2018) criminology and crime prevention (Homel et al., 2004; Hobbs et al. 2005; Forsyth, 2006; Felson, 1997; Brennan et al., 2011; Graham & Homel, 2012; Tseloni & Ganpat, 2015; Newton, 2015; Newton & Felson, 2015) insecurity and the right to the city (Wilson, 1992;Walkowitz, 1992) night-time urban environments (Shaw, 2018); process of urban gentrification (Talbot, 2006; Nofre, 2013; Olt et al., 2019; Kolioulis, 2018); the emergence of night-time management offices and informal bodies (Seijas & Gelders, 2021).

Tracing back the origin of the modern Night-Time Economy, it is worth considering how urban societies after dark have been shaped over the past centuries.

In the Mediaeval Age, darkness would trigger a series of regulations. For instance, in the 14th century a decree in Paris required that all homes needed to be locked after dark. No one was permitted to enter or exit a residence without a valid reason. Those who did venture out were frequently required to carry a lamp in case they were suspected of mischief (Schivelbusch,1988). In the late 17th century, the introduction of street lighting completely changed the way the urban night was experienced. The immorality associated with dark and night, when mischievous deeds were performed, was going to be fought by Thomas Edison's new invention: the electric light. In the inventor's own words, ''put an undeveloped human being into an environment where there is artificial light, and he will improve' (Edison, 1948, p. 231).

European monarchs started adopting this new technology to ignite the *nocturnalisation* of spectacle (Edensor, 2015, p. 425) with the diffusion of places for conspicuous consumption like theatres, shops, taverns and cafes. Adding to this, public surveillance started becoming a key concern for the bourgeois class wanting to prevent anti-social and deviant behaviours in the name of efficiency and sanitisation of modern society. As a results of these improvements, cities like London experienced an increase in the number of bars and pubs in the eighteenth-to-nineteenth century. It was the time of the first industrial revolution, and bars and pubs functioned as social gatherings and refuges for the working class (Kneale, 1999).

Interestingly, pubs and bars were already licensed and controlled, primarily to assure that the working class remained sober and productive by not allowing late night outlets to sell alcohol.

The strong urbanisation also saw an increasing participation of women in the night, even though that remained secondary until the twentieth century. Around the early 20th century, the first modern NTE cultural and entertainment venues started to appear in the form of *cabarets,* where different forms of art, sexualities and creativity were experimented. Noteworthy examples are Les Folies Bergère in Paris, the Cabaret Voltaire in Zurich and the Eldorado in Germany (Lewer, 2016). Unfortunately, the two world-die conflicts tragically put a halt to the expansion and the flourishing of night experiences (Roberts & Eldridge, 2012).

As observed by Bianchini (1995), a turning point in the development of the Night-Time Economy was the democratisation of access to universities after the 1968 movements.

The spread of higher education gave rise to a new strong population of consumers: the students (Bianchini, 1995). Additionally, the birth of urban social movements like the feminism and the gay and black activism was accompanied by requests for a more inclusive night-time environment in cities. In the UK, `Reclaim the Night' was, for instance, a key demand of the women's movements in the mid '70s against night-time harassment and gender violence (Roberts & Eldridge, 2012).

In the same decade, dedicated gay and queer clubs started appearing in cities like New York and Chicago, producing a great impact on cultural and creative expression (Buckland, 2002). At the same time, the increasing availability of leisure time and disposable income for the majority had a huge impact on how free-time was experienced.

The contemporary concept of Night-Time Economy however, lays its roots in the rather recent passage from a Fordism-oriented urban context into a post-Fordist organisation of society. As research showed, by the end of the '70s the worldwide industrial crisis led to a rearrangement of the modes of production with the integration of new technologies and the rise of a hyper-connected globalised market (Schmidt, 2011). In this transition, flexible accumulation and customised production started to replace the concept of mass production, leading to what is now known as 'late neoliberalism' (Peck & Tickell, 2007; Clarke, 2004; Larner, 2003).

Entertainment and culture began to be considered ideal commodities, given their very fast and short turnover (Nylund, 2001) as they better addressed the need for a shorter conversion-time between capital investment and profit generation in highly volatile markets.

2.1.1   The birth of the creative city

In the aftermath of the industrial crisis, cities were also left with entire abandoned and deserted central areas to be reconverted and reimagined. Thanks largely to a significant public investment in urban renewal, decades-strong patterns of disinvestment in central urban areas started to reverse in the mid-1990s, and a return to city centres ensued. Cultural quarters started to emerge, alongside a major shift in cultural policies supporting the belief that cultural industries should be innovative, flexible and can bridge the gap between the 'global' and 'local' (Kong, 2010; Montgomery, 2003). Accompanying the creation of these new districts, new types of urban festivals of contemporary music started to consolidate, with the Sonar festival in Barcelona being one of the precursors in 1992 (Richards & Colombo, 2017). After the 1992 Barcelona Olympics, the festival was initiated to provide a relevant cultural product for the city and to animate the newly developed area surrounding the cultural facilities of the Museum of Contemporary Art of Barcelona (MACBA) and the Centre de Cultura Contemporània de Barcelona (CCCB) (ibid.).

The economist Richard Florida proposed the concept of the creative class, arguing that the most dynamic cities in the United States were those that supported a bohemian-inclined type of workers whose values were at odds with those of standard corporation (Florida, 2002). According to the author, the ability to innovate and develop new entrepreneurial initiatives is what makes this class so important for modern cities. Florida argued that this new social group particularly values thriving nightlife, with 'cool' bars, cafés, and performance venues thriving in an architecturally and historically significant setting. Therefore, cities should invest in those activities and businesses.

Therefore, local policy makers started to invest great capitals in the creation of a diversified offer of events, art installation, shopping malls, new residential areas, prestigious offices, and concert halls (Kong, 2010). However, most of the time the process didn't involve public consultations and was carried out with a top-down approach, making some authors question whether those interventions could have led to a bland standardisation and normalisation of urban landscapes (Bianchini, 1991; Bianchini, 2004). The so-called 'generic city', conceptualised by the architect Rem Koolhaas (1995), highlighted the risk that cities might tend to increasingly replicate generalised socio-economic patterns instead of fostering their own local

features. One of the main negative consequences of this process would be the idiosyncratic coexistence of parallel cities: one 'external city' simplified by few signature buildings or landmarks, and the "the inner-directed mnemonic city" (Graham, 2002, p. 1011) reflecting the perception of people who inhabit the city.

These deep changes in the relationships between cities, economy, culture and social life required new forms of governance and political agendas. Neoliberalism came into existence as a historically distinct, hybrid, pattern-forming tendency of market-disciplined regulatory restructuring. This new system administered the transition from public to (partially) private urban planning strategies, with an emphasis on competitive and market-oriented solutions. In contrast to the social-democratic view that politics should discipline the market, the idea became that the market should regulate politics. More entrepreneurial and managerial approaches stepped in to transform the city into an economic entity in an increasingly competing world (Kavaratzis, 2004; Bianchini, 1991). Local councils started to promote their assets to access better resources in terms of cultural, intellectual and economic capitals and talents: the city-imaging had to be directed towards the creation of city-brands (Bavinton, 2013).

City-branding became an essential dictum in urban planning and political discourse, laying the foundations for the following thirty years of urban management policies and strategies. Branding endows a product with a specific and distinctive identity "by its positioning relative to the competition and by its personality, which comprises a unique combination of functional attributes and symbolic values" (Graham & Cowking, 1993, p.10). Cities started to carve their identities via their own experiential values, which had to be profoundly original and uncopiable (Florian, 2002), and shaped by the link between real, objective space and its perception (Kampschulte, 1999). Cities started to heavily rely on sentimental values, affects and emotions as ways to elicit a sense of brand preference and loyalty in (potential) citizens-customers, serving at the same time the person in their individuality and the group's 'togetherness' (Kavaratzis, 2004).

However, the creation of city-brands through culture and city-imaging has followed market and real estate strategies. Many authors have linked this urban regeneration to financial exploitation and gentrification processes, where culture and entertainment being among the main factors responsible for middle class desirability, henceforth driving urban planning and properties' speculation (Kong, 2010). As Jancovich and Bianchini (2013) conceptualised, cities are risking to become the playground of the elites, excluding low-income populations from cultural capital and community planning.

For instance, a criticised benchmark of city-branding-though-culture operations has been the Guggenheim Museum in Bilbao (Evans, 2003), a world-renowned building and art museum, which attracts hundreds of thousands of people every year without really interacting with the local arts community and the Basque culture.

2.1.2 Contemporary Night-Time Economies

The night-time symbolic capital started to be used as a city-branding strategy early in the nineties, with cities like Manchester, Berlin, Amsterdam and London being championed for their nocturnal offer.

Fostering night-time activities as a tool to generate urban interactions and vibrancy has a strong connection with the work of Jane Jacobs, who authored the pivotal work *The Death and Life of Great American Cities* (1961). In one fundamental passage of her book, she pointed out that "on successful city streets, people must appear at different times" (ibid., p.152) and "the continuity of this movement (which gives the street its safety) depends on an economic foundation of basic mixed uses" (ibid., p.153).

Bianchini (1995) recalls how in the `24-Hour City' conference held in Manchester in September 1993, a new form of urban governance was proposed to foster "interrelationship between different areas like policing, childcare, transport, arts and entertainment involving a co-operation between the public, private and voluntary sectors" (p.125). Interestingly, when Manchester was awaiting the verdict on its Olympic bid in September 1993, licensing hours were extended to 12pm for pubs and 4am for night clubs. Andy Lovatt's report More Hours in the Day (1994) revealed a decrease in arrests of 43% and in alcohol related incidents of 16% over the four-week period.

Other than reducing crime, in the early '90s many cities started to roll out strategies aiming for a 24-hour city model to establish their position as attractive urban centres in the worldwide market. The amenity city was henceforth established as the new successful urban trend, supported by studies demonstrating that population tends to increase faster in vibrant cities with live performances venues, bars and restaurants (Glaeser et al., 2001). In the same years, the Night-Time Economy became a fast-growing sector and the number of venues licensed to sell alcohol increased vertiginously. Taking the UK as example, between 1997 and 1999 there was a 243% increase in the total capacity of night-time venues in the Manchester city centre, while in Nottinghamshire it rose from 61500 people in 1997 to 105000 people in 2004 (Roberts, 2006).

According to a recent study made by the Night Time Industry Association, the number of nightclubs in the UK peaked in 2006 with around 3,000 venues and has been in steady decline since then.

On the other hand, over the years other ways to exploit the NTE potentials emerged.

For instance, the financialization of clubbing was recently observed by Koulionis (2018) in regards to in the recent redevelopment of the area of Canada Water in London. In this case, the British Land Agency has created a new events space at the Printworks "to raise the public profile of the area and to generate income, as well as (to test) the appetite for this kind of facility within our plans" (British Land, 2017, p.30).

Printworks is a five-thousand people capacity venue which was launched in 2017 with the only purpose of using the subcultural capital of clubs (Thornton, 1996) as a tool to engineer real estate speculation.

These phenomena are being observed in many parts of the world accompanying other processes of urban homogenization and growth in emerging 'hypertrophic' cities, (Bianchini, 2004).

Overall, the global emergence of urban night-time economies and the related concept of the '24-Hour City', introduced a new layer of complexity in urban planning practices (Roberts & Turner, 2005). Indeed, the expansion of NTE activities led to the emergence of a new piece of the urban mosaic: the NTE districts, clusters of complimentary NTE activities which changed how certain urban areas are used and perceived.

2.1.3 Clustering nights: the birth of NTE districts

Overall, the functional organisation of urban areas reflects different people's needs and is responsible for the formation of urban mosaics of land uses (Kinney et al., 2008). The term urban mosaic was coined in the 1970s as a response to Burgess' concentric zone model of the city (Park & Burgess, 1925). In the early twentieth century, the observation of the distribution of urban activities led the two authors to conceptualise the existence of urban land uses organised in concentric ring extending from the central business district to the suburbs.

On the other hand, the urban mosaic model argued that cities should be viewed as a mosaic of land uses and activities - like residential areas, business districts, cultural districts, green areas, and mixed-use lands - that can have a variety of spatial shapes and patterns (Yuan et al., 2012). These zones may be built intentionally by urban planners or can emerge spontaneously as a consequence of people's lifestyles and economic activities. (Chang Xia, 2020). In line with the Chicago school other scholars, like structuralist Marxists, argued that urban spatial configurations and organisations are largely influenced by economic factors (Katznelson, 1993). Indeed, through economies of scale and agglomeration, economic forces organise in the urban ecosystem to maximize their profit and to cater from a diverse range of social groupings. This is why one of the fundamental characteristics of contemporary global industries is the geographical concentration of similar businesses which cluster as soon as " the net benefits to being in a location together with other firms increase with the number of firms in the location" (Arthur, 1990, p. 237).

Even though scholars in industrial organisation, ecology, and economic geography have observed the propensity of geographical clustering of enterprises within different sectors (Pouder & St. John, 1996), Scott noted (1989, p. 91) "that the question of the initiation and early consolidation of growth centres in capitalism, from 19th century Lancashire to Henry Ford's Detroit to Silicon Valley, has never really been satisfactorily addressed or resolved".

Recent studies indicate that also sectors like innovation, creativity and fashion tend to clusters. Fashion for instance "overconcentrates in particular headquarters (New York, Milan, Paris, London and increasingly Los Angeles) that are strongly connected to one another, reflecting a global city network of the cultural industries" (Williams & Currid-Halkett, 2011, p. 3026). Other recent studies conducted by NESTA identified the creative clusters present in the UK cities where specific types of creative businesses tend to co-locate and interact with each other (Chapain et al., 2010; Mateos-Garcia & Bakhshi, 2016).

Therefore, it comes as no surprise that also night-time economy businesses tend to form clusters within the urban fabric, creating NTE districts, (Roberts & Eldridge, 2012; 2006; Miller, 2016) with the to benefit from a greater cumulative pulling power onto visitors and tourists (Van den Nouwelant &Steinmetz, 2013). Even though is it possible to recognise proto night-time economy clusters in certain neighbourhoods in the early twentieth century – see Figure 2.1, most of contemporary NTE districts evolved in the late '80s early '90s as

the result of the already mentioned transition into post-Fordist cities.
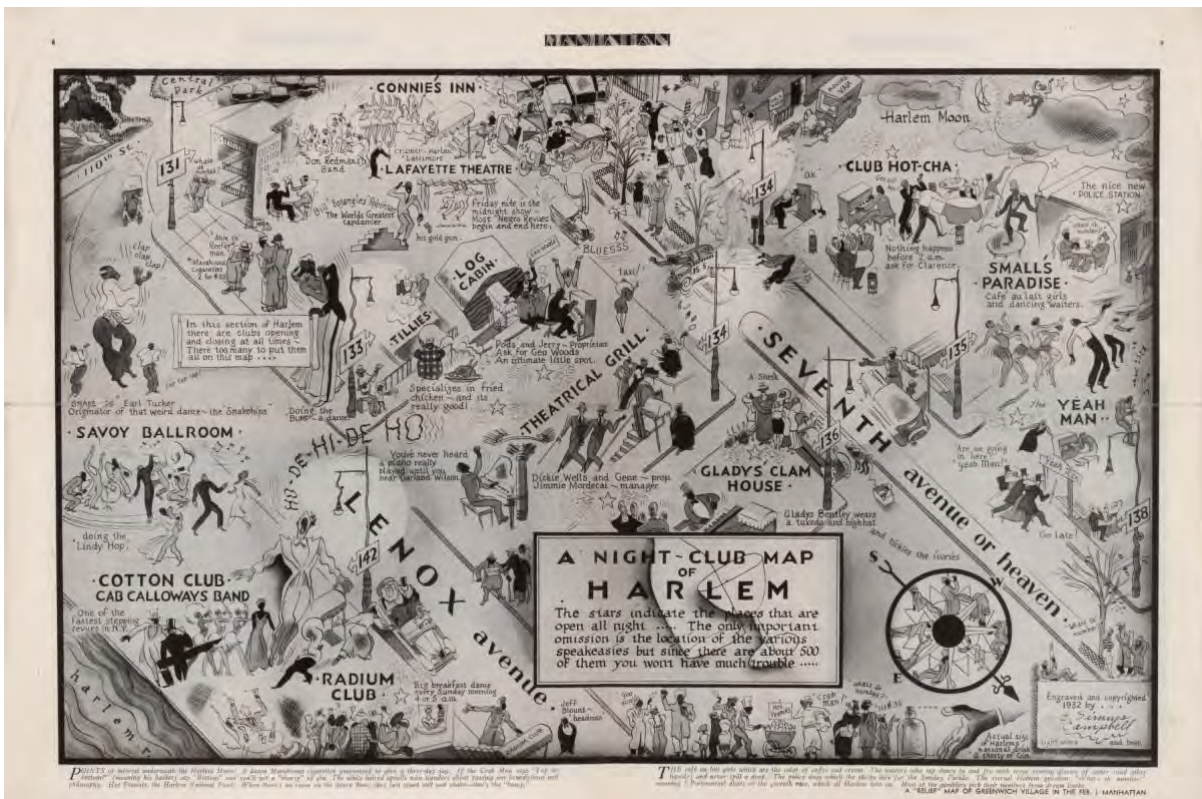
Figure 2.1: A night-club map of Harlem. Retrieved from Library of Congress, Geography and Map Division.

Interestingly, NTE districts have been hardly explored, and their identification and characterisation have been based on mainly empirical and general observations. Looking at the literature concerning NTE districts, different definitions referring to those areas can be found: "entertainment zones" (Campo & Ryan, 2008) "entertainment districts" (Babor et al., 2010; Mazerolle, et al., 2012), "late night economy areas" (Van den Nouwelant & Steinmetz, 2013) or "night-time entertainment districts" (Miller et al., 2013; Devilly, 2022). However, the elements that identify or characterise these districts remain mainly unexplored and are mostly taken for granted.

For instance, Babor (2010) refers to the presence of clusters of licensed premises in entertainment districts while Hadfield (2006) noted that the value of night-time properties located close to other licensed premises can worth twice as much as those further removed from drinking circuits. Campo and Ryan define entertainment zones as "concentrated nightlife districts occupying the margins of downtowns in former commercial and industrial areas, underutilized retail corridors or underdeveloped waterfronts" (Campo & Ryan, 2008, p. 292). In their description of entertainment zones it can be recognized some sort of naivety, as they state that the "dominant physical presence of chain-oriented megaprojects" is absent and that "their design and content is discreetly rooted within existing urban fabrics in a way that megaprojects scarcely achieve" (ibid., p. 292). As the results of the present study will demonstrate, nowadays NTE districts present a completely different scenario.

In their study, the classification of these areas is the result of the examination of the city in Milwaukee using "visual and experiential criteria" (ibid., p. 293) resulting in four types of entertainment zones:

1) mixtures of industrial buildings, where the industrial aesthetics and the shape of big empty floors are deemed ideal for night-time experiences;

2) old downtown or faded commercial corridors or districts, where vacant retail activities with no apartment units above are converted in night-time businesses;

3) nightlife venues clustered within strip malls and commercial buildings along arterial roads in suburban areas, which developed around the middle of the twentieth century;

4) districts which are integrated into traditional and mature urban neighbourhoods, like the East Village and Astoria in New York.

Van den Nouwelant and Steinmetz (2013) observed the emergence of 'late night economy' areas from the clustering of Night-Time Economy activities in line with the "economic orthodoxy" (ibid, p.4) of the early '90s. For them, there are two main typologies of late-night economy clusters: demarcated entertainment precincts and historical high streets, and neighbourhood centres.

The first two are the results of a top-down approach, often publicly supported through tax breaks and other subsidies (Eisinger 2000) and aim to attract larger companies and chain businesses. In those areas it is not unusual to find mix of different activities including bars, casinos, theme parks and shopping malls. One example can be found in night-time waterfront developments around the world (Lovatt & O'Connor, 1995). The latter type of late-night economy cluster is the conversion of those inner-city high streets which have been facing a steady decline. This type of cluster often evolved organically and spontaneously from an existing restaurant and café area.

In other research, entertainment districts are defined as "urban areas with a high concentration of venues where alcohol is sold, particularly in bars and nightclubs, although restaurants and clubs may also feature" (Mazerolle et al., 2012).

These generalised classifications are based on a limited set of urban characteristics. By not taking into account more subtle features of urban NTE ecosystems, including the combination of venues, their proposed contents and other socio-cultural factors, there is currently a gap in the understanding of these environments. Indeed, the vagueness of the conceptualization of NTE districts is still reflected in today's urban planning strategies. For instance, in the 'The London Plan' report, the Greater London Authority (2017) points out that Night-Time Economy is "generally focused in the Central Activities Zone (CAZ) and within town centres across the city" (p.293) and classifies NTE districts only by their "scale of significance".

However, the right strategy for comprehending NTE clusters would require "getting inside the cluster to understand the often-intangible mechanisms by which information, innovation, capital and people move through the system" (Rosenfeld, 1997, p.20).

The current gaps in understanding the – sometimes - rapid formation and evolvement of NTE districts, have prevented policies and strategies from monitoring and achieving their goals. Resulting tensions between distinct nocturnal users and stakeholders, as well as the excessive concentration of specific activities, might have led to the emergence of social issues and have negatively impacted the perception of NTE districts.

2.1.4 Contested nights

Contemporary NTE districts are inherently complex and there are plenty of factors to consider when analysing social phenomena happening in these environments. Indeed, there is not a single night-time economy, but rather a variety of economies operating concurrently, either in support of in opposition to one another. Streets frequented by chain bars and young people may be adjacent to streets where families dine in a more relaxed atmosphere. Further afield, one may find underground bars and factories teeming with workers, back streets that are empty and appear abandoned, and parks that are frequented by underage or street drinkers. Rowe identifies three main causes of night-time inhomogeneity (Rowe & Bavington, 2011):

- cultural disaggregation, which implies different night cultures based on practices of consumption. Similar motivations and patterns of behaviour, like meeting friends, making new social connections, dining, dancing, consuming alcohol and listening to music or seeing other performances can generate distinct (but also porous) contexts;
- temporal segmentation which separates the night-time economy in three temporal sub-contexts: the evening economy (6 pm -11 pm), the night-time economy(11-2 am), the late night-time economy (2 am - 5 am). Even though each segment is not completely compartmentalized, there might be some characterising features of each time frame, for instance transports, demographic of visitors, and types of venue operating.
- the fluidity of nightlife practices: the public space is a complex social site because of the unavoidable intermingling of "distinct cultures of consumption that might otherwise be kept separate by the conscious stylization of venues and commercial practices of market segmentation" (Rowe & Bavinton, 2011, p. 119).

Furthermore, nocturnal venues have been classified into three categories by Chatterton and Hollands (2003):

1. Mainstream nightlife spaces, which are highly recognizable venues, often part of larger brands or pub chains.

2. Residual nightlife spaces, such as traditional pubs, were a common element of most city centres and played a strong community role; they are now left to decline.

3. Alternative nightlife spaces, related to niche audiences, connected to youth subcultures (e.g., punks, ravers etc.), sexual, political (e.g., squatter-friendly places) and, ethnic identity.

However, Chatterton and Holland (2003) explained clearly how the broad market dominance of a few players has led to the commercialisation of NTE districts, where mainstream, corporate-owned venues thrive by maximising profit through the consumption of alcohol and food (Chatterton & Hollands, 2003). Brands and large corporations are now able to afford specialised law firms to challenge planning and licensing decisions by taking advantage of the British planning and legal system, which is based on precedent and flexibility rather than codes and land-use plans. These mainly alcohol-oriented venues target different demographics through the differentiations afforded by 'design and branding' (Bavinton, 2013) and as Kunzmann (2004, p.389) suggested, only a 'cultural militant' would draw a distinction between cultural and entertainment venues.

In the view of Haydock (2014), NTE districts end up providing a sort of apparent diversity, while, behind the veil of Maya, a clear homogeneity of actors and practices remains unquestioned.

In this landscape, grassroots and residual venues tend to suffer more and be burdened by precarity (Chatterton & Hollands, 2003). Gallan (2015) argues how a distinctive and long-lived music-based youth scene might struggle to find recognition and support within the officially sanctioned and promoted NTE, "because the night-time economy's branded allure has essentially devoured many alternate forms of youthful leisure experience" (Hobbs et al., 2005, p. 167). Traditional pubs are replaced by corporate-owned venues targeting young consumers (Hayward & Hobbs, 2007). Beyond their economic value, those disappearing spaces are valuable because they provide their patrons with a sense of belonging and an opportunity for congregation; they can function as safe spaces and nuclei for the development and flourishing of friendships, relationships, and community connections (Ross, 2017), but in preservation strategies, economic viability could outweigh the cultural importance of these spaces.

On the other hand, youth-oriented bars and clubs are currently the most visible, profitable, and issue-prone forms of nightlife. Tierney (2006) highlighted that nearly 80 percent of drinkers in town-centre pubs and bars were aged 18 to 35, and only 3.2 per cent 50 and over. In 2006 Great Britain 9.6% of adults (around 4.9 million people) drank alcohol on 5 or more days and 26.8% of adults (around 7.8 million people) "binged" on their heaviest drinking day, with young drinkers being the most likely age group to 'binge' on their heaviest drinking day (Office for National Statistics, 2017). Authors argued that the myth of a diverse and harmonious cosmopolitan night model (Young et al., 2006) failed to become reality, and nightlife has been populated prevalently by 18–to-24 years old individuals (Roberts & Eldridge, 2012; Roberts, 2015; Van den Nouwelant & Steinmetz, 2013; Tiesdell & Slater, 2006; Bromley et al., 2000). Also, Haydock (2014) pointed out that the attempt to foster a "'café society' and the emulation of Bologna in Birmingham and Madrid in Manchester" (ibid., 2014, p. 174) failed in favour of an alcohol-led homogenized drinking night-time model. The resulting segregation of city centres has meant that specific demographics aged 30 or more now avoid the drinking streets (Thomas & Bromley, 2000; Bromley et al., 2000) which have turned into no-go areas. Even though over the past two decades researchers, civic organisations, and the UK government have expressed concerns around the monoculture of entertainment venues centred on alcohol consumption and

targeting young individuals, (Davies & Mummery, 2006), very little has been done in terms of policy and interventions. For instance, recommendations have been proposed to encourage cultural consumption at night, such as attending theatres, or non-alcohol-related forms of recreation and entertainment, like going to the gym or to the library (Eldridge & Roberts, 2008). The strategy has been to foster the right type of offer and attract more diverse and quiet types of visitors.

However, little evidence ever suggested that people would attend those venues and make those experiences at night. In another study (Haydock, 2014), it emerged that, in the view of certain local counsellors, a more balanced Night-Time Economy would allow certain venues to attract a wealthier type of crowd willing to purchase "bottles of champagne" (ibid., p. 181) instead of cheap cocktails. Here, diversity and balance at night are intended as form of class exclusion, where civilized behaviours are directly correlated with the spending power of consumers.

On the other hand, it remains overlooked the lack of variety in the styles and types of NTE venues available, which emerged in another study as a central topic among the people not visiting NTE districts (Roberts & Eldridge, 2007). Certain consumers avoid city centres not only because the perceived risk of crime, but also because the absence of independent and more niche venues which would allow for a more diversified offer; even though the constant proliferation of themed bars in the UK might suggest the presence of an increasing demand for these venues, it remains overlooked whether the current market circumstances make the existence of alternatives actually improbable.

Indeed, the criteria for assessing the social and cultural values of NTE venues are almost missing in the existing literature and only recently there has been an increasing interest for the more intangible values concerning night time grassroots venues (Dines et al., 2015). For instance, Sara Ross (2017) highlights the importance of considering the intangible cultural capital of venues, as the "the practises, representations, expressions, knowledge, skills-as well as the instruments, objects, artefacts and cultural spaces associated therewith-that communities, groups and, in some cases, individuals recognize as part of their cultural heritage" (Ross, 2017, p. 3). In this sense, it is worth asking how urban planning and regeneration practices have taken into account the local knowledges or have empowered and facilitated the intangible capital of night-time communities (Kurin, 2007). In the 24-hour city model, there is a recognizable lack of understanding in regards to whether the alcohol-sector-led economy can create the fertile ground for inclusive and diverse ecosystems (Hadfield, 2015). Again, as Shaw states, "Night-Time Economy was never fulfilled due to its elision with the alcohol and leisure industry" (Shaw, 2014, p. 89) since this sector was hijacked by the neoliberal system and turned into a new marketplace to be exploited, with alcohol being its (almost) unique selling point. "By making the object of study the 'night-time economy', the city at night is reduced, first, to just the bars and clubs which make up city centres, and second, to the 'economic' value of these settings" (Shaw, 2014, p. 89).

Indeed, as an economic component of modern urban settings, the NTE ecosystem is a contested area where global economic interests, local policies and social needs intersect. In the UK the regulatory context has

always had a huge impact on how NTE unravels and has been evolving through different phases over the past decades which are going to be discussed in the next section.

2.1.5   What governs the night in the UK

Pubs have been the subject of moral crusades since the 1600s (Roberts & Eldridge, 2012). In the early nineteenth century, leisure venues became a topic of general concern, but pubs had been associated with disorder for centuries. From the mid-1600s onwards, complaints against pubs and drinking establishments revolved around broader critiques of disorder, sexuality, poverty, and what were perceived as threats to traditional family values.

however, it is in the last thirty years that the conversation around night-time economies unravelled, often influenced by complex political and economic agendas. The discourse around Night-Time Economy has followed three stages: in the '90s, cultural planners highlighted the potential of extending urban life into the night, giving more space to activities taking place after 5/6 pm. The second wave of research put the attention on the side-effects that the NTE expansion was causing and identified binge-drinking, anti-social behaviour, and deregulation as the main issues to be considered (Hadfield, 2015). In the third wave many researchers started to question whether the power relations emerging from the regulatory context, policing approaches and the conspicuous economic interests, were in fact hampering diversity in favour of gentrification processes and the sanitisation of the Night-Time Economy (Hobbs et al., 2005). In terms of regulation, particularly noteworthy has been the work of Phil Hadfield (2015), who tried to outline the four spheres that govern and shape night-time economy experiences:

-        law and urban design, which regulate the types of activities allowed to operate in specific areas of the city and how they will be connected with other infrastructure and urban elements; an example would be the role of licensing authorities and how licenses are granted;

-        police enforcement, that shapes how areas are experienced, by employing specific interventions and strategies, like closing time restrictions aimed at specific areas (Kypri et al., 2011);

-        private governance of affect, where different niche markets create a set of possible identity-shaping practices. For instance, the political and cultural background of certain cities or urban areas can influence the subcultural and creative offer which attract certain types of visitors (Thornton, 1996);

-        informal governance, which influences how different genders, ethnicity, sexuality and individual personal assets allow people to feel welcomed in night-time spaces.

In terms of laws and regulations, while alcohol is a commodity which is strongly connected to health and safety issues, most of the licensing and political agendas concerning its use have been influenced by the alcohol retail and distribution sector, de facto prioritising economy and employment over health (Jayne & Holloway, 2008). In the transition to the post-Fordist city, when emerging chains of pubs and bars offered to turn grand and redundant buildings into wine bars, local councils were favourable. It was, as one senior public official later remarked, 'regeneration in part, being built on cheap drinking establishments' (Roberts,

2006, p. 333). Yet, the normative government agenda that aims to limit alcohol-driven excesses and promote particular ideals of suitable consumer-citizens often conflicts with commercially-driven imperatives to (over) consumption (Crawford & Flint, 2009). For instance, recent research found that the English alcohol industry deeply relies on people who drink above guideline levels, their consumption quota estimated to account for 68% of total alcohol sales revenue in 2013/14. The 4% of the population is responsible for around 30% of all consumption and 23% of all industry income. Alcohol sales income might decrease by 38% (£13 billion) if all customers adhered to recommended alcohol consumption limits (Bhattacharya et al., 2018).

All these considerations invite the questioning of the current regulatory system, and the ability of governing forces to effectively set the scene for a more diverse and socially sustainable NTE; in the words of Hobbs, diversity "would become achievable only should central and local government cease to collude with market forces and introduce regulatory regimes that would challenge the logic of the market" (Hobbs et al., 2005, p. 174).

In the UK, the Government's position related to entertainment and night-time management has been the site of heated controversy (Roberts & Eldridge, 2012).

Night-Time related policies are currently under the responsibility of three different ministries:

- the Department of Culture, Media and Sport, which is in charge of reforming the liquor licensing legislation;
- the Home Office, which controls local police forces;
- the Office of the Deputy Prime Minister, which has broad responsibility for local government and the built environment.

Other stakeholders who regularly are affected by NTE, are the Department of Transport and the Department for Food and Rural Affairs which has an interest in waste management.

The current licensing structure is the main consequence of the widely discussed Licensing Act 2003 (LA003), which "made provision for the regulation of the sale and supply of alcohol, the provision of regulated entertainment and the provision of late-night refreshment and for offences relating to alcohol and connected purposes" and came into full force on 24 November 2005 (Department of Culture, Media, Sport, 2008, p. 4). The Act brought together eight separate licensing regimes into one and in so doing transferred the regulatory responsibility for the sale of alcohol from licensing justices and magistrates' courts to local authorities. Local Licensing Authorities became 'one stop shops' for all the licensing requirements and are now in charge of establishing a committee and producing a Statement of Licensing Policy to publicly explain how the following key objectives are to be met (Hadfield, 2006):

1) prevention of crime and disorder;
2) public safety;
3) prevention of public nuisance;
4) protection of children from harm.

Among the main changes, LA003 introduced flexible times of sale to be agreed for each set of premises individually, following the principle that extended trading hours would reduce criminality via natural surveillance. Staggering closing times would also reduce "the old madness of everyone being thrown out onto the street at the same time" (Newton et al., 2008, p.4).

Overall, many criticisms have been raised against this act and its formulation process. Room stressed the fact that different stakeholders, like "institutions, voluntary associations or - notably - local governments" had not been taken into account in the process (Room, 2004, p. 1085). The absence of any reference to possible repercussions of licensed venues on customers' health and physical safety made many question how much influence the economic imperative of neoliberal growth wielded on the formulation of the act; as a speech from the Culture Secretary made clear: "the reforms would be good for the economy, opening the way to new and more diverse markets" and Room emphasised how "licensing authorities should not interfere with the free operation of the market" (Room, 2004, p. 1086).

After three years from its introduction, the DCMS wrote a report which stated that the LA003 "has not led to the widespread problems some feared" (Department of Culture, Media, Sport, 2008, p. 8) and is allegedly responsible for "delivering the administration cost savings to businesses, third sector and other licence holders of around £99 million a year" (Department of Culture, Media, Sport, 2008, p. 7). However, alcohol-related violence has increased in the early hours of the morning and some communities have seen a rise in disorder, which has been associated to the fact that "people are not sufficiently using the considerable powers granted by the Act to tackle problems" (Department of Culture, Media, Sport, 2008, p. 40).

These findings were confirmed by Newton and Hirschfield (2009) who did a study on five UK areas (Blackpool, Birmingham, Croydon, Guildford and Nottingham) and found that there was evidence of temporal displacement in the proportion of offences occurring at particular times post LA03. In order to tackle crime displacement, the DMSO's report listed the following recommendations: identify hotspots by ranking geographical areas with a concentration of premises, introduce a yellow card and red card alert system, increase the maximum fine for non-compliant individuals, and expand brief interventions to reduce alcohol consumption.

Current licensing objectives are based on the assumption that licensing is primarily a tool of control, with the task of minimising negative outcomes of NTE activities. In their work, Hadfield and Measham (2015) noticed how local authorities are often provided with controversial powers like the Alcohol Disorder Zone, then become Late-Night Levy and Early Morning Restriction Order and other invisible powers like High Volume Vertical Drinking' (HVVD) and 'Irresponsible Drinks Promotion', which have been mainly underused. These invisible powers combined with unevaluated programmes risk taking away attention from other approaches which can result in more effective and implementable solutions. For instance, a Special Saturation Policy (SSP) theoretically authorises local government to consider saturation and to request a review of the licence if any of the licensing objectives is not met (Oxford City Council, 2023). The cumulative effects of the excessive density of NTE premises in certain areas may lead to severe or chronic

public nuisance and anti-social behaviour. This policy operates at micro-district level and is the result of a periodical Cumulative Impact Analysis assessing whether the density of NTE venues is negatively impacting a specific area. However, there is a lack of consistency as to what constitutes the saturation point of an area and how NTE clusters should be configured. Furthermore, from 2010 to 2016 there has been a reduction of almost 50% in the number of reviews being issued, which went down from 1300 to just 700 (ibid.). Alongside the LA003, there have been other regulations and laws which affected the Night-Time Economy in different ways. Even if it's not the purpose of this research to evaluate and discuss all the regulatory framework within the UK context in details, it is nonetheless important to outline the main policy changes which have directly and indirectly affected the NTE (Figure 2.2).

Figure 2.2: A timeline of UK policies impacting the NTE (Source: PGR)

The Criminal Justice and Public Order Act of 1994 was one of the toughest laws, promulgated in the 90' to give more powers to the police to stop illegal raves and repetitive music (Hadfield, 2006). For some authors, that legislation strategically put an end to illegal raves, which were at the time representing a threat for the licensed and accepted leisure ecosystem, since they were largely unauthorised gatherings happening outside urban areas (Measham & Brain, 2005).

The Private SIA of 2001 regulated the requirements for door staff who henceforth had to have a supervisor licence when working in licensed premises. The smoking ban of 2007 forbade smoking in indoor public areas, and completely changed the way drinking outlets and their surroundings were experienced. The Live music Act of 2012 deregulated music events with specific characteristics and made a licence no longer needed to stage a live music performance or play recorded music if it occurs between 8 a.m. and 11 p.m. in an alcohol-licensed establishment with no more than 500 attendees. A license is not required for the

performance of unamplified live music at any location during the same hours, or for the performance of amplified live music at a workplace during the same hours and provided the audience does not exceed 500 people (DCSM, 2015). In 2019, following a sustained campaign, the central government reversed an important urban planning principle and imposed a requirement on developers to act as "agents of change" taking adequate noise mitigation measures for new-build schemes that would be affected by noise from established venues in an area (Roberts et al., 2020).

On a local level, authorities have also been trying to respond to the night-time sector's expansion by formulating cross-sectorial partnerships, often included in land-use planners, the police, licensing officers, environmental protection, economic development and waste management officers, local residents and transport providers in the negotiations (Roberts & Eldridge, 2012). In doing so, many local authorities have demonstrated to be ahead of national policy in managing night-time economies. Some examples are the Manchester City Safe, a joint operation which involved the Greater Manchester Police and the City Council, and the Leeds City Centre Management Board, another multi-agency partnership which represent good benchmarks in terms of night-time management.

Furthermore, in the UK some attempts to change the narrative revolving around NTE have been made through certain branded initiatives: 'Purple Flag' (sponsored by Diageo), 'Best Bar None' (Bacardi Brown-Forman Brands, Diageo, Heineken and Molson Coors) together forming the Social Responsibility Alliance (SRA), which constitutes a forum for collaboration between key alcohol industry CSR initiatives are some examples. Hadfield and Measham (2015) argue however that Corporate Social Responsibility (CSR) has been often used to influence the licensing process while offering compensation to police officers for the trouble. Being 'awarded' became a way for venues to negotiate with public licensing and enforcement forces, which in turn use such schemes to promote the public-facing sense that 'something is being done' (Hadfield & Measham, 2015). Several authors have pointed out that findings about interventions in Night-Time Economy are limited due to methodological shortcomings and flaws, the high variability of samples, the size of studies and the insufficiency of data (Brennan et al., 2011; Kurtze et al., 2018).

Policy documents have been increasingly gesturing toward the need to change the drinking culture as a way of addressing problems associated with alcohol use (Savic & Room, 2016); very little however, has been done to understand how more holistic interventions could modify the way in which the night-time environment is constructed, experienced and replicated.

As mentioned before, initial hopes were that the UK "will witness the 'continentalisation' of the night-time economy, whereby it would be transformed into a multifaceted, multicultural and safe environment" (Tierney, 2006, p. 454). However, as Hadfield suggests, for a socio-cultural shift towards different forms of drinking habits and environments, all the different cultural factors which determine such habits should have been considered (Hadfield, 2006). Conversely, culture remained the main absence in discourses around the policy which focused on the 'vibrancy' of town centres as another key indicator to be pursued. However, the term vibrant is ambiguous, as it can refer both to diversity of venues and visitors as to high footfall,

regardless of its characteristics. "A vibrant town centre at night can therefore be socially exclusionary and culturally limited, while attracting high numbers of patrons" (Roberts et al., 2020, p.3). Culture does not equate to more visitors or sales volumes, and venues which actively contribute to diversity and creative expression might not always be recognised as an added value by authorities in the current regulatory framework. Moreover, as Roberts and others noticed, alternative approaches might consider the public cost of managing alcohol-intensive NTE districts. By subsidising public cultural institutions or supporting other kinds of grassroots or alternative activities, these costs might be curtailed (Roberts, 2006; Hadfield & Measham, 2015) by encouraging a critical mass of different night crowds and experiences. Unfortunately, the current fiscal environment and central government policy will unlikely be able to subside and support this vision.

All these policies and planning strategies can have both a short and long-term impact on how and where Night-Time Economy districts emerge and how they evolve. They also have an important impact on the manifestation of certain issues like anti-social behaviour, victimisation and perception of crime.

In the next sections, the existing literature about the correlation between violence, perception of crime and NTE activities will be presented.

2.2 Aggressions in the Night-Time Economy and crime prevention approaches

The link between violence and Night-Time Economy activities has been central in the academic discourse for the past three decades. Lister et al. (2000) found that 29% of urban violent offences occurred inside licensed premises and 70% of city centre violence took place between 9.00 pm and 3.00 am. Additionally, going to clubs or pubs has been identified as a common risk factor for violent victimisation (Tseloni & Ganpat, 2015).

Baron defined aggression as "any form of behaviour directed toward the goal of harming or injuring another living being who is motivated to avoid such treatment" (Baron, 1977, p. 7) while Bennett et al. (1969) posited that aggressive behaviours can be classified in: physical-verbal, active-passive, and direct-indirect. Graham studied interpersonal violence within night-time licenced venues, defining five types of aggression (Graham et al., 2006):

- minor non-physical harm, like mild expressions of anger;
- minor physical-harm from physical acts, such as light pushing;
- moderate–severe non-physical acts causing psychological or emotional discomfort, such as yelling or threatening;
- moderate physical-acts causing discomfort, such as shoving, grabbing;
- severe physical-acts causing pain, such as punching.

The way violence is perpetrated in night-time settings, its frequency and the level of its seriousness are all influenced by a series of social and physical factors which interact with the visitors of the environment. Violence can be facilitated by poor management, lax surveillance and enforced by careless liquor licensing,

lack of transport options for patrons, and negligent bureaucratic controls and legislation (Homel et al., 1992). Graham analyses the physical environment and its relation to violence, pointing out that the neighbourhood in which the venue is located, the size and layout of the establishment, the type of furnishings and the comfort of seating, cleanliness and upkeep are all deemed to be cause of enough frustration and discomfort that they can act as environmental irritants (Graham et al., 2006).

Other environmental aspects include smokiness (Graham & Homel, 1997), crowding and congestion (Macintyre & Homel, 1997), permissiveness, standards of decorum, rowdiness and sexual competition or activity (Graham et al., 1980; Homel & Clark, 1994, Homel et al., 2004).

Within the barroom environment, Graham found the most common location for aggression to be the dance floor (20.0% of incidents) or its surroundings (11.5%), followed by the area next the serving bar (15.7%), tables (13.1%), aisles, hallways and other areas of movement, like stairs (6.2%), entrance (4.5%) and the pool playing area (4.1%) (Graham et al., 2012).

In their seminal article, Macintyre & Homel (1997) stressed the significance of overcrowding on the patrons' frustration and subsequent behaviour, by pointing out the difference between the full saturation and the mere density of a venue. Understanding how people may be able to interact with the built environment and with specific sensorial stimuli (i.e., signs, visuals, tables disposition, toilets' location, queue etc.) would make it possible to prevent scenarios in which where overcrowding becomes a negative actor, able to generate and precipitate aggression.

In terms of composition, particular attention should be put on both age and social background, which have been found to highly influence the odds for aggressive behaviour, with crime hot-spots more likely to be frequented by young and male individuals (Quigley et al., 2003). In regard to the seriousness of an offence, another study found that more serious violent incidents tend to occur at premises with a (slightly) older clientele (Forsyth, 2006). It is therefore not totally clear whether the increased risk of violence is due to the characteristics of patrons *per se* or to the interrelationship between certain features and the social composition of visitors. Indeed, younger patrons may be positively linked to an atmosphere of sexual competition or to specific drinking patterns, which are also influenced by offers of cheap drinks and special deals (Quingley, 2003; Homel et al., 1992; Graham et al., 1980; Homel & Clark, 1994) which are associated with increased amounts of drinking, increased likelihood of being highly intoxicated, and therefore of participating in fights (Kaplan & Reed, 2018).

Overall, sales of beer, wine, and drinks with a high alcohol content have all been linked to an increase in aggressiveness and drunk-driving, whereas sales of non-alcoholic beverages have been correlated to a decrease in police complaints. Furthermore, the lack of food has been associated with increased level of intoxication and aggressiveness (Lang et al., 1998). So, it might be the case that younger patrons' behavioural patterns are encouraged by contextual factors which aim to create a permissive atmosphere while inducing alcohol consumption without providing alternatives (like food or other non-alcoholic drinks, free water etc.). In the United States, Australia, and Canada, illicit activities such as drug usage, drug selling, and

prostitution at drinking establishments have been linked to increased aggressiveness. At UK nightclubs, however, venues with less illegal drug use have been shown to have higher levels of conflict. (Hughes et al., 2011). Regarding the involvement of drugs in violent acts, it should be taken into account that the consumption of illegal substances by offenders has been rarely assessed by chemical analysis, with most of the data relying on anecdotal or subjective impressions (van Amsterdam et al., 2020). Despite this, in police reports the suspects of drug-related violence are often labelled as 'known drug users' or with the phrase 'drugs have likely been used', therefore this data should be interpreted with caution.

Staff also forms an important part of the barroom environment and its management has been demonstrated as being an essential factor when considering violence in night-time economy. Aggression in bars has been found to be positively associated with staff being intoxicated, hostile and aggressive, with the staff's gender composition (Homel & Clark, 1994) and the lack of professional boundaries, including serving patrons at closing time (Marsh & Kibby, 1993) and allowing a large number of patrons to hang around after closing (Graham & Homel, 2012; Graham et al., 1980; Homel & Clark, 1994). Lower levels of patron intoxication have been linked to establishments with female or all-female staff, while younger employees are more likely to serve drunk customers (Hughes et al., 2011). Another study pointed out (Forsyth, 2006) that door policies can have an impact on levels of disorder outside the barroom environment, since refusing entry to certain types of people might lead to the formation of what Hobbs (2003) named 'the legion of the banned' (Hobbs et al., 2003, p. 125) and increase the number of intoxicated people on the street.

Surrounding outlets, competition for public transportation (Homel & Clark, 1994) and food services are other important factors to take into account (Scott & Dedel, 2001), with literature suggesting the availability of transport as an important precipitator of assault (Homel et al., 2004; Maguire, 2003). In fact, areas surrounding drinking establishments tend to report the most severe violent incidents (Graham et al., 2012), and should be considered pivotal to crime prevention efforts.

Some studies have linked the proximity of venues to each other to the occurrence of violence, due to increased practices of 'bar hopping' and the consequential increase in the consumption of alcohol (Felson et al., 1997) and in the number of people emptying such venues (Marsh & Kibby, 1993) at similar fixed closing times (Livingston, 2008). However, the reasons why people loiter around bars after closure time and how these contribute to the frequency and the severity of aggression deserve further exploration (Hughes et al., 2011).

In his work, Babor (2010) explains how the growth in number and density of NTE outlets impacted crime has been extensively explored in the past. A wealth number of research has examined the effects of changes in the outlet density on alcohol consumption and associated harms, especially violence. In Norway, changes in the density of venues over a period of 35 years were associated with increasing violent assaults rates, even when controlling for individual alcohol consumption (Norström & Skog, 2005). More recent studies have used shorter time periods and smaller geographic units to conduct cross-sectional time series analysis, showing a significant relationship between output density and violence rates over time (Gruenewald &

Remer 2006; Livingston, 2008). A study of the sharp decline in off-site stores in parts of Los Angeles following the 1992 civil unrest indicated that for every 10% reduction in outlets in a census tract, assaults were reduced by 2.6% (Yu et al. 2008). A longitudinal study conducted in California (Freisthler & Weiss, 2008) found that greater alcohol outlets density was related to higher child maltreatment rates, with annual changes in outlet numbers varying significantly with county-level referrals to child protection. Another recent longitudinal analysis found that a 10% increase in off-premises store density was associated with a 0.9% increase in alcohol-related deaths (Treno et al., 2007). Overall, the evidence on the association between outlet density and alcohol-related harm is fairly consistent.

However, when it comes to explore the composition of night-time venues, very few studies have tried to investigate how alternative and niche venues, e.g. gay / lesbian clubs, grassroots clubs, squats, latin / salsa clubs, lap-dancing clubs, private members clubs, and non-dancer nightclubs might correlate with different patterns of violent behaviour (Forsyth, 2006).

Indeed, the cultural values communicated by NTE venues, the environmental characteristics which influence their reputation can be interconnected in ways that can prevent or facilitate certain behaviours associated with violence or perception of safety.

All these studies have influenced how crime prevention interventions and approaches are designed over the past years. In the next section the main strategies to prevent and reduce crime at night will be outlined.

Crime prevention approaches at night

In most cities, the NTE strongly relies on the consumption of alcohol which is not an 'ordinary commodity' (Babor, 2010). In a national study conducted on 18 to 24 years old, Richardson and Budd (2003) found that 49% of people that committed an offence reported to binge drink alcohol at least once a month, compared to only 14% of regular drinkers. Binge drinkers were also five times more likely than regular drinkers to have been involved in a group fight in public. Furthermore, from the Crime Survey for England and Wales, victims believed the perpetrator(s) to be under the influence of alcohol in 39% of the cases (561,000 people) and more than half of violent incidents (54%) occurred during the night (Office for National Statistics, 2019).

Giancola et al. (2009) list a series of personal traits which can be risk factors for alcohol-related aggression and violence. Among them: aggressivity, irritability, trait anger, hostility, permissive beliefs about aggression, the pursuit of intense sensations, a desired image of power as well as low levels of anger control, self-awareness, socialisation, self-control, dispositional empathy, the consideration of future consequences, and executive cognitive functioning (for the complete list, see (Giancola et al., 2009, p.2). He also points out how it is alcohol's acute effects that have the greatest impact on violent behaviour (Giancola, 2015) and, while statistics show a strong association between alcohol and violence, it's still not completely clear how all factors interact to contribute to aggressive and antisocial behaviours among intoxicated people. Recent research has theorised that alcohol can lead to aggression "through an indirect path involving the disruption of intermediary mechanisms that then determine whether alcohol will, or will not, facilitate aggression"

(Giancola et al., 2009, p.2). The Alcohol Myopia Model (AMM) proposed by Giancola postulates that a high dosage of alcohol can impair the cognitive process functions and induce a myopic effect, which restricts the range of internal and external cues that the body can process (Giancola, 2015). Attentional resources are therefore allocated to only the most salient cues in the environment, which can either facilitate or prevent aggressive behaviours, depending on the context. Following this discourse, the AMM model suggests that a high quantity of alcohol consumption has the potential to either increase or hamper aggressive behaviours in individuals, contingent on what cues are present in the surrounding environment.

Distractions can therefore divert the attention from anger-inducing prompts, rumination, frustration and, combined with self-awareness and empathy, prevent people from acting aggressively. Parrott and Eckhardt (2018) developed the theory further by stating that it is possible to predict whether a given social interaction will result in aggression by discerning the strength of 'Instigation', the degree of 'Impellance', and the presence of 'Inhibitory' factors. They propose their '3I' theory as a useful framework to understand the cognitive, affective and behavioural risk factors in specific contexts, resulting in effective prevention strategies.

Finally, Graham et al. (1998) described alcohol-related aggression as the result of different factors which, once intertwined, can have different weights on the alchemy of violence:

- cultural, which relates to how alcohol and its relation to violence are understood in society;
- personal, which includes individual expectations and beliefs about alcohol;
- pharmacological, grounded in the psychopharmacological properties of alcohol;
- contextual, relating to the physical and social circumstances in which alcohol is consumed.

This is why certain authors have found that comfortable and entertained patrons display less hostility and consume alcohol at a slower pace (Homel & Tomsen, 1993), whilst a lack of quality entertainment can increase boredom, that can lead to frustration and violence (Graham et al., 2006; Graham & Homel, 1997; Homel & Tomsen, 1993). For these reasons, authors suggested situational interventions in NTE contexts towards the reduction of boredom, including the provision of television screens, stage entertainment, live music, and quizzes (Homel & Tomsen, 1993; Giancola et al., 2009). Furthermore, previous research observed that patrons who care about the type of cultural activity present in a venue would also be 'more tolerant of poor décor or any other negative features of nightclubs' (Forsyth, 2006, p. 23).

Yet, having music line-ups or other activities has been also linked with dancing, crowding, increased sexual activity and competition, which can increase the chances of aggression. In this regard, contradictory results were found in a European-wide study. In the Netherlands and France, for example, loud music was associated with increased drinking speed and alcohol intake, while in Sweden it was linked to decreased levels of over-serving of alcohol (Hughes et al., 2011). Also, the genre of music being played in NTE venues has been emphasised as a contributing factor to drinking behaviours and alcohol-related harm in several studies (Homel et al., 1997; Forsyth, 2006). From the observations carried out by Forsyth's team (2006), it is

clear that music genres dictate the type of clientele that each music club attracts, influencing patrons' behaviours and eventual risks of disorder.

Even if researchers referred to the 'nature and quality' of entertainment (Graham et al., 1980; Homel et al., 1992), it remains unclear how quality can be measured and whether it may be possible or even advisable to link specific types of entertainment, creative expressions and music genres to violent behaviour. In the end, factors increasing risky drinking and associated harm are not fully predictable and can include patron mix characteristics (Miller et al., 2011); levels of comfort, boredom, alcohol service, and intoxication; environmental factors such as noise, light, discounts on alcoholic beverages and the behaviour of the security staff. Babor et al. (2010) classifies the main areas of interventions to reduce alcohol-related harm and violence in different categories.

Taxation and price regulation interventions generally involve the manipulation of alcohol prices (usually an increase) in order to induce a shift in consumers' choice and the consequent redirection towards different products. Reviews and meta-analyses report that a 10% price increase can be associated with a 5% decrease in consumption. These values are supported by other studies, which confirm that each percent increase in alcohol price results in a decrease in alcohol-related problems. (Measham & Paylor, 2015; Zhao et al., 2013; Meng et al., 2012).

Regulating marketing in another strategy employed as various studies suggest that exposure to alcohol advertising relates to an increased risk that adolescents would begin drinking - or drink more if they currently drink (Babor, 2010). Governments may control two major components of marketing: population exposure and advertising content. Although while some modelling studies contend that advertising restrictions are the most successful and cost-efficient options (Cobiac, 2009; Holm et al., 2014), another study found that the effect of advertising bans was inconclusive (Siegfried et al., 2014).

Policies regulating the availability of alcohol are based on the theory that easier access to alcohol directly increases alcohol consumption and harm. A series of well-designed Australian studies demonstrates that reducing late-night hours of on-trade sale substantially reduces the rate of violence (Kypri et al., 2014). In their review the authors (Sanchez-Ramirez & Voaklander, 2018) found that regulating alcohol trading times is positively associated with the prevention of injuries (Grönqvist & Niknami, 2011; Han et al., 2016; de Goeij et al., 2015; Newton et al., 2007; Marcus, 2015; Liang et al., 2016), alcohol-related hospitalisations (Marcus, 2015; Durnford, 2008; Newton et al., 2007), homicides (Duailibi et al., 2007; Sánchez et al., 2011), and crime (Grönqvist & Niknami, 2011; Han et al., 2016).

Policies that aim at informing and educating the population on alcohol damage could have the ability to reduce alcohol use while overcoming negative sentiment from public opinion, usually averse to policies like tax increase or marketing regulations. Alcohol education courses in schools and institutions of higher education are a popular strategy, although their efficacy is weakly supported by research (Strøm, 2014).

In different parts of the world licensing regulations have been targeting the place management practices of NTE venues. For instance, the *Liquor Control Act 1988,* which regulates the production, sale, supply and

consumption of liquor in Western Australia, requires venues to have a House Management Policy, Code of Conduct and Management Plan (Cozens & Greive, 2014). When effective, this approach allows the encounter between different crowds and licensed venues to be mediated and facilitated, rather than provoked, by means of context - and location -sensitive security and management. Entry requirements refer to dress codes, codes of conduct, and conditions of entry and signage, like proof of age identification and ID scanners. In Torquay, equipping door-staff with breathalysers to prevent drunk persons from entering the establishment decreased violent occurrences by 39%. (Boyd et al., 2018; van Amsterdam et al., 2020). A recent reform in Irish licensing law introduced a new category of objection for license renewals, related to the absence of the conditions necessary to protect the staff, the patrons and performers from harassment (Department of Justice, 2022).

Multi-component programmes generally involve many stakeholders who are able to interact with the context to influence how people experience, consume and perceive the night time. Over the past twenty years multi-component programmes have been trialled and implemented by combining community mobilisation, Responsible Beverage Service (RBS) training, house policies and the enforcement of licensing laws. Unfortunately, the existing literature is tainted with studies suffering from methodological shortcomings (Warpenius et al., 2010; Moore et al., 2014). Among the most well-known programmes of the past twenty years, STAD (Stockholm Prevents Alcohol and Drug Problems) has shown the most promising results. STAD was implemented in 1995 in Stockholm and was based on three main activities including the creation of an advisory group with local stakeholders, an RBS 2-day training for hospitality workers and increased enforcement, accompanied by regular meetings between the police and the Licensing board (Skardhamar et al., 2016). During the period of intervention, there was a significant decrease in assaults, illegal threats and harassment, violence and threats directed at door staff/police in the intervention area (Wallin et al., 2003). Graham et al. (2004) examined Safer Bars, a violence prevention program that include RBS intervention and a premises risk assessment, using a randomised controlled trial technique. This approach coupled a risk assessment workbook with a training programme for managers and employees, featuring a checklist of 92 elements related with the risk of violence; the project trained personnel on how to proactively identify and combat risk (Braun, 2000). The intervention decreased more serious physical aggressiveness. On the other hand, pure policing and enforcement techniques were found to be mainly ineffectual, although there was some indication that focused police engagement in high-risk locations may be a more effective strategy than low level policing. Research increasingly suggests that police can do more than just front-line strategy to respond to alcohol-related problems, and that monitoring, regulation and collaborative partnerships with different stakeholders should be advocated for (Liu, 2016).

It is interesting to note that even if alcohol consumption and binge drinking are still very much present in public discourse and national media, throughout the last six decades, alcohol expenditures have fluctuated with the most recent data showing that the proportion of total expenditure on alcohol now is back to 3%, the same percentage as 1957 (Office for National Statistics, 2018).

In the 2016 Opinions and Lifestyle Survey, taken among adults aged 16 years and above, only 56.9% of respondents admitted to drinking alcohol in the week before being interviewed, the lowest level seen since the time series began in 2005 (64.2%) (Office for National Statistics, 2017). Over time, a similar reduction has been observed in the number of those who drank on 5 days or more in the week prior to interview. Comparable declines in youth alcohol use have been shown in various European, North American, and Australian countries (Looze et al., 2015; Livingston et al., 2016; Hibell, 2013). According to existing data, the drop in alcohol intake may be attributed to changes in parenting style, the delay to adolescence, an increase in social media usage, changes in gender expression and as the consequence of new health and fitness trends (Pape, 2018).

As the next section will explore, the way how individuals perceive reality can be shaped and influenced by a wide range of factors. Perception of crime can form invisible and exclusionary barriers which can prevent certain groups of people from moving through the public space. As Roberts (2006) explained fear of crime is not a straightforward concept and certain places which are perceived as safe during the day can become frightening at night. Also, public discourses and media have an important impact on how people picture and imagine different public issues in relation to urban areas, as moral panic can stigmatise certain phenomena and places.

2.3 Perception of safety at night

Even though police data have shown a continuous decrease of crime rates in European cities (Farrell et al., 2014; T; Van Dijk, et al., 2012; Valera & Guàrdia, 2014), public anxiety about crime and the perception of violence have not abated.

The physical environment has been the focal point of most of the research on fear of crime in human geography and related disciplines (Pain, 2000). Indeed, both qualitative and quantitative research demonstrated how the spatial element is central to how people experience fear (Wurff & Stringer, 1988; Valentine, 1990).

Empirical research demonstrates that perceived safety can be influenced by the physical conditions and maintenance of the space, by its configuration, and by different types of land uses, alterations and modifications to the environment, as well as by the presence or absence of certain types of individuals (Mehta, 2014). For instance, Perkins discovered that the personalisation of property and the presence of streetlights, yard decorations, and private plantings made the street environment appear safer (Perkins et al., 1992). Also, certain economic activities like retail stores and other non-residential properties can help perceive public areas as safer (Perkins et al., 1993).

In contrast, the absence of territorial control made the street environment noticeably less secure (Taylor et al.,1984). Living in an area with a high crime rate or suffering from visible signs of disorder is associated with higher crime anxiety (Brunton-Smith & Jackson, 2012). Authors found that the perception of safety can be negatively impacted by the presence of litter, graffiti, vandalism and poorly maintained buildings (Skogan

& Maxfield, 1981; Hope & Hough,1988; Perkins et al., 1992). More recently, the effect of street lighting (Atkins et al., 1991; Ramsey & Newton, 1991; Herbert & Davidson, 1994) and closed-circuit television (CCTV) have been studied (Fyfe & Bannister, 1996; Short & Ditton, 1998) as strategies aimed at improving feelings of safety in public space for certain groups, especially women (Thompson, 1994; Metha, 2014). However, growing evidence shows that the built environment plays a minor role in the formation of the fear of crime. Planners and architects are becoming increasingly aware that the relationships between objective, physical space and its social and psychological dimensions are dynamic and complex (Madanipour, 1996). Davis argues that some of these tactics can lead to more fear, isolation and social exclusion, as benefits are not equally distributed across classes, with richer communities being overall more positively affected. Other urban life characteristics, including crowding (Thomé & Torrente, 2003), social integration difficulties, ethnic diversity (Brunton-Smith & Sturgis, 2011), social conflict (Di Masso et al., 2011), building sizes (Newman & Franck, 1982), and degrees of urban vegetation (Kuo & Sullivan, 2001) are likely to impact how public space is perceived.

On the other hand, the vulnerability hypothesis proposes that an individual's perception of his or her own vulnerability to victimisation is the main factor in how people perceived safety (Baur, 2007). Insecurity resulting from concerns of criminal assaults against family members or friends and fear resulting from perceiving crime as a threat to society, can be impacted by how citizens perceive their overall quality of life and by their doubts that authorities will be able to protect them (Tseloni & Zarafonitou, 2008). Perceived insecurity can be therefore conceptualised as a combination of three key dimensions relating to the socio-environmental characteristics of an unsafe location (Valera & Guàrdia, 2014):

- personal variables;
- real and perceived skills for coping with potentially threatening situations;
- social representation of insecurity, combining self-reports of victimisation, social influence, and level of environmental satisfaction.

Furthermore, urban insecurity is also associated with uncertainties related to employment, economic, or emotional issues (Hollaway & Jefferson, 1997), as well as social instabilities resulting from alterations in welfare state policies (Hummelsheim et al., 2011).

Age and gender are other factors that must be included in relation to the perception of safety, with urban structural factors found to affect women more compared to men (Beebeejaun, 2017; Chant, 2013). Indeed, studies show that harassment and (sexual) violence, including but not limited to staring, groping and stalking as well as assaults are very common issues (Weitzman et al., 2020). In comparison to men, women have a greater perception of risk in the built environment due to their greater physical and social vulnerability (Skogan & Maxfield, 1981). Gargiulo et al. (2020) found that women are more likely to feel unsafe in degraded or secluded locations or around indicators of uncivil behaviour such as vandalism or graffiti,

prompting them to prefer driving or taking a cab over walking (Atkins, 1989). On the other side, findings around age were deemed questionable by some authors (Tseloni & Zarafonitou, 2008).

Another layer that has been proven to have a huge impact on fear of crime, is the temporal dimension in the experience of public places. Dark, isolated, run-down and poorly designed places are normally perceived as unsafe (Warr, 1990; Vrij & Winkel, 1991). The habitual trust we place in familiar strangers during the day can become tinged with caution, suspicion, and fear in urban areas at night (Fileborn, 2020). Night-time spaces can be destabilising and bring an entirely different set of social relationships, exclusions and inclusions dynamics. In this sense, Williams (2008) uses Deleuze's concept of deterritorialization to explain the way public space at night shifts in meaning, form, use and purpose.

For instance, familiar areas like parks and squares might be perceived as dangerous after dark, if left unguarded (Newton, 2018). Indeed, the desertification of entire urban areas at night can have a huge impact on fear of crime: "the city at night may be avoided, not because of the drunken crowd, but because of the barrenness and lack of sociality" (Roberts & Eldridge, 2012, p.16).

Again, gender seems to play an important role in the way how women experience the urban environments at night. Recent research on safer nightlife conducted by the non-profit Sexism Free Night (Hernández et al., 2022; Pires, 2022) involved more than 4000 respondents across Europe. Both women (77.5%) and people identifying as transgender and non-binary (63.1%) feel more unsafe than men (22.9%) when they go out at night alone. Furthermore, a statistically significant portion of women reports the mere fact of encountering men on their way to/from home to because of fear.

When venturing in the city at night, women are typically advised to stay in well-lit and populated areas, and to avoid travelling alone (Hardley & Richardson, 2021). The research confirms that women and people of transgender and non-binary gender identities deploy several strategies to deal with the risk of sexual assault when walking alone on a night out, like carrying keys in their fists (women: 66.6%; transgender and non-binary gender identities: 57.5%; men: 15.7%), pretending to talk on a mobile phone (women: 67%; transgender and non-binary gender identities: 51.3%; men: 15.6%), or carrying a self-defence object (women: 18.3%; transgender and non-binary gender identities: 23.8%; men: 9%). Other strategies, such as simulating a manly attitude or hiding personal traits were expressed by cis-gender women who responded to the survey. Overall, improving street lighting at night has been proposed as one of the main solutions to fear of crime and to encourage the use of streets at night (Boyce et al., 2000).

However, with the aid of increasingly sensitive methodologies, researchers are proposing more holistic approaches to the analysis of the fear of crime, considering it as a phenomenon that varies between individuals, that has geographical, economic, social, cultural, and psychological dimensions, that is influenced by a vast array of processes and relations (Vauclair & Bratanova, 2017).

2.4 Environmental criminology theories

Crime analysis is the set of systematic, analytical processes that provide timely, relevant information about crime patterns and crime trends (Wortley & Townsley, 2017). Multiple disciplines, including urban

geography, urban sociology, and especially social ecology, have explored the complexity of urban crime. Over the past three decades, crime analysis has been applied to the Night-Time Economy field too, given that crime, anti-social behaviour and fear of crime at night remain among the top priorities for local councils and the general public. As explored in the previous sections, the existing literature have been mainly focused on the relationship between crime and the characteristics of the environment of either individual NTE venues or the area surrounding them. Therefore, the group of theories known as environmental criminology theories will be explored as they provide a solid theoretical framework for the study of the complex relationship between violence, fear of crime and night-time environments.

Environmental criminology, according to Brantingham and Brantingham (2016), states that criminal incidents should be viewed as the space-time convergence between criminals, victims, and specific law frameworks. Environmental criminology stemmed from the Chicago school of human ecology (Park & Burgess, 1925) alongside a series of other theories which have been trying to explain the complex link between crime and the surrounding environment. A group of sociologists at the University of Chicago adopted the fundamental concept of ecology — that individuals must be studied as components of a complex whole — and applied it to the study of human behaviours. They suggested that crime is not limited to a small, definable group of offenders with criminal dispositions: given the right circumstances, the vast majority of individuals are capable of engaging in illegal behaviour. Therefore, the context and surrounding environment play a central role in the manifestation of crime.

However, before delving into the main authors advancing the environmental criminology related theories, it is worth introducing how the work of Jane Jacobs anticipated and influenced some of the theories which became the pillars for the current understanding of criminology.

Jane Jacobs wrote in 1961 *The Death and Life of Great American Cities,* a book where she aimed to criticise urban development and regeneration trends of her times. Among other theories she stressed the idea that "the bedrock attribute of a successful city district is that a person must feel personally safe and secure on the street" (Jacobs, 1961, p.30). She indeed pointed that even rare incidents of violence can have a tremendous negative impact on people's perception of safety. For this reason, she advanced different features of urban districts which might prevent or reduce the episodes of violence. For instance, she proposed that "the sidewalk must have users on it fairly continuously, both to add to the number of effective eyes on the street and to induce the people in buildings along the street to watch the sidewalks in sufficient numbers' (Ibid., p. 35).The concept of the eyes on the street will deeply influence the concept of capable guardianship in the following crime theories.

Exactly ten years later, Jeffery published *Crime Prevention Through Environmental Design* (1971), in which he analysed the impact of the immediate environment on crime, and proposed a variety of strategies for preventing crime by modifying the built context. In his book *Defensible Space: Crime Prevention Through Urban Design*, published a year later, Oscar Newman (1972) focused solely on the design of the built environment. Newman's work (1972) also provided the theoretical framework for a generation of planners a

the effort to "design out" or at least mitigate the worst effects of the fear of crime by altering built environments has played a role in numerous policy initiatives (Vrij & Winkel, 1991; Fisher & Nasar, 1992; Trench et al., 1997).

Situational crime prevention developed a framework to deal with traditional 'acquisitive crimes', like burglary or theft, considered the result of rational choices (Tonry, 2014), in contrast to expressive crimes where "the criminal act is the goal in itself" (Garius, 2016, p. 38). Indeed, Clarke argued that the key to effective crime prevention is to focus on very specific types of criminal behaviour in order to comprehend their precise situational dynamics. Like Jeffery, Clarke saw the reduction of opportunity and the manipulation of costs and benefits of crime as the basis for prevention. In fact, the rational choice perspective (Clarke & Cornish, 1985; Cornish & Clarke, 1986) argued that the perceived cost-benefit of exploiting a presented opportunity to commit a criminal act is the central factor of criminal events: criminals are believed to act in a manner that maximises benefits and minimises costs, according to their best interests (Henry, 2006). Clarke and Homel (1997) made also a central contribution by emphasising the role of perceived context in the explanation of criminal behaviour, given that opportunities, risks and benefits are always filtered through the senses of the offender.

Wilson and Kelling's (1982) 'broken windows theory' explained the potential of one crime to encourage other similar or even worse crimes. "If a window in a building is broken and left unrepaired, all of the rest of the windows will soon be broken" (Skogan, 1990, p.10), therefore suggesting that minor decay, like acts of vandalisms or graffiti (Wilson & Kellings, 1982), or even activities perceived as detrimental can generate opportunities for crime: the lack of maintenance signals a lack of capable guardianship in the area. Furthermore, as Wilson and Kelling's research report "the greatest fear was expressed by persons living in the buildings where disorderliness and incivility, not crime, were the greatest" (Wilson & Kellings, 1982, p.8). After their work, a wealth of research has explored the interconnection between specific signals of physical and social disorder and crime in urban neighbourhoods (Sampson & Raudenbush, 2001; Skogan, 2012). Indeed, a large number of police intervention strategies have been informed by this theory, like "appearance-based regulations, aggressive-order maintenance policing, order maintenance policing, zero-tolerance policing, preventative policing, problem-oriented policing, harm reduction policing, harm focused policing, hyper-policing, proactive policing, and hot spots policing" (Davis, 2018, p.166).

On the other hand, authors have questioned the dichotomic distinctions between disorderly and decent people, and between decay and cleanliness-sobriety (Harcourt, 1998). Furthermore, according to Harcourt "certain crimes, like physical assault and burglary, are significantly related to disorder; however, the statistical relationship vanishes when neighbourhood poverty, stability, and race are taken into account." (Harcourt, 1998, p.309).

Cohen and Felson, employing what they termed a routine activities approach, sought to explain the apparent paradox concerning the fact that crime rates after World War II increased substantially while economic conditions improved. According to them, crime was the result of the spatial and temporal intersection of

three minimum conditions: (1) motivated offenders; (2) eligible targets; and (3) the absence of capable guardians. If targets are unprotected and the benefits for committing a crime are high enough, a motivated offender will commit a crime (Cohen & Felson, 1979). According to this theory social characteristics of the population like unemployment, income as well living in certain areas can have an effect on the possibility to being victimised (Nicholas et al., 2007) as they increase the exposure to risky situations (Sampson & Lauritsen, 1990). Also living in a densely populated and transitory area might increase opportunities for violence, as the high proportion of strangers can translate in a lack of guardianship.

Paul and Patricia Brantingham's (2016) crime pattern theory aimed to explain this convergence in order to account for the lack of uniformity and unpredictability that characterizes urban crime. They postulated that higher levels of victimisation and criminal acts tend to concentrate in specific places, which can be referred as 'risky facilities' or 'hot spots' working as 'crime attractors' and 'crime generators. The necessity to travel to employment, school, and certain communal or recreational areas influences the everyday movements of criminals and potential victims. In the criminal pattern theory, these visited places are known as nodes, and the regular pathways that link them are known as paths. Certain nodes, such as retail malls, sports stadiums, and transit hubs, where both prospective offenders and victims gather, provide several chances for criminal behaviour, thereby creating crime concentrations or hotspots.

Also Eck and Weisburd (1995) posited in their crime-place theories that crime events are not uniformly distributed, and some geographic areas have less crime than others. In this micro context, places are specific locations within the larger social environments of neighbourhoods and communities. They can range in size from single addresses to street segments to small groups of connected street blocks, but they are all significantly smaller than neighbourhoods or communities, which have traditionally been the focus of scholars studying the place-crime relationship.

Cozens (2002) expands on these notions by introducing additional roles that a location can play, such as that of a crime detractor, where fewer opportunities for criminal activity emerge, of a crime facilitator, where offenders are assisted in circumventing existing crime prevention elements, and of a crime precipitator, actively encouraging people to engage in criminal activities. Having put context at the centre of the discourse, the management, design or manipulation of the environment can disrupt rational decision processes and systematically reduce the number of criminogenic opportunities (Hough, Clarke & Mayhew, 1980).

Overall, environmental theories are based on the idea that all behaviours are the result of a person–situation interaction. The three resulting main principles of environmental criminology are that:

1) The immediate environment is not merely a passive backdrop for criminal behaviour; rather, it plays a crucial role in initiating and directing criminal activity.
2) The spatial and temporal distribution of crime is not stochastic and criminal behaviour is influenced by situational factors. Crime is patterned according to the location of criminogenic environments.

3) Changing the criminogenic aspects of environments can reduce the incidence of crime in that location.

Furthermore, the situational crime prevention framework proposes five core principles to reduce the attraction to crime in the eyes of rational offenders: (1) increase the effort of crime, (2) increase the risk of detection at every stage of the offence, (3) reduce the rewards obtained through the engagement in a crime, (4) remove precipitating factors that serve to provoke criminal activities, and (5) remove the excuses that offenders may use to justify the offence. For instance, the early Crime Prevention Through Environmental Design (CPTED) approach was based on four areas of interventions (Saville & Cleveland, 2006):

- surveillance, for instance by for example, building residential homes in *cul de sacs* to encourage the "eyes on the streets" by the residents;
- territoriality, by employing security hardware to clearly delimit private property through fences, security alarms and circuit television cameras (CCTV);
- image, through maintenance and avoidance of any signs of physical decay;
- milieu, by controlling the land use and the types of activities and certain styles are present in the area.

However, when it comes to applying those theories to violent crime prevention approaches, in the past one of the main obstacles has been the priority given by scholars to appropriative and instrumental crimes, where the offense is considered a mean to reach a clearly defined goal - e.g., burglary or theft. Indeed, most situational prevention strategies have been applied to property crime (Felson, 2002) as violence has been generally labelled as an irrational manifestation "ungoverned by decisions or opportunities, and impervious to situational cues" (Garius, 2016, p38).

However, the irrationality of expressive crime rests on a series of misconceptions regarding the limitations of the rational choice framework: the first being that instrumental and expressive crimes are mutually exclusive categories (Wilkinson, 2001). The second misconception surrounding the rational choice framework is that it requires monetary goals. Instrumentalists reject the distinction between instrumental and expressive aggression on the grounds that both are "instrumental" in meeting the offender's goals (Bandura, 1973; Felson, 2002; Tedeschi & Felson, 1994); the only distinction being the nature of the goals held by the aggressor (Indermaur & Ferrante, 1993).

Despite this historical separation between 'instrumental' and 'expressive' crimes, some authors have argued that a merely expressive crime without external goals does not exist (Felson, 2012; Hayward, 2007). Indeed, in trying to explain "why people get into foolish fights with no apparent gain" (Felson & Clarke, 1998, p. 9), the authors argued that non-monetary and intangible rewards might play an important role in acts of violence too. Honour, macho concerns, the pursuit of excitement and physical strength can all be seen as common reasons behind violence especially in specific settings and demographics (Neff, 1991; Athens, 2005; DeHaan, 2011; Tedeschi & Felson, 1994). Self-reported benefits of taking part into fights can include feeling

'heroic', experiencing a rush, or increasing group cohesion (Indermaur, 1999). Therefore, violent acts are purposive because aggressors invariably seek to achieve certain readily identifiable goals (Athens, 2005). Tedeschi and Felson (1994) outline three overarching goals of assaultive violence: (1) to get others to comply with your wishes, (2) to restore justice as the offender perceives it, and (3) to assert and protect self-image or identity. Furthermore, following Wikström's research (2004), Garius underlined how "moral actions are also based on perceptions and choice processes linking an individual to the environment in which they act, and that all actions, including acts of violence, can be attributed to what the actor perceives as a rational choice" (Garius, 2016, p. 38).

Following these considerations, Garius (2016) proposes that violent crimes should be also investigated applying the environmental criminology framework, since the decision-making processes of violent offenders are to be regarded as ultimately 'rational'; she suggests that the ways in which opportunities for violence unravel in space and time has to be explored by taking into account socio-demographic and lifestyle preferences in their interaction with environmental cues which can potentially facilitate, provoke, or inhibit, violent behaviours (Wortley, 1998).

Therefore, several environmental, situational and routine characteristics must be considered in order to have a more holistic approach in the study of NTE related violence and perception of safety. Therefore, as the following sections will explain, the present research aims to embrace the complexity of NTE districts, by including a wide range of different factors which can concur to impact the manifestation of violent incidents and to an increased sense of security in urban areas at night.

2.5 Conclusions

This chapter aimed to trace the origin and development of contemporary Night-Time Economies in western cities. It described how despite NTE activities were already present before the twentieth century, in the past three decades, the expansion in the number and types of night-time economy activities has led to the formation and expansion of urban NTE districts. Different policies and strategies alongside deep changes of the socio-economic structure of western cities have shaped the trajectories of the development of NTE districts. These are normally referred as entertainment districts, and are often regarded as a uniformed urban phenomenon. Despite the recent trends in homogenisation of businesses, aesthetics and practices in NTE (Chatterton & Hollands, 2003), it is worth considering possible differences between NTE districts and their possible impact on social phenomena like violence and perception of safety. Night-Time Economies are complex ecosystems with multiple stakeholders involved. They should be treated as wicked situations, considering how different interests, environmental factors, activities, power relations and political agendas interact and compete. In the words by Ekblom (2010, p.46) practitioners should "accept this complexity rather than pretend it doesn't exist".

The following chapter will outline which datasets and methodologies have been employed in order to identify and analyse the NTE districts present in six different UK cities. Understanding where and how

specific types of NTE activities tend to cluster was the starting point of the exploration.

The NTE districts were identified using a spatial analysis approach and then explored using different methods to explore a broad range of environmental characteristics that can have an impact on violent trends and perception of safety at night. The reason behind the inclusion of certain characteristics is also explained alongside the adaptation measures taken to overcome the limitations imposed by the Covid-19 emergency taking place during the data collection period. Also, the justification behind the use of specific datasets and the exclusion of others is included in the chapter.

After having considered the identification and exploration of NTE districts, the statistical approaches employed to test independent correlations between individual factors and violent victimisation and fear of crime at night are also presented. The decision regarding the use of specific regressions models will be also explained by referring to previous studies focusing on similar research areas. The geographical level of the analysis as well as the reasons behind certain approximation in the manipulation and the weighting of the independent variables are also presented.

Overall, the methods employed aimed to:

1) provide a robust way to identify Night-Time Economy districts in urban settings;

2) explore environmental characteristics of Night-Time Economy districts, taking into account different levels of information;

3) explore the links between environmental characteristics of NTE districts and violence and fear of crime in urban areas at night.

3 Methodology and Data

This chapter explains the criteria behind the selection of the main data sources, and the key techniques employed to address the aims and objectives of the research.

The spatial analysis of Points of Interest data was first employed to identify NTE districts containing clusters of NTE activities in six UK cities. Previous research employed spatial analysis to explore clusters of economic activities and was used as the main reference for identifying NTE districts.

Google Street View (GSV) images alongside Points of Interest were the two main sources used to examine remotely the characteristics of the NTE districts in response to the the restrictions imposed by Covid-19 emergency measures.

As explained in the previous chapter, location-specific features of the NTE can either facilitate or prevent Night-Time Economy violence and influence the perception of safety at night. Drawing from previous literature on environmental criminology and NTE, urban characteristics which possibly impact these social phenomena have been selected for investigation through GSV.

The justification behind the use of such technique has been detailed by showing the increasing number of studies using Google Street View for the assessment of the urban environment.

The next stage of the analysis involved the study of the possible correlation between the characteristics

identified and different trends in violent victimisation and perception of safety at night. In the UK, crime statistics generally rely on two main datasets: The Crime Survey for England and Wales (CSEW) and police crime (Maguire & McVie, 2017). The motivations behind using the CSEW to capture violence and the perception of safety at night in relation to the NTE districts will be explained.

The use of the CSEW also allowed the researcher to consider demographic characteristics and other variables related to the routine activity of the population as possible explanatory factors of the social phenomena of interest.

To identify the possible independent correlation between the environmental characteristics observed, violent victimisation trends and perception of safety at night, the regression models used for the analysis will be presented. Violent victimisation data tend to have specific peculiarities which require the use of certain statistical models which will be presented.

An account of the limitations of the datasets and the approach employed will be outlined in Chapter 6, exploring how they have impacted the present study and proposing possible alternatives for future studies.

In the table below the workflow of the research is summarised with the corresponding aims of the study (Figure 3.1)
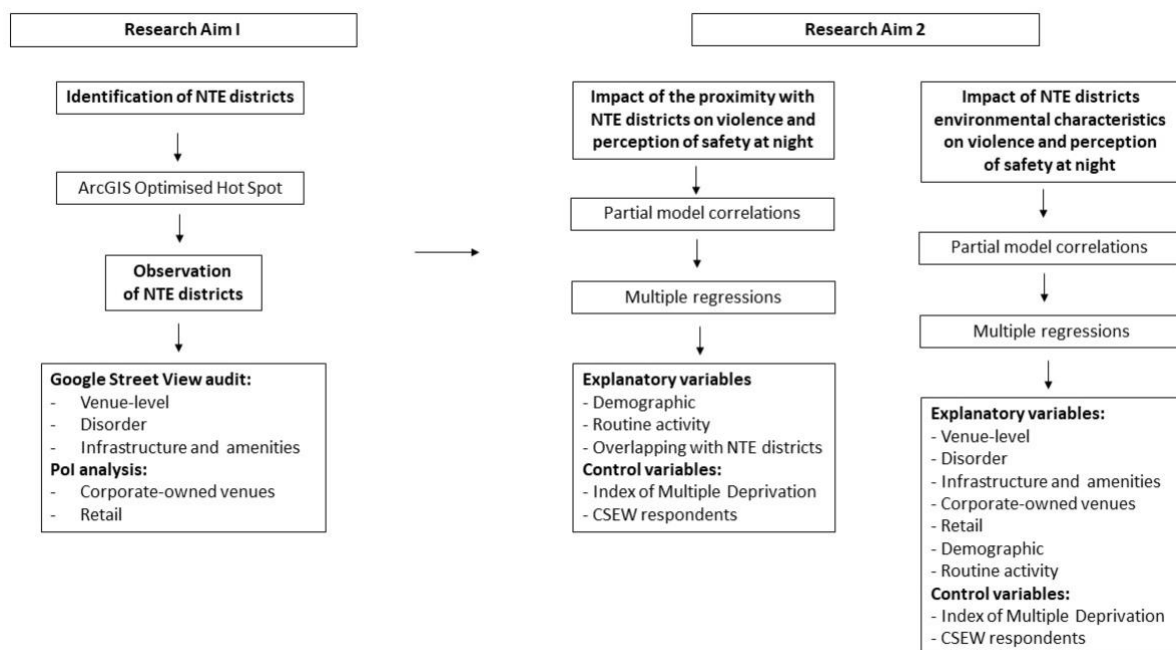
Figure 3.1: The workflow adopted by the present study to address the two aims of the research.

3.1 How to identify and explore NTE districts

This study critically engages with the current conceptualisation of urban Night-Time Economy districts and with the lack of a deeper understanding of how NTE districts are configured.

Several studies have focused the attention on "entertainment districts", "night-time entertainment districts"

pointing out how NTE activities have been following the same economic trends as other sectors, de facto forming districts in cities (Babor et al., 2010; Mazerolle, et al., 2012). Furthermore, policy makers and urban planners often call for more vibrant and diverse NTE districts, with a more cosmopolitan atmosphere (Young et al., 2006). However, very few studies have pushed the effort to conceptualise the way in which Night-Time Economy districts unravel and what features they reveal in terms, for instance, of mixes of activities or land-use.

To address the first aim of the research, the Getis Ord (GI*) Hot Spot analysis, a spatial analysis technique which allows for the identification of statistically significant clusters of activities, was therefore employed. This first stage of analysis involved the use of Ordnance Survey's Points of Interest dataset which provided the information about the location and the type of the NTE activities present in six UK cities taken in consideration. In the following sub-sections, the rationale behind the selection of the cities for investigation, the use of spatial analysis and Points of Interest dataset will be explained.

Cities Selection

Several factors including the presence of creativity hubs and active NTE management programs have been used to select the six cities involved in the analysis, so as to allow for a better representation of urban NTE districts configurations and diversity. Existing literature links successful NTEs with the presence of creative industries (Florida, 2002) and, more recently, of active strategies for managing and fostering Night-Time Economy ecosystems (Seijas & Gelders, 2021). As explained in Chapter 2, several cities around the world are starting appointing specific organisations or individuals to the management of local NTEs, in order to improve the vibrancy and the offer of the city, and to prevent eventual side effects of existing nightlife. Furthermore, in the UK, the Purple Flag programme annually rewards those cities who achieve a remarkable level of innovation, curation, planning and collaborations after dark (ATCM, 2023).

For these reasons the following characteristics have been taken into account to get a sample of comparable cities:

- Urban population: the Census 2011 data have been checked to obtain population data.
- Presence of creativity clusters: for the identification of creative clusters, the researcher used both the Nesta Creative Clusters list (Bakhshi, 2017) and the British Council creative hubs map (Dovey et al., 2016).
- Night-Time Economy management programmes or NTE awards: the list of the Purple Flag awarded cities (Brandén & Rönnblom, 2019) has been used alongside the list of NTE management programmes active in the UK published by Seijas and Gelders (2021).

The final six cities selected for the analysis were Birmingham, Bristol, Leicester, Manchester, Nottingham, and Oxford.

3.1.1 Data Source: Geomni's Points of Interest data (PoI)

Point of Interest (PoI) data are spatial data containing sub-parcel level business and human activities information, which can serve as proxies for land use and urban functions; they are available from online mapping and cataloguing service providers and have high spatial (e.g., geo-coded business locations) information (Liu & Long, 2016; Yuam, 2012). For instance, recent research has adopted PoI datasets for the study of NTE distributions in different China districts (Cui et al., 2021; Wang et al., 2022) as they provide a reliable source of geolocated human activities. The present research employed the Ordnance Survey (OS) PoI dataset which uses a three-levels classification scheme, for a total of nine groups, fifty-two categories broken down in 616 PoI classes (Ordnance Survey, 2020).

Besides data on location, latitude, longitude, address, name, and category information, the Ordnance Survey's PoI dataset includes other information like the possible brand affiliation of businesses. Therefore, the whole PoI dataset, including all the classes of the six cities, have been downloaded from the OS website, and then filtered to capture the NTE activities of each city. This study adopted the recently established definition of the NTE published by the UK Night-Time Industry Association (Night Time Industry Association, 2021), whereby the NTE is recognized as part of the Out of Home Leisure Activities (OHLA). This definition considers all sub-sectors within the OHLA that primarily serve evening or night-time consumers, including:

- On trade outlets – nightclubs, bingo, casinos, public houses, sports and social clubs, licensed restaurants, hotels, performance venues, cinemas;
- Unlicensed businesses – fast foods and takeaways, unlicensed restaurants, canteens;
- Public events and live performances, museums, theme parks and visitor attractions.

This study will explicitly address the first two categories which can be considered more permanent fixtures of the NTE, whereas those in the third classification include activities only occasionally staged during night-time. Table 3.1 illustrates the PoI classes considered in the research.

Point of Interest classes
Nightclubs
Pubs, Bars, and Inns
Hotels, Motels, Country Houses and Inns
Fast-foods and Takeaways (including Fast Foods and Takeaway Outlets, Fast Food Delivery Services, Fish and Chips shops)
Restaurants
Alcoholic Drinks Including Off-Licenses and Wholesalers
Casinos
Theatres, Concert Halls

Table 3.1: The list of PoI classes considered for the analysis of NTE districts.

To address the Question 1 of the study - "*Is it possible to spatially identify NTE districts in urban ecosystems?"*- the *Optimised Hot Spot* spatial analysis using the ArcGIS software has been used to identify the clusters of NTE activities in each of the six cities considered.

3.1.2 Spatial analysis of NTE districts

Using spatial cluster analysis, which separates data into homogenous groups based on the geographical position of characteristics and their spatial interactions, it is possible to examine the spatial distribution of human activities in cities. Spatial clustering analysis measures the degree of spatial autocorrelation between characteristics and quantify the statistical significance of identified clusters (Lloyd, 2010). If certain elements which are closer together tend to be more similar than those farther apart, they are considered spatially clustered together (Lloyd, 2010). Clustering techniques are examined within the framework of a null hypothesis stating that attribute values do not display local spatial clustering. The null hypothesis may only be rejected if the findings are statistically significant within a certain degree of confidence. Several techniques, including thematic mapping, kernel density estimates, closest neighbourhood hierarchical clustering, K-means, and the Getis Ord (GI*) statistic, may be used to find clusters of activities (Newton, 2015).

For instance, in previous research authors used the hot spot analysis based on the Getis Ord (GI*) statistic to observe statistically significant clusters of fashion activities and explore fashion districts in different cities (Williams & Currid-Halkett, 2011). A similar approach has been followed by the present study, which employed the *Optimised Hot-Spot* analysis - based on the Getis Ord (GI*) statistic and available on the ArcGIS software - to identify city areas where NTE activities are significantly clustered. The hot spots of NTE activities returned by the software were used to locate the urban areas where those activities are significantly clustered.

These areas were used to locate the NTE districts in each city for the subsequent analysis. For this reason, throughout the rest of the thesis the terms 'NTE clusters' and 'NTE districts' are used interchangeably.

Hot spots Analysis Getis-Ord (GI*) statistics

The Getis Ord (GI*) statistic is a method for analysing clusters in the attributes of spatial data (Getis & Ord, 1992, 1996; Mitchell, 2005; Ord & Getis, 1995). Developed in the mid-1990s, this method has commonly been used in rainfall and epidemic modelling and has been applied in recent years in criminology as well as urban analysis (Newton, 2015; Chopin & Blazy, 2013; Kounatidis et al., 2008). The method is an adaptation of the General G-statistic (Getis & Ord, 1992), used for quantifying the degree of spatial autocorrelation over an area. The method evaluates the degree to which each feature is surrounded by features with similarly high or low values within a specified geographical distance (neighbourhood).

The statistic is given by the following equation:

$$G_j(d) = \frac{\sum_{j=1}^{n} w_{ij}(d) x_j}{\sum_{j=1}^{n} x_j}, \ j \ not \ equal \ to \ i,$$

Where $\{w_{ij}\}$ is a symmetric one/zero spatial weight matrix with ones for all links defined as being within distance d of a given i. All other links are zero including the link of point i to itself. The numerator is the sum of all x_j within d of i but not including xi. The denominator is the sum of all x_j not including x_i.

The statistical significance of the degree of local autocorrelation between each feature and its neighbours is assessed by the *z-score* test in ArcGIS. This approach has an advantage over previous hot spot mapping methods since it discovers statistically significant grid regions and produces a *z3* score that quantifies the clustering's intensity and importance (Newton, 2015). The *z-score* therefore represents the significance of clustering at a specified distance. To identify hot and cold spots, the software requires a minimum of 60 points sample.

ArcGIS: Geographical Information Systems for clusters identification

Geographical Information Systems (GIS) provide a tool for generating, modifying, managing, analysing, and visualising spatial data, including identifying overlaps between different features, identifying clustering in points and exploring spatial patterns (Lloyd, 2010). Typically, in GIS software there are two models to represent spatial data: the vector-based model and the raster-based model. Vector-based models use geometric primitives such as points, lines, and polygons to represent spatial objects referenced by Cartesian coordinates, while raster-based models quantise an area into grid-cells (Yuan et al., 2012). For the current study ArcGIS software has been used and the *Optimised Hot-Spot* analysis tool has been performed on each city by using the NTE activities sample filtered from the Points of Interest dataset.

First, the *Average Nearest Neighbour* tool in ArcGIS was used to calculate the average Nearest Neighbour distance Index (NNI) of each NTE class and identify which ones are clustered. The *Average Nearest Neighbour* tool calculates the average nearest neighbour ratio of the dataset by dividing the observed average distance by the expected average distance, with the expected average distance being based on a hypothetical random spatial distribution of the dataset (ArcGIS, 2022). If a class of NTE activities co-locates in the urban environment, the correspondent Nearest Neighbour Index (NNI) will show a result smaller than one.

The *Optimised Hot Spot* analysis function on ArcGIS was then used to map significant hot spots of those NTE activities which co-locate in the urban environment. *The Optimized Hot Spot Analysis* tool interrogates the data provided to obtain the parameters and settings that will yield optimal hot spot results. The tool aggregated the NTE venue samples into weighted features, and it then identified an appropriate scale of analysis using the distribution of the weighted features. The statistical significance reported is automatically adjusted for multiple testing and spatial dependence using the False Discovery Rate (FDR) correction method (ArcGIS, 2022).

Then, the *Optimized Hot Spot* analysis function identifies a grid area of polygons where the points are statistically significantly clustered. The strength of clustering is reflected in the *Gi_Bin* score returned by the function, with numbers ranging from 0 - i.e., no clustering - to 3 - i.e., maximum clustering. As mentioned before, the *z-score* measures the strength of the clustering and its significance. To set up the distance band – i.e., the scale of analysis - a 'rule of thumb' provided by the ArcGIS developers recommends evaluating each feature in the context of at least eight neighbourhoods, especially if the values associated with the features of interest are skewed (Esri, 2021). In every city considered, for each class of NTE activity with at least 60-point sample, the *Optimized Hot Spot* analysis was employed to identify and map the significant hot spots where the activities are clustered.

Exploratory analysis: coexisting land uses in NTE districts

Land use is a concept that aims to explain the activities or socio-economic functions for which land is used (Foster et al., 2003). Having a solid understanding of different functions and forms of land uses is essential for devising local strategies and policies for regeneration, housing, employment, transport, environment, and culture (Foster et al., 2003). Land-use classification schemes typically organise distinct areas or buildings as hierarchically nested categories (LaGroJr, 2005). More aggregated classifications (level I) include broad land-use categories, such as 'agriculture' or 'urban and built-up' land. Within each level I class there are a number of more detailed (level II) mutually exclusive land use classes like 'residential,' 'retail,' and 'industrial' subclasses. Echoing Jacobs' (1961) theories around mixed land uses, increasing the level of the eyes on the streets and natural surveillance, the Night-Time Economy has been championed as a possible solution to revitalise urban areas (Bianchini,1995). On the other hand, previous research has underlined how the coexistence between residential buildings and NTE activities can cause tension and increase social disorder (Ottoz, 2018).

Therefore, the present study has completed an exploratory analysis of different land uses present in each NTE district identified. The Geomni *UkBuildings* dataset was employed for the analysis, as it provides detailed information about individual buildings, including the building's age, use, height, residential type, number of floors, location, structural detail and area. The *use* information category contains 27 classes, which can be used to explore the land use of the identified NTE districts.

The *UKbuildings* dataset was fetched from the Geomni platform and manipulated using the *tabulate intersection tool* on ArcGIS, to calculate the rates of each land use in the NTE district. Furthermore, the rate of buildings with at least one NTE related activity – henceforth referred to as *NTE buildings* - has been calculated to explore the rates of buildings with a NTE use in each NTE district.

3.2 NTE districts characteristics

Following environmental criminology theories, various characteristics related to the urban environment, like the presence of specific built elements in the public space, signs of physical disorder and the amount and types of businesses present, can potentially become crime generators or precipitators (Tonry, 2014).

Self-report questionnaires, census data, and neighbourhood audits are some of the approaches available to researchers for gathering information about the urban environment (Rundle et al. 2011). However, due to Covid-19 restrictions, most of the traditional techniques had to be discarded as most of NTE activities were either shut down or restricted for several months across 2020 and 2021, when the data collection was planned; therefore, the methodologies for collecting urban environmental data had to be readapted and other remote and digital alternatives were considered.

Conducting research in times of emergency: the digital ethnography approach

As Pink et al. argued in their *Digital Ethnography* book (2015, p. 130), "ways of representing the experience of locality and ways of coordinating and acting in localities in a contemporary context, happen in ways that weave together digital, material and weather worlds". In ethnographic research, methods like digital mapping are becoming an important accessory tool to help overcome some of the traditional limitations connected with physical ethnography – e.g., time and cost. "The local is often *known simultaneously* through our feet moving over the ground below us, and our sensing of a Google map image of that very ground as already photographed" (Pink et al., 2015, p.130).

It comes as no surprise that urban planners are increasingly combining physical environment exploration methods with virtual tools, favouring Google Street View, Google Earth and, more recently, pictures collected from social media platforms, to explore specific urban sites (Haddad et al. 2021; Richards & Edwards, 2017). For instance, previous research has employed Google Street View to assess physical deprivation (He et al., 2017), the presence of alcohol signals in public areas (Clews et al., 2016) and walkability of urban areas (Yin & Wang, 2016). Google Street View was therefore selected in this study to audit the urban environment and explore NTE related features. Other existing and noteworthy auditing protocols have been reviewed and considered to create a list of the urban characteristics to be observed (Sampson & Raudenbush, 1999; Graham & Homel, 2012), Kan et al., 2021). Among them, it is worth mentioning one of the key works concerning the study of the barroom environment, authored by Graham and Homel (2008), which compiled a thorough auditing tool for the *Safer Bars Project*. The tool is composed of six parts, exploring environmental characteristics of bars and pubs, including the activities offered, the disposition of furniture, the general atmosphere, the entrance features, the behaviour and number of the venue staff and the features of the venue surroundings.

Some of those characteristics were included in the present study and will be discussed in the next subsections. The digital assessment of the urban environment was then complemented with the analysis of PoI data, which included the density of NTE venues and retail activities, as well as the number of venues which are owned by larger corporates. These characteristics are discussed in detail in the following sections, after having presented GSV and how it was employed in the study.

3.2.1 Data source: Google Street View for digital ethnography

Google Maps was originally launched in 2005 (Vandeviver, 2014) and is a "free-to-use, web-based mapping service that combines conventional cartographic maps with satellite imagery and high-resolution aerial photography" (Vandeviver, 2014, p. 1-2). The maps contain information on economic activities, street and road names, landmarks and buildings, public transports, real-time traffic information. Users can choose different types of visualisations, between map and satellite view, or access the Street View function on most of the streets present on the maps.

Street View is a function of Google Maps allowing users to access a set of photographs taken by Google's personnel and edited to offer panoramic views of metropolitan streets from the ground up. The user can pan 360° degrees, spin the camera vertically 290 degrees, and zoom in and out while moving forward or backward down the streets covered. The coverage of Google Street View has been steadily expanding to encompass more places since it was first introduced in 2007. The resolution varies depending on when the photos were shot, with more recent shots benefiting from higher resolution. The tool also allows the user to compare the pictures with previous collections of pictures dating back to 2007.

Street View has been implemented in a broad range of studies and has the potential to become a useful tool for quickly collecting large amounts of data of the built and social environment (Sampson, 2013). Data collection via Street View has been found to be less costly and logistically simpler than in-person audits, facilitating quality and inter-rater reliability. It also addresses some concerns about the intrusiveness of field audits.

In the present study, the layouts of the NTE hot spots identified using the *Optimised Hot Spot* analysis on ArcGIS, have been exported as pictures and manipulated in Microsoft Paint, a raster graphics editor software that allows users to add drawings, notes and other visual cues in pictures. These pictures allowed the researcher to take note of the streets already assessed and cover with precision only the street segments included in each NTE district.

The researcher knew the basics of the Google interface but he had not used Google Street View previously for research purposes and had not undertaken any formal training. As this was his first research experience with Google Street View, before starting the observations the researcher undertook a four-week trial-and-error learning process in order to become more confident with the instrument and with its main obstacles and potentials. This process determined the final decision about the list of factors to be observed.

For instance, an initial variable concerning the possible presence of signs outside of restaurants or fast foods advertising healthy food was discarded, as it was nearly impossible to acquire images on that matter. On the other hand, the presence of unhoused people in the public space, was included as it was easily observable through Google Street View.

Starting from the edge of each NTE cluster, the researcher travelled each street two times. Where feasible, data was collected using photos captured from the road lane closest to the sidewalk, and the angle of view was frequently adjusted to observe structures in the centre of the street. When necessary, the zoom tool was

utilised to provide a closer view of any significant areas of interest, so that the perspective would match that of a pedestrian. Furthermore, to ensure data coherence and avoid the misrepresentation of certain factors – such as the adjustment and closures of venues as a result of Covid-19 – whenever possible the pictures considered were those ones shot in 2019. In Google Street View, a dedicated slider box on the top left of each image allows the user to move through time and select the corresponding thumbnail of a specific year. When images from 2019 were not available for a street segment, the researcher navigated to 2018 or older images. To normalise the number of observations obtained, each observation value was divided by the combined streets length of the related cluster, calculated using the ArcGIS software.

In this way the density of each characteristic per km of street was obtained for each NTE district. However, some characteristics were more difficult to count, like, the number of graffiti, of bike racks or the presence of cycling lanes. For each of those characteristics, the researcher calculated the number of streets with at least one feature observed, and then normalised it by the number of streets of the related NTE cluster. In the next subsections each individual environmental characteristic observed and considered for the analysis will be presented and contextualised using previous literature exploring violent crime and perception of safety in urban ecosystems.

3.2.2   Venue Level characteristics

NTE venues are "ecological systems" (Homel & Thomsen, 1993, p.56) housing a plethora of physical and intangible cues which can either facilitate or hamper opportunities for interpersonal violence. Starting from the encounter with certain cues present outside of venues, visitors build expectations based on pre-existent sets of values and experiences which can in turn facilitate certain behaviours. For instance, the presence of happy-hour drink promotions, has been associated with increased amounts of drinking, increased likelihood of being highly intoxicated, and participating in fights (Kaplan & Reed, 2018). Other authors have advanced that television screens, stage entertainment, live music, and quizzes can also have an impact on how visitors behave, by helping reduce boredom and frustration among night-time visitors and reduce the speed at which alcohol is consumed (Homel & Tomsen, 1993; Giancola et al., 2009). Therefore, elements like drinks offers, or signages indicating music or entertainment activities are among the characteristics being considered in the present study. In the next subsections, each venue-level factor will be described in detail (Table 3.3).

Characteristics	Description
Alcohol Promotion	Presence of signs outside the venue with alcohol promotions, discount or offers
Entertainment activity	Any sign of entertaining activity, like sport screening, or pool game being advertised
Music activity	Any sign of music programme, music activity advertised
Chairs and tables outside	Presence of table and/or chairs for outdoor drinking and dining
Venue policy	Presence of any sign of venue policy, like age restrictions, awareness messages, prevention of noise

Table 3.3: The list of venue level characteristics observed.

Alcohol promotions

Marketing strategies like the happy hour or drink promotions like the "2-4-1" (indicating that visitors will get two drinks at the price of one) have been found to have an impact on binge drinking levels and alcohol related issues (Kaplan & Reed, 2018). For instance, a study found that in the US, those authorities which banned happy hour promotions had a lower alcohol-impaired driving crashes in 2016 and 2017 (Reish & Booker, 2019). Furthermore, another study in the US (Baldwin et al., 2014) found that altered drinking behaviours in venues with happy hour promotions significantly increased the odds of getting into a fight while intoxicated.

In the present study, the researcher found that signs indicating promotion strategies in relation to alcohol discounts and happy hours were very visible from the street and included this characteristic among the venue-level variables. Therefore, the density of alcohol-related promotional signs over the km of streets was calculated for each NTE district.

Entertainment activities

Following the Attention-Allocation Model, the contents and activities present in NTE venues can have an impact on how people experience and regulate alcohol intake in the face of frustration (Giancola et al., 2009). According to the Attention-Allocation Model theory, it is more probable that consumption of alcohol will lead to violence in those contexts where irritants and frustrating cues are stronger than the inhibitor ones. Comfortable and entertained patrons are seen to display less hostility and consume alcohol at a slower pace (Homel & Tomsen, 1993), whilst a lack of quality entertainment can increase boredom, and frustration. However, some studies have also found correlations between entertainment activities and crime at night, as these can increase overcrowding, rowdy behaviour and sexual competition (Hughes et al., 2011).

For these reasons, signs promoting the presence of entertaining activities (like sport match screening, pool tables, karaoke etc.) present outside of venues were recorded and their density calculated.

Music activities

Music related activites are among the key offers of NTE districts. However, while certain authors believe that music and entertainment might have a positive effect in preventing frustration and aggressivity (Homel & Tomsen, 1993), Hughes (2011) argued that having loud music can increase the speed of alcohol intake which can impact the chance of violent aggressions. Furthermore, contradictory results were found in a European-wide studies (Forsyth, 2006).

therefore, venues displaying both generic messages related to the presence of "live sets" or "djsets", as well as proper programming entailing a list of artists alongside the dates of the performances were recorded. As for the other venue-level variables, also the density of venues with a music offer per km of street was calculated.

Chairs and tables outside

Following Jacobs' theory (1961), the presence of people involved in various activities can increase the number of active guardians – i.e., the eyes on the street - in the public space. On the other hand, as other researchers argued, a high number of strangers in a neighbourhood might hamper residents' ability to distinguish locals from strangers (Kurtz et al.,1998; Stucky & Ottensmann, 2009). This can negatively impact social control in urban areas. In the context of NTE districts, it has been noted that the presence of chairs and tables outside can help decrease overcrowding of indoor spaces, which can be loud, warmer, and lead to frustration (Green & Plant, 2007).

Therefore, the number of venues with chairs and tables outside per km of street has been calculated to test its possible impact on violence and perception of safety at night.

Venue policy

According to previous research, health warnings have positively impacted consumers' choices and decreased certain unhealthy habits (Campos, 2011). However, according to the available literature, industry-sponsored messages on alcoholic beverages seem to be ineffective (Hastings & Angus, 2009).

This variable was initially added to determine if alcohol regulating signs outside of venues can have an effect on violence and perception of safety at night. The elements considered included materials promoting safer consumption of alcohol, responsibility statements on techniques to dealing with drunk and underage individuals and on the regulation around alcohol use, such as signs requiring age identification for all purchases of alcoholic beverages. However, in the initial trial-and-error learning process, the researcher found it very difficult to distinguish any of these signs outside of the venues and decided not to take into account this element in the subsequent phases if the research.

3.2.3 Disorder characteristics

The Broken Windows theory (Wilson & Kellings, 1982) proposes that even signs of minor decay, like acts of vandalisms or graffiti, and activities perceived as detrimental can generate opportunities for crime. Researchers conventionally divide the concept of disorder into social and physical (Welsh & Farrington, 2012), where physical disorder generally includes signs of negligence or decay like vandalised buildings, burned-out cars, broken streetlights, litter on the street, loose syringes, condom, and graffiti (Welsh & Farrington, 2012). On the other hand, social disorder refers to the presence of certain activities or individuals which are deemed uncivil, like fights, drunk people and prostitution on the streets. Also, the physical space providing opportunities to loiter and consume alcohol, might be the cause of social disorder (Sampson & Raudenbush, 1999). However, contrary to the Broken Windows theory, however, researchers have found that the relationship between public disorder and crime is not so evident except for the case of robbery (Sampson & Raudenbush, 1999).

In a recent study, authors concluded that "GSV-based neighbourhood disorder observational scale provides an accurate, concise, and valid measure of neighbourhood disorder, comparable to measures obtained with traditional observational instruments" (Marco et al., 2017, p.195). One study tested the validity of Street View in assessing the neighbourhood environment by the size and temporal variability of features. The research compared neighbourhood measures from Google Street View images with those collected through field observation in a prior study. In the study, research found inter-methods agreement to be low for 35% of the physical disorder items, and only high for 23.5% of them. Another study, found extremely high correlation between virtual and physical audit of the neighbourhood environment. The studies concluded that it is feasible to conduct environmental observation of neighbourhood physical decay using Google Street View (Marco et al., 2017; He, Paez & Liu, 2017).

Table 3.4 lists all the characteristics observed using GSV and in the next subsections each individual feature will be presented alongside their possible relation to violence and perception of safety at night.

Characteristics	Description
Construction sites	Presence of scaffolding or construction sites which offer opportunity for crime, vandalism and graffiti
Graffiti	Graffiti on street walls
Unhoused people	Presence of shelters or homeless people in the public space
Unsupervised private parking lots	Presence of private unsupervised parking lots
Litter	Presence of litter on the streets
Abandoned residential houses	Presence of abandoned run-down houses or apartments

Table 3.4: List of the disorder characteristics analysed.

Construction sites

Construction sites have been explored in previous literature under the lens of "acquisitive crime" related to stolen construction materials and machines (Carney, 2015). Interestingly, some authors have pointed out that long working hours and exhausting manual labour are possibly related to issues of harassment and discrimination in construction site work environments (Rawlinson & Farrell, 2010). The same authors also noted that construction sites can facilitate the presence of graffiti (Rawlinson & Farrell, 2010), as writing directly on construction walls is even employed by workers as an informal medium to inform and instruct. In this study, the inclusion of construction sites in the list was twofold: in their possible function as facilitators of vandalism and graffiti and at the same time as sign of decreased guardianship and opportunity for loitering.

The percentage of streets with at least one construction site was therefore included in the audits of the disorder variables.

Graffiti

Tag graffiti, creative works, stencil art, unlawful sprayings on public or private property, and murals on legally designated walls are just a few examples of the many different types of graffiti in the urban environment (Vanderveen & Van Eijk, 2016). Many municipal governments aim to prevent and remove graffiti in accordance with the "broken window" theory (Young 2010; Uittenbogaard and Ceccato 2014). Indeed, graffiti is part of a greater "grey area" of deviant behaviours, which are frequently classified as "disorder" while not being clearly either harmful or criminal (e.g., loitering, skateboarding, public

drinking, noise). By combining preventive and punitive measures, and with the provision of specific locations where graffiti is allowed, local and national authorities appear to distinguish between graffiti as a form of art – i.e., street art - and graffiti as a crime. Over the past years several actors actively contributed to the development of the symbolic capital (Bourdieu, 1977) of the street art movement, resulting in the emergence of the concept of "streetness" (Andron, 2018, p. 1046). Streetness is now sold through tour guides and city branding campaigns and has become a symbolic currency employed by urban regeneration planners, NTE interior designers, fashion brands and even food delivery companies.

The researcher has first tried to make two separate variables to diversify illegal street tags (graffiti) from street art on legally designated walls. However, Google Street View was not found to be a reliable tool to acknowledge the nature of this form of creative expression, and only street tags were recorded as a sign of possible missing maintenance and physical disorder of the area.

Unhoused people

Unhoused people are socially excluded groups that can encompass migrants, non-migrants, vagrants, outcasts and those who, despite being well known to the community, do not belong to 'the community of value' (Anderson & Serpa, 2013). In England and Wales, begging is regulated under the Vagrancy Act 1824 as an illegal and arrestable offence (Fitzpatrick & Jones, 2005).

In some studies, authors have questioned whether the primary goal of local policies about removing homeless individuals from certain areas, might have been to effectively reduce crime or rather to remove visible poor people from the urban environment and encourage the subsequent gentrification of the area (Vitale, 2010). Rowe and O'Connell (2010, p.879) also added that the "broken windows theory has been applied to putatively "broken people" who, apparently (and here the logic falls) are not to be fixed but instead are cited for the crime of brokenness and removed from sight".

On the other hand, authors have found that the homeless populations incur in much more severe risk of victimisation (Nilsson et al., 2020) as the vulnerability to crime is exacerbated by social, economic, and political exclusion. For the present study, the percentage of streets with signs of shelters and unhoused people living on the street was recorded using Google Street View.

Unsupervised private parking lots

Private parking lots which are physically separated from the street were also included in the study as they tend to lack natural surveillance due to the absence of housing, shops or offices. Previous research found that parking lots constitute potential hot spots for vehicle crime (Bromley & Thomas, 1997) as well as opportunities for loitering and drinking which have been regarded as signs of social disorder. Furthermore, Reid and Andresen (2012) found that the night-time use of private parking was linked more tightly to feelings of insecurity compared to daytime use.

Therefore, the percentage of streets with at least one closed off parking was reported and included among the physical disorder class of environmental variables. In the private parking lots variable, the study included any parking area visible and accessible from the street and delimited by any type of gate that would prevent vehicles from entering, while remaining accessible by pedestrians.

Litter

Physical disorders include overt signs of negligence or unchecked decay as well as the visible consequences of malevolent misconduct (Lockwood, Wyant & Grunwald, 2021). Research has shown that increased litter in a neighbourhood, is related to increased perceived risk of crime (LaGrange et al., 1992), fear of crime (Perkins & Taylor, 1996), actual crime (Skogan, 1990; Wilson & Kelling, 1982), and incivilities (Perkins et al., 1992). It is also correlated with lower levels of physical activity for adults (Shenassa et al., 2006) and with the decreased utilisation of public parks (Gobster, 2002), which in turn can affect levels of active guardianships and natural surveillance. Physical infrastructure (Wagner & Broaddus, 2016) and businesses (Skogan, 1990) can also be harmed by excessive litter on the street, which can even reduce home values (KAB, 2009). Every street with at least one evident sign of litter being left on the sidewalk or on the street was recorded.

Abandoned residential houses

Following the "broken windows theory", abandoned, run-down and vandalised buildings are among the more common environmental factors considered by authors when assessing the physical decay and deprivation of an urban area. Other than constituting a visual cue of disorder and lack of maintenance of the area, abandoned or run-down buildings can also imply a lack of natural surveillance and the absence of "eyes on the street". In line with the routine activity theories, a lack of "capable guardians" is a necessary condition for crime (Cohen & Felson, 1979), and areas with a higher number of abandoned houses can create more opportunities for different types of crime. The presence of vacant buildings provides locations in which to carry out crimes unobserved (Spader et al., 2016). Previous research employing Google Street View has assessed vacant houses or vandalised buildings. The present study has considered the number of streets with at least one abandoned residential house. It did not consider cases where commercial buildings seemed to be vacant, as it was not possible to ascertain whether they were employed for storage, used as offices or just empty buildings.

3.2.4 Infrastructure and amenities characteristics

Infrastructure can be conceptualised as the material public capital of the cities, including facilities and networks, publicly and privately owned providers of systems such as utilities (gas and electricity, water supply and sewerage, waste collection and disposal); public works (roads and bridges, canals, ports and airports, subways and railways); community facilities (prisons, schools, parks, sport facilities, hospitals, libraries); and telecommunications (telephone, television, satellites, cable, broadband) (Burh, 2003).

They are essential for the correct functioning of cities and human ecosystems. Not only they provide the means for the correct production and reproduction processes of tangible and intangible capitals. They also heavily influence how space is perceived; they provide opportunities for different kinds of optional activities which are the backbone of human social interactions.

For example, in their study, Chen et al., (2016) determined that sitting and lying account for 43.6% of the total activities performed in the public space. The frequency and length of these optional activities are found to be particularly influenced by the quality of the amenities and physical infrastructure present in urban areas. Public benches, bus stops with seatings, bike racks, public squares are all elements that can have an impact on who experience the public space, the duration of their activities and on the level of inclusivity of areas. Given the importance of promoting a diverse use of public space (Jacobs, 1961) to reduce crime and increase the perception of safety, the following variables were included in the observation (Table 3.5).

Characteristics	Description
Parks and public squares	Presence of a square or a park
Bus stops with seating	Presence of bus stops with bus seatings
Cycling lanes	Presence of a cycling lane
Bike racks	Presence of bike racks
Public bench	Presence of public benches

Table 3.5: The list of infrastructure and amenity characteristics observed.

For each infrastructural element, the total number of streets containing at least one observation of the variable has been divided by the total number of streets assessed.

Parks and public squares

Urban parks and open green areas are strategically important for quality of life in our increasingly urbanised society (Chiesura, 2004). Indeed, growing scientific evidence suggests that the presence of natural resources and elements in urban settings enhances quality of life in a variety of ways. A visit to a park may relieve tension, encourage contemplation, regenerate city dwellers, and facilitate a sense of serenity and tranquillity. On the other hand, parks may negatively impact people's perceptions of urban areas, as they can be attractors/generators of crime (Groff and McCord, 2012). As stated by Groff and McCord, they are "owned by all but controlled by none" (ibid., p.2), and they can become contested common goods where the temporal dimension of their use can play an important role. While during the day and under certain conditions – e.g.,

the presence of specific activity generators like recreation centres, pools, playgrounds, and basketball – they can allow a mixed use, at night parks can become crime attractors if left unguarded (Newton, 2018).

Outdoor squares are public gathering places central to the good functioning of neighbourhoods and cities (Gehl, 2011). However, after dark, lighting features become important in relation to people's perception of the space, and their decisions around visiting or spending time in pa public square (Durak et al., 2007; Küller et al., 2006).

Unfortunately, it was not possible to gather information on the quality and the nature of public lighting, or to assess the presence of activity-generators in parks, as Google Street View pictures are taken in daytime and parks are generally surrounded by fences or grates. The number of streets facing a public square or park was nonetheless recorded as parks and squares can have an impact on both the public use of the area and the perception of safety at night. The percentage of streets facing either a public park or a square has been included among the infrastructure and amenities variables.

Bus stops with seating

Public transport is a central infrastructure in contemporary cities, and perceived insecurity on public transportation has been described as one of the main factors affecting its use (Gerell, 2018; Newton et al., 2008; Newton, 2014). This topic has received international attention by several authors (Newton et al., 2008; Newton & Bowers, 2007), and it is well established that important public transport nodes, or more generally places with many bus stops, tend to suffer from high levels of crime (Brantingham & Brantingham, 2016; Ceccato & Uittenbogaard 2014). Ceccato et al. (2013), noted however that the link between transport nodes and crime seems to largely be an effect of the number of people, especially in regards to violent acts.

The amount of public transport stops in an area can also facilitate the use of this public service and increase the chance of having people walking and traversing the public space. Furthermore, other studies suggest that the bus shelter characteristics, i.e., the presence of seating and real-time information, are the most important factors influencing safety and crime perceptions related to this public asset (Abenoza et al., 2018). The rate of streets with at least one bus stop with seatings was therefore recorded.

Cycling lanes

Studies found an increased number of cyclists being reported after the installation of bike lanes in urban areas, with striped lanes being correlated with a higher proportion of riders cycling in traffic (Parker et al., 2013). Furthermore, cycling lanes is deemed to diminish the level of car traffic and its consequent pressure on neighbourhoods and increase the liveability of neighbourhoods (Simpson, 2017).

Therefore, the resulting higher perception of sustainability and civility might lead to less social disorder, perception of insecurity and crime.

The rate of streets with a cycling lane was therefore included among the infrastructure variables for further analysis.

Bike Racks

Bike racks and bike-related infrastructure have been studied in the context of urban mobility, health, and the liveability of cities (Chen, Liu, & Sun, 2018). Areas with bike racks and other amenities, like trees along streets, were more commonly preferred by those who engage in moderate physical activity and can be linked with increased public guardianship (Chen, Liu, & Sun, 2018). On the other hand, a shortage of bike racks can result in undesirable parking practices, with bicycles ending up being locked on trees, fences, road signs, and streetlights. These undesirable practices can result in congested and obstacle-ridden sidewalks.

Bike racks were considered as a possible indicator of urban vitality, civility and reduced social disorder. The rate of streets with at least one bike racks area was therefore included among the infrastructure variables for further analysis.

Public benches

According to existing research, stationary activities such as standing, sitting, leaning, and resting are crucial for the presence of social activities in the public space; the presence of stationary activities enhances the vitality of public open spaces and can help prevent urban desertification and abandonment (Chen et al., 2016). Seats may give psychological and material comfort, support psychological security and aesthetic demands, and allow for the observation of city life and natural elements. It can also create unity with the space and contribute to the creation of urban identity for those who make use of it.

The percentage of streets segments with at least a group of benches was therefore assessed, including any type of public seating both within parks and squares and on the street.

3.2.5 NTE venue density and corporate owned venues

Much research has been focused on the study of the possible link between the number of NTE venues and crime. In the context of routine activities theory, it is proposed that the density of venues plays an important part in increasing violence by attracting a larger number of individuals, especially young and intoxicated males, who can potentially assume the roles of both victims and aggressors, as suggested by Babor (2010) and other authors (Gruenewald & Remer 2006; Livingston, 2008; Babor, 2010). Efforts to mitigate alcohol-related issues have often involved limiting the availability of alcohol by regulating where it can be sold. For instance, in the UK and Australia, local authorities have tried to address the problems associated with concentrated drinking establishments by imposing restrictions on the issuance of additional alcohol licences in specific areas (Hadfield & Measham, 2015; Homan, 2019). However, it's important to note that the effectiveness of these policy changes has not yet been assessed. On the other hand, as Roberts pointed out "the city at night may be avoided, not because of the drunken crowd, but because of the barrenness and lack of sociality" (Roberts & Eldridge, 2012, p.16).

Therefore, the density of those NTE venues used for the identification of NTE districts has been employed in the analysis as a possible predictor for violent victimisation and perception of safe at night.

NTE corporate-owned venues

Chatterton and Holland (2003) provided a clear explanation of how the extensive control of a small number of entities in the market has resulted in the transformation of night-time districts into mostly commercial areas. Here, mainstream, corporate-owned, and -operated establishments flourish by prioritising profit generation through high volume sales of alcoholic beverages and food (Chatterton & Hollands, 2003). Furthermore, the authors have pointed how increasing competition has led venues to focus on young binge drinkers (ibid.). As explained before, following the routine activity theories, a larger number of individuals with certain characteristics -e.g., young, male and intoxicated - can lead to an increase level of violent incidents (Babor, 2010).

The Ordnance Survey PoI dataset allows researchers to consider whether businesses are part of larger chains by including the name of the brand (e.g., "All Bar One", "Burger King" etc.). The density of corporate-owned venues per km of street has been calculated and included in the list of variables.

Retail activities

Previous research has found interesting relationships between the formation of Night-Time Economy districts and the retail sectors. Campo and Ryan describe entertainment zones as nightlife districts occupying the margins of downtowns in former commercial and industrial areas" (Campo & Ryan, 2008, p. 292) as well as areas closely associated with malls and commercial buildings. Therefore, the relationship between nightlife and retail activities seems to be twofold: Night-Time Economy activities might have replaced shops and other economic activities, by forming a homogeneous NTE district; or they can coexist with retail activities. Also, previous research proved that higher density of retail activities can decrease the likelihood of violent assaults (Bowes, 2007); the researcher wanted to test whether they can possibly perform a protective action in relation to NTE districts too.

Therefore, the density of retail activities has been calculated to explore its possible impact on violence and perception of safety at night.

3.2.6   Weighting the Environmental characteristics of NTE districts

This study started from the assumption that different amounts of certain environmental characteristics can have an impact on violent victimisation and perception of safety at night.

However, a critical step in identifying certain environmental characteristics as crime generators is determining how they manifests and link in the context of its surroundings (Newton, 2018).

Weisburd, Bernasco, and Bruinsma (2009) classified crime-place geographic links into micro-level, which is constituted by a street segment or street intersection; the meso-level, that can be represented by urban neighbourhoods or districts or the macro-level, which refers to areas bigger than a neighbourhood.

The present research had to acknowledge the impossibility of analysing environmental characteristics, violent victimisation and perception of safety on the same geographical level. Due to the absence of geo-

located crime and perception of safety data, the present research had to work on two distinct geographical levels:

1) the NTE districts, identified using the Optimised Hot Spot analysis tool in ArcGIS, where NTE activities are statistically more clustered than in the rest of the city; the Optimised Hot Spot analysis tool creates a fishnet grid to fit the dataset point provided. The points within each polygon cell are then counted and significant hot/cold spot polygons - alongside non-significant polygons - are created. In this study, the hot spot polygons of NTE venues were considered NTE districts.

2) the geographical level of the variables selected from the Crime Survey of England and Wales at the Middle Layer Super Output (MSOA) level, a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales. According to the 2011 Census, there were 7206 MSOAs in England and Wales with an average population of 7,790 persons (3,245 households) (Jones, 2016).

For this study all the MSOAs within the boundaries of the six cities of interest were included in the analysis. However, expectably only a small part of the MSOA sample overlapped with the NTE districts identified (Figure 3.3).

This only partial overlapping between the two geographical levels of analysis required the weighting of the environmental characteristics observed to take into account the individual overlapping profile between each MSOA area and NTE districts.
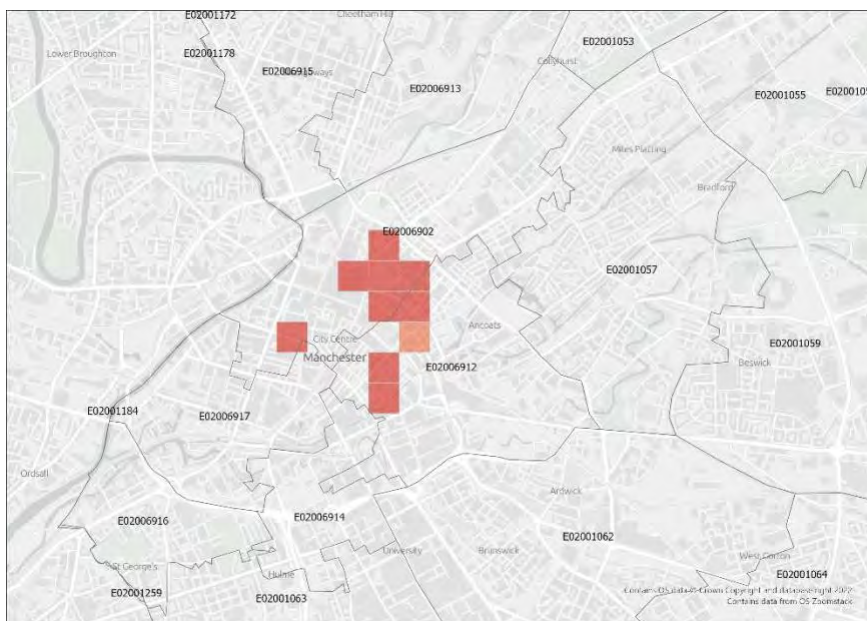
Figure 3.3: Manchester of spot areas overlapping with MSOAs

The researcher used the following formula to weight each environmental characteristic density or rate previously calculated:

$$E_w = D \, x \, A$$

where E_w is the Environmental characteristic weighted, D is the environmental characteristic density and A is the overlapping area between the NTE cluster and the MSOA.

Therefore, if for instance a MSOA overlaps by the 3.3% of its area with the a NTE district which has a *Alcohol promotion* density of 3.4 per km, the density value 3.4 will be multiplied by 3.3% to calculate the Environmental characteristic weighted of *Alcohol promotion* for that specific MSOA.

In the case that the MSOA overlapped with more than one NTE district, the weighting resulted from the the following formula:

$$E_w = \frac{\sum (E_n \, x \, A_n)}{n}$$

where E_w is the Environmental characteristic weighted, E_n is the Environmental characteristic density of the district n and A_n is the overlapping area between the MSOA and the district n. There can be for instance one MSOA that overlaps both with one *Pubs* and one *Restaurants* districts by 0.7% and 1.9% respectively. The NTE districts have respectively a *Alcohol promotion* density of 2 and 1.5 per km; first the two densities are weighted using the respective overlapping areas - i.e., *Pubs' Alcohol promotion* density is multiplied by 0.7% and the *Restaurants' Alcohol promotion* density is multiplied by 1.9%; then the average is obtained by dividing the sum of the two weighted characteristics by the n of overlapping clusters - i.e., 2. In this way, the resulting Environmental characteristic weighted allows the researcher to explore the possible impact of each environmental characteristic observed at the NTE district level on MSOAs.

3.3 Violence and Perception of Safety at Night

The next section of the methodology clarifies the concept of violence and physical assault used in the research; then it explores the reasons behind the use of the Crime Survey for England and Wales (CSEW) to explore the level of violence at night. Alternative datasets were considered and discarded for different reasons which are also explained.

After having described the data selection process and rationale, the CSEW variables considered are explored and the data manipulation process is illustrated.

Other than the variables related to the aims of the study - i.e., violence and perception of safety at night –the variables related to the demographic composition of MSOA areas were included in the analysis given previous concerns around the mono-age - i.e., under 30 - and male dominated NTE environments (Chatterton & Hollands, 2003; Hobbs et al., 2005). Routine activity characteristics of the population, like drinking habits, pubs and nightclubs frequentation, have also been considered, following the routine activity theories pointing at the correlation between attendance to specific NTE venues and increased chance for victimisation (Tseloni & Ganpat, 2015).

After having explained the datasets and manipulation techniques, the rationale behind the use of specific regression analysis models to test the independent correlation between environmental, demographic, and

routine activity variables with violent victimisation trends and the perception of safety at night is also presented.

3.3.1 Data source: Crime Survey for England and Wales

In the UK, crime studies have been relying on two principal data sources: police recorded crime and crime surveys.

Administrative police recorded crime figures are based on the offences reported to judicial authorities. They can be used for local crime pattern analysis and provide a good measure of trends in well-reported and well-recorded crimes. Police crime data also can possibly offer precise information on where and when the offence took place, therefore allowing for a better time-space identification of crime trends. Police crime data are also publicly available on the online platform *www.data.police.uk* which provides open data about crime and policing in England, Wales and Northern Ireland. However, the platform does not provide a time-stamp for each crime recorded which makes it impossible to distinguish between night time and day time crimes. Interestingly, the dataset provides information about the location where the crime happened with different spatial categories, which include "*near or around a nightclub*". Unfortunately, using this category of data for the analysis of night-time violent crime would restrict the attention on the possible criminogenic effect of nightclubs on violent crime and miss the broader picture of crime happened at night. From the information provided by the platform, it is also not clear whether daytime crimes fall under the *"near or around a nightclub"* category, which would lead to additional confusion in the interpretation of the results.

Overall, police crime data presents some limitations, the most problematic being cases of non-reporting by the public and lack of standardisation across police forces and over time (Hough & Mayhew, 1982; Van Dijk et al., 2012). For instance, for certain categories of crime (such as drug possession offences), the volume of offences recorded is heavily influenced by police activities and priorities; in such cases, recorded crime figures may indicate police activity in an area rather than levels of criminality. In contrast, recorded crime figures do not include crimes that go unreported to the police or incidents that law enforcement chooses not to record. This has been referred as the dark figure of crime (Buil-Gil et al.,2021). For instance, burglary had an 89% compliance rate, while robbery had 86%, sexual offences 74%, and violence with or without injury had 67% (Office for National Statistics, 2023). Furthermore, it was estimated that only approximately 42% of Crime Survey of England and Wales comparable crimes were reported to the police in 2020 (Office for National Statistics, 2023).

Finally, demographic characteristics can influence the propensity for reporting crime, as previous research has found that female victims, elderly individuals are more likely to report than young males (Buil-Gil et al., 2021). Considering the study of violence at night, where young males have been found to have a better chance to be involved in violent incidents, it can be argued that police crime data might lead to a misrepresentation of violent crime trends at night.

In January 2014, the UK Statistics Authority assessed several crime statistics in England and Wales and found that statistics based on police-recorded crime did not meet the required standard for designation as

National Statistics (Office for National Statistics, 2023). Consequently, National Statistics no longer include police crime statistics, as they do not meet the rigorous standards set by the UK Statistics Authority (Ariel & Bland, 2019).

Internationally, the Crime Survey for England and Wales (CSEW) is recognised as one of the most reputable sources of data on crime (Farrell et al., 2010). At the time of writing, the Crime Survey for England and Wales (CSEW), originally known as the British Crime Survey (BCS), has consistent high response rates - 70% on average (Williams & Holcekova, 2015). The CSEW is primarily a face-to-face victimisation survey, in which residents of English and Welsh households are asked about their experiences of a range of crimes in the twelve months prior to the interview. The CSEW questionnaire for the adult survey has a complex structure, consisting of a set of core modules asked of the whole sample, a set of modules asked only of different sub-samples, and self-completion modules asked of all 16–74-year-olds.

The CSEW adheres to a consistent approach that remains unaffected by shifts in public reporting levels or police recording practices (Rosenfeld, 1997). For the crime types and population, the CSEW offers a more accurate reflection of the true extent of crime experienced by the resident population in England and Wales compared to police-recorded statistics (Garius, 2016). This is primarily because the CSEW includes crimes that go unreported to or unrecorded by the police. Moreover, it provides a more reliable indicator of long-term crime trends, as it remains unaffected by changes in counting rules, levels of reporting to the police, or police recording practices. However, the CSEW does have certain exclusions from its main estimate of crime, such as homicide, crimes against businesses and other organisations, and drug possession (Office for National Statistics, 2023). One notable challenge associated with using the CSEW for analysing violence is its reliance on self-reported data (Buil-Gil et al., 2021). Respondents must recollect episodes of victimisation from their memory, introducing potential issues related to non-recall and external telescoping, a phenomenon in memory recall that could artificially decrease or increase reported crime incidence (Schneider, 1981). The CSEW collects information about crime experiences in the previous 12 months, and external backward telescoping can occur when respondents mistakenly report events as having occurred earlier than they actually did, placing incidents incorrectly outside the survey's reference period and potentially lowering reported crime incidence artificially (Schneider, 1981). Conversely, external forward telescoping happens when respondents report events as having occurred more recently than they did in reality, artificially increasing reported crime incidence. This telescoping effect may be particularly relevant when reporting interpersonal victimisation over a 12-month period – with Cohen and Java (1995) pointing that forward telescoping can be exacerbated when questioned about autobiographical events, and to increase as the recall period increases (Cohen & Java, 1995).

While these issues have little impact on the overall CSEW projections (Pickering, Smith, Bryson & Farmer, 2008), the CSEW is also unable to record crimes experienced by populations living outside the parameters of private accommodations eliminates the possibility for the exploration of a variety of cohorts – including those within prisons, nursing homes, university halls of residence, and mental health facilities; many of

whom may be at heightened risks of physical assault (Garius, 2016). Furthermore, it is less reliable in measuring rarer serious violent crimes, which for instance can potentially limit the study of assaults which involve the serious wounding of the victim (Shepherd & Sivarajasingham, 2005). Furthermore, most surveys tend to be designed to focus on representative samples for large geographical areas, while they become less accurate when it comes to low geographical levels (Buil-Gil et al., 2021). The CSEW is also weighted to adjust for possible non-response bias and ensure the sample reflects the profile of the general population (Office for National Statistics, 2023).

Since 2012-13, the core sample size of the CSEW has been approximately 35,000 interviews conducted with adults across the year. A minimum of 625 adult interviews is required per police force area as this model provides a national sample efficiency of 95%. For these reasons, the sweeps of the CSEW from 2012 to 2019 were downloaded and merged together to produce estimates at the MSOA level to produce an effective sample size (Buil-Gil et al., 2021).

When considering which data source was going to be employed in this study, the researcher took into account both the police crime and the CSEW as viable datasets. However, police crime data with timestamps indicating the time of the incident are not publicly available and local authorities require a long process to get access of those data. The researcher has tried to contact all the local authorities considered for the study, and, out of six police forces, only two authorities – and only at a very late stage of the research - agreed to provide aggregated crime data with time stamps.

On the other hand, the CSEW provides information around the time and place where the victimisation incident took place and the UK Data Service agreed to provide access to the dataset at the MSOA level, which was deemed as sufficient low geographical level to address the Aim Two of the research.

3.3.2 The CSEW: selecting variables for inclusion

The initial stages of analysis required a thorough appraisal of the relevant survey questions (and their corresponding variables and variable pathways) available in the original survey datasets. The variables considered for incorporation in the present analysis were subject to a set of inclusion criteria: namely, they had to (1) indicate the spatial-temporal dynamic of the violent assault; (2) allow the researcher to get information on the perception of safety in the respondents' areas; (3) specify certain information on the demographic and their routine activities of the population in relation to NTE experiences. The variables found to be relevant for the aims of the research were gathered from the following modules:

- Module 1: Household Grid: age and sex of the respondents.
- Module 2: Perceptions of crime (missing in 2016-17): a series of attitudinal questions which asked respondents about their perceptions of particular aspects of crime and anti-social behaviour. The questions here are asked only to Module 4 participants, reducing the sample to only 25% of the total population. In the same

- Module 3: Screener questionnaire: Following the questions regarding the perceptions of crime, all respondents are asked whether they had experienced certain types of crimes or incidents within a specified reference period, namely the preceding 12 months. All respondents are asked about their experience of personal crime. The wording of these questions has been kept consistent since the CSEW began to ensure comparability across years.
- Module 4: Victimisation Modules for non-fraud incidents identified (up to a maximum of six). In this module, a series of key questions established important characteristics about the incident, such as where and when the incident took place.
- Self-Completion Module: All core respondents are asked a series of questions on drug and alcohol consumption.

Accessing CSEW: the Secure Research Service accreditation

Due to the low geographical level necessary to explore violent victimisation trends and perception of safety at night in relation to the urban NTE districts identified, the Secure Research Service (SRS) accreditation was needed to get access to CSEW data at the MSOA level. First, the researcher needed to be awarded the title of Accredited Researcher by the UK Data Service (UKDS). This phase involved attending a dedicated course and succeeding a final test. The SRS application process was conducted through the Office of National Statistics (ONS)' Secure Research Service portal, which requires the researcher to go through several stages of checks to access secure data. The entire process took about 6 months to complete and involved several stages of reviews and integrations. Specifically, the project was reviewed by:

- a first review by an ONS officer;
- a second review by a research officer for a feasibility;
- the data owner approval;
- the UK Statistics Authority review.

The datasets were then manipulated using the *R* software at the ONS office in London. To complete this stage, the researcher had to relocate to London in 2022 and spent six months working on the manipulation of the data. Individual cases of the CSEW were provided with LSOAs and MSOAs identifiers, which allowed the researcher to geo-localise each response at the geographical level requested. Once the manipulation of data was completed and the aggregated counts of each variable for the period between 2012-2019 was completed, a new application was required in order to export the output of the manipulation outside of the secured laboratory. The outputs were retrieved at the end of July 2022.

3.3.3 Data Preparation
All the variables selected from the CSEW were recoded, computed, and dichotomised to fit the aims of the research. Each variable was transformed into a dummy variable, a binary level information piece which adopts the numeric value either of 0 or 1 to indicate the absence or presence of a characteristic or condition

(Pedhazur & Schmelkin, 2013). This allowed the researcher to sort data into mutually exclusive categories, such as in the case of violent victimisation "happened at night" or "not happened at night". The dummy variable sets can be automatically created by SPSS (in certain analytical procedures), or instead can be manually coded by the researcher. As mentioned before, due to the rarity of violent incidents happening nearby respondents' households at night at the MSOA level, the researcher needed to merge different sweeps (2012-2019) into one unique dataset in order to allow for enough variation across the MSOA sample and reduce the excess of zero events recorded. The SPSS command language and SPSS syntax files were used for all data preparation, transformation, and analysis. Due to the vast amount of data and to the number of variables available in the CSEW, syntax was chosen as the preferred method for the present study. Utilising command language improves both the efficiency and the accuracy in the analysis of large-scale datasets (Collier, 2010). Additional advantages of command language include the ease with which each phase of data preparation (data harmonisation, dataset merging, and/or aggregation), as well as the analysis of the data itself, can be traced and retraced, providing evidence and rationale for the process at each stage.

In the next subsections the preparation process of each CSEW variable will be presented.

3.3.4 The night-time violent victimisation variable

The CSEW violent crime is classified by offence type and victim-offender relationship. The CSEW Offence Coding System was created for the CSEW of 1982 to correspond as closely as possible to how police classified incidents. The CSEW divides crimes based on the victim's version of events, rather than requiring proof of criminal intent. Victimisation Modules gather specific information regarding instances reported by respondents in order to categorise crimes. A final offence code is issued to each Victimisation Module after a verification procedure on the gathered data.

The current research analysed authentic occurrences of violence – threatened or committed – as well as sexual offences that occurred at night in the vicinity of the respondents' residences. In the victimisation module the questionnaire asks to indicate in which setting the incident happened, including the options "In/around a place of entertainment (e.g. restaurant, cafe, cinema, bingo hall)" and "In/around a nightclub/disco". The justification behind considering incidents happened near the respondents habitation instead of the setting is aligned with the aim of the current research. Indeed, the setting of the incident does not provide information around the geographical location of the incident (for instance, the MSOA area) and this would have made impossible for the research to select only those incidents which took place at night nearby the identified NTE districts. On the other hand, as the study is focused on the possible impact of NTE districts on violence and perception of safety at night; by considering the number of incidents and of people feeling safe at night nearby the respondents' households, it is possible to explore more precisely how the presence of certain characteristics of the NTE districts identified can impact these two social phenomena in the MSOA which overlap with the NTE districts.

Therefore, SPSS-generated dummy variables were utilised to compute several variables into one final

variable – e.g., "violent incidents happened at night nearby the respondent's household" –, which combined three different variables holding three levels of information – "what", "when" and "where" (Table 3.6). This allowed the researcher to calculate the number of violent victimisation at night near the respondents' households at the MSOA level, the geographical level chosen for the purpose of the study.

Original CSEW variable	Values	Recoded variable	Recoded values
Crimtype = *Crime Type* (recorded at screener questionnaire)	22=Deliberate violence 23=Threatened Violence 24=Sex Attack	*Viol_crime*	22, 23, 24 = 1; else = 0
Timevic2 = *At what time of day did it happen?*	4= 6pm - 10pm 5= 10pm – 00 am 6= 00 am – 6 am 7= evening/night (can't say exactly)	*Night_crime*	4,5,6,7 =1, else=0
Victarea = *Did it happen in this area (within 15 minutes of here)*	1 = yes 2 = No 8 = Refused 9 = Don't know	*Nearby_crime*	1 = 1, else = 0

Table 3.6: Recoded variables for violent victimisation happened at night near the respondent's household

3.3.5 The perception of safety variable

Since it is widely acknowledged that the establishment of safe and entertaining spaces free of fear will attract more visitors and consumer spending, the reduction of fear of crime in urban areas has become crucial in city strategies (Jayne & Holloway, 2008). The intent to mitigate fear of crime is particularly strong in the context of the NTE because of the debate regarding (binge) drinking, vandalism and disorder that surrounds urban nightlife (Jayne & Holloway, 2008). Residents fearful of crime report more disorder than their less fearful counterparts, even when both sets of observers are reporting on the same neighbourhoods (Perkins et al., 1992). Fear and vulnerability, which intensify after dark (Gates & Rohe, 1987), have a complex and not always straightforward relationship with perceived disorder in the urban environment. Perkins et al. (1992) examined on-site assessments of physical incivilities in Baltimore's streets and found that, controlling for social factors, physical incivilities predicted a worse perception of crime-related problems. However, using a similar approach in a different city, the same author (Perkins et al., 1993) reported that residents' perceptions and physical disorder were not significantly correlated. Observed environmental items correlated more strongly with indicators of block crime than did residents' perceptions of the environment. The majority of researchers employ a single-item indicator of fear, measured by asking one of the following questions (Hale, 1996): 'How safe do you feel being out alone in your neighbourhood after dark?' or 'How safe would you feel being out alone in your neighbourhood after dark?' or 'Is there any place around here where you feel unsafe

walking at night?'.

Variables contained in the non-victim form (NVF) of the CSEW include the respondent's perception of safety when walking alone after dark. The question *walkdark* asks "*How safe do you feel walking alone in this area after dark?*" and include four possible answers referring to different grades of safety perceived (Table 3.7). The original variable was recoded in the new dummy variable *percdark* where the value 1 indicates when the respondent feels safe while walking after dark. The creation of a dummy variable allowed the researcher to calculate the number of respondents feeling safe while walking at night near their house in each MSOA.

Original CSEW variable	Values	Recoded variable	Recoded values
Walkdark = *How safe do you feel walking alone in this area after dark* (Only Module D, 25% respondents)	1 = Very Safe 2 = Fairly Safe 3 = A bit unsafe 4 = Very unsafe	*Percdark*	(1,2 =1; else=0)

Table 3.7: The recoded variable for measuring the perception of safety at night in the respondent's area.

3.3.6 Demographic characteristics variables

Demographic characteristics of the population like age and sex have been found to be influential in relation to aggressive behaviour as crime hot-spots in relation to NTE activities have been more associated with the presence of young and male patrons (Quigley et al., 2003). Therefore, the new variable *Male_population,* allowed the researcher to calculate the number of male respondents in each MSOA, while the variable *Under30* allowed for the counting of the people aged under 30 years old in each MSOA *(*Table 3.8*)*

Original CSEW Variable	Values	Recoded variable	Values
Sex = *sex of the respondent*	1=Male 2=Female	*Male_population*	(1 =1; 2=0)
Age = age *of the respondents*	Continuous 1-80	*Under30*	(1-29 = 1; else = 0)

Table 3.8: The recoded variables for capturing demographic characteristics of the population.

3.3.7 Routine activity characteristics variables

Routine activity theories stress the importance of certain activities and conditions which make potential victims and offenders converge. Existing literature using the CSEW, found that going to pubs and nightclubs can increase the risk of victimisation (Garius, 2016). Drinking habits were also taken into account as they correlate with risk of victimisation and fear of crime (Brennan et al., 2011). In the table below (Table 3.9) all the routine activity variables considered and how they were recoded are listed. For instance, to explore the numbers of frequent pub goers present in an area, the five possible answers contained in the *Pubeve* question of the CSEW - i.e., "How often have you visited a pub or bar in the last month" - were collapsed in a new

variable called *Pub visits* with two possible responses: "1*"* for people who go to pubs at least once a week, "0" for all the rest of the answers. Theis process allowed the researcher to calculate how many respondents visit nightclubs and pubs or drink alcohol frequently in each MSOA.

Original Variable	Values	Recoded variable	Values
Pubeve= *How often have you visited a pub or bar in the last month*	1 = none 2 = 1 - 3 times 3 = 4 - 8 times 4 = 9 - 12 times 5 = > 12 times 8 = refused, 9 = don't know	Pub visits = *people who go to pubs at least once a week*	(3,4,5 = 1, else = 0)
Club = *How often have you visited a nightclub in the last month*	1 = none 2 = 1 - 3 times 3 = 4 - 8 times 4 = 9 - 12 times 5 = > 12 times 8 = refused, 9 = don't know	Nightclub visits = *people who go to nightclub at least once a week*	(3,4,5 = 1, else = 0)
Alcoft = how often have you had an alcoholic drink of any kind during the last 12 months?	1 = Almost every day 2 = 5 or 6 days a week 3 = 3 or 4 days a week 4 = Once or twice a week 5 = Once or twice a month 6 = Once every couple of months 7 = Once or twice a year 8 = Not at all in last 12 months 9 = Do not drink alcohol at all 10 = Don't want to answer	Alcohol = *people drinking alcohol at least three days a week*	(1,2,3 =1) (else=0)

Table 3.9: The recoded variables capturing routine activity characteristics of the population.

3.3.8 The Index of Multiple Deprivation variable

Several researches argue showed that deprivation can impact how people perceive and experience urban areas (Mason et al., 2011).

The English Indices of Deprivation 2019 provide statistics on relative deprivation for small areas across England, and they are widely used in the context of policy. The most frequently used of these datasets is the Index of Multiple Deprivation 2019 (IMD), which ranks every small area in England from 1 (most deprived area) to 32,844 (least deprived area). These small areas are called Lower-layer Super Output Areas, and they employ standard statistical geography to divide the country up into even areas, each with a similar total population, averaging approximately 1,500 residents or 650 households. IMD can be presented as quintiles, which are calculated by dividing the 32,844 small areas in England into 5 equal groups (quintiles), where quintile number 1 is the most deprived and quintile number 5 is the least deprived. If, for example, an area is ranked 5000, by dividing this number by 32,844, the result 0.15 will show in which quintile the area lies within (in this case, the first). The IMD unites information from seven domains, which are combined using the following weights:

- Income Deprivation (22.5%)
- Employment Deprivation (22.5%)
- Education, Skills and Training Deprivation (13.5%)
- Health Deprivation and Disability (13.5%)
- Crime (9.3%)
- Barriers to Housing and Services (9.3%)
- Living Environment Deprivation (9.3%)

The ONS gives instructions on how to calculate the IMD when the areas of interest are larger than the LSOAs (Ministry of Housing, Communities & Local Government, 2020): the approach is to sum together the Lower-layer Super Output Area scores, weighted by the Lower-layer Super Output Area population size. MSOA level index of multiple deprivation (quintiles) were produced and joined to MSOA unique id codes for the analysis. The IMD was used as one of the control variables of the regression models used to test the possible link between environmental characteristics of NTE districts, the demographic and routine activity characteristics of the population and violent victimisation and perception of safety at night.

3.3.9 The number of CSEW respondents variable

To take into account the lack of uniformity in the number of respondents across the MSOA sample a new variable called *CSEW_respondents* has been created to be one of the control variables for all the regression models.

Given the fact that only one in the CSEW only one in four respondents are asked the question related to perception of safety at night, a new variable called *proportion_MSOA* was created by calculating the 25% of each MSOA respondents' number.

3.3.10 Overlapping between MSOA areas and NTE districts

The entire list of MSOAs within the boundaries of the six cities considered was downloaded in a shapefile format and manipulated in the ArcGIS software. Using the *tabulate intersection* tool in ArcGIS, a new variable named *NTE_Any* was created to identify the sample of MSOAs which share any amount of their area with at least one NTE district. This new variable is a dichotomous dummy variable where the value '1' indicates the presence of overlapping with at least one NTE district while '0' equals to a lack of overlap.

3.4 Modelling night-time victimisation and perception of safety at night

Environmental criminology theories focus on the importance of the situational characteristics of the environment where incidents happen, and the importance of daily movements and routine activities of offenders and victims in creating fluctuating opportunities for crime (Garius, 2016). For instance, they stress the importance of specific features of urban neighbourhood, like signs of vandalism and disorder, or the presence of elements impacting the natural surveillance in the public space (Wilson & Kelling, 1982). Age and sex are other elements which influence victimisation trends as well as perception of safety at night. For instance, as explored in Chapter 2, women tend to perceive public spaces at night less safe compared to men, while young male individuals have more chances to both be victimised and commit violent offences at night (Quigley et al., 2003; Babor, 2010).

For this reason, all the environmental characteristics previously observed, as well as the routine activity and demographic characteristics of the urban areas considered, were analysed using regression models to establish whether they independently correlate with violent victimisation and perception of safety at night.

The number of violent victimisation and of people feeling safe near their house at night were used as dependent variables, as they constitute the criminological effects this study aims to explore. All the environmental features of the NTE districts, the socio-demographic characteristics and the routine activities of the population at the MSOA level were considered as independent variables and the possible predictors of violent victimisation and perception of safety at night. The number of respondents and the IMD of each MSOA were considered as control variables to take into account the lack of uniformity among the respondents' sample and the different level of deprivation of each MSOA area.

The variables have been grouped into Blocks of variables based on their levels of information to facilitate the analysis process and the presentation of the results:

- Venue-level features (Block A), include all the information gathered about the venue's activities, alcohol promotion and the presence of tables and seatings outside.
- Elements of neighbourhood disorder (Block B), included the signs of vandalism, construction sites, the presence of unhoused people and unsupervised private parking lots.
- Infrastructure and amenities (Block C), included those elements like bike racks, cycling lanes, benches, public squares which can impact how - and by who - the public space is experienced.

- NTE businesses and corporate-owned venues are part of the Block D, which includes the variables related to the density of each type of NTE activity used for the identification of NTE districts and the density of corporate-owned NTE venues.
- Demographic characteristics (Block E) are the information related to the sex and age of the population in the urban areas considered (MSOAs).
- Routine Activities (Block F), included the number of people visiting regularly pubs and nightclubs, alongside people who often drink alcohol in the urban areas considered (MSOASs).

Finally, the *NTE_Any* variable was used to test whether the simple overlapping between NTE districts with MSOAs can impact the level of violent victimisation and perception of safety at night.
In the table below (Table 3.10) all the independent variables used for the analysis are summarised for better clarity.

Block of variables	Variables	Description
Block A: Venue-Level	Drink_promo	Density of venues with alcohol promotion signs per km of street
	Music	Density of venues with music activity advertised per km of street
	Entertainment	Density of venues with entertainment activity advertised per km of street
	Chairs	Density of venues with chairs and tables outside per km of street
Block B: Disorder	Construction	Percentage of streets with at least one construction site
	Graffiti	Percentage of streets with any sign of graffiti
	Litter	Percentage of streets with any sign of litter on the street
	Unhoused_people	Percentage of streets with any sign of homeless people or

		homeless shelters
	Bus_seating	Percentage of streets with at least one bus stop with seatings
	Square_park	Percentage of streets facing a public square or park
Block C: Infrastructure and amenities	Bench	Percentage of streets with at least one public bench area
	Bike_racks	Percentage of streets with at least one area with bike racks
	Cycling_lane	Percentage of streets with a cycling lane
	Brand	Density of NTE venues which are part of larger corporate
	Pubs	Density of pubs, bars and inns per km of street
Block D: NTE businesses, corporate-owned venues	Restaurants	Density of restaurants per km of street
	Fast foods	Density of fast foods per km of street
Block E: Demographic characteristics	Under30	Number of people aged under 30 in each MSOA
	Male	Number of men in each MSOA
	Nightclub_visits	Number of people attending nightclubs at least once a week in each MSOA
Block F: Routine activities	Pub_visits	Number of people going to pubs at least once a week in each MSOA

	Alcohol	Number of people drinking alcohol at least three days a week in each MSOA
Overlapping between MSOA and NTE districts	NTE_Any	The MSOA is sharing any amount of area with any NTE district (NTE_Any = 1)
Density of retails	Retail	The number of retail activities per km of street
Index of Multiple Deprivation	IMD	IMD quintiles for each MSOA, where quintile 1 is the most deprived and quintile 5 is the least deprived
Number of CSEW respondents	CSEW_resp	The total number of CSEW respondents for each MSOA considered

Table 3.10: The list of the independent variables used as possible predictors of violent victimisation and perception of safety at night, and as control variables.

3.4.1 Regression models

Linear regression, particularly Ordinary Least Squares (OLS) regression, represents one of the most traditional statistical techniques in applied research. However, OLS regression models rest on particular assumptions which oftentimes are not satisfied by criminology data (Maxfield & Babbie, 2001). In econometrics, Ordinary Least Squares (OLS) method is widely used to estimate the parameter of a linear regression model. OLS estimates the regression line which minimises the sum of the squared errors - i.e., the difference between observed values and predicted values.

The OLS function is given by:

$$y = \beta_0 + \beta_1 x + \varepsilon$$

where β_0 is the intercept of the equation, β_1 is the slope (or coefficient) of the regression line, and ε is the random error component. Therefore, the results of the regression analysis identify the direction (i.e., the sign ± of the slope) and strength (through the coefficient β_1) of the relationship between the variables in the model. The coefficient value (β_1) of the regression tells the change in Y for a unit change in X. When considering the efficacy of a regression model in explaining correlation, the *R-squared* of the model (R^2) needs to be evaluated, to take into account the percentage of the variation in the dependent variable which is

explained by the independent variables. *R-squared* values range from 0 to 1, where 0 implies that the independent variables have no explanatory power, while a value of 1 indicates a perfect fit.

To measure the significancy of the regression - i.e., how likely it is that any observed correlation between independent and dependent variables is due to chance - a *p-value* of 0.05 has been considered the threshold to discriminate significant from non-significant results (Di Leo & Sardanelli, 2020).

While OLS is computationally feasible and can be easily used while doing any econometrics test, there are underlying assumptions that need to be met. OLS assumes that the dependent variable is a continuous value, normally distributed (e.g., not skewed), and linearly related to the independent variables.

Testing for distribution linearity

The linearity test was conducted in the software *R* using the *Global Validation of Linear Models Assumptions* function. The function is an easy-to-implement procedure for testing the assumptions of the linear model, and it produces five different values:

- *Global Stat* checks whether the relationship between the dependent and independent variables is roughly linear.
- *Skewness* and *Kurtosis* assumptions show if the distribution of the residuals is normal, and measure how peaked the distribution is.
- *Link function* checks if the dependent variable is continuous or categorical. Our variable is continuous.
- *Heteroskedasticity* tells if the error variance is equally random.

In the present study both dependent variables - the number of violent victimisations at night and the number of people perceiving their area safe while walking after dark at the MSOAs level - were tested to check whether the conditions for general OLS regressions were met. Given that previous studies have found that violent victimisation data tend to be over dispersed, the appropriate steps were taken to explore this condition and find alternative regression models which could fit the data sample .

Overdispersion and excess of zero

Count dataset with an excess of zeros is common in several research areas. Ridout et al. (1998) provided examples of data with an excessive number of zeros from various fields, such as agriculture, econometrics, patent applications, species abundance, medicine, and recreational facility use. Indeed, crime data rarely adheres to these assumptions as most crime incidents are distributed as rare event counts with zero often being the most observed value. This excess of zero observations can occur as a result of clustering of crime, which has been observed and explained by several authors (Sherman et al., 1989; Barr & Pease, 1990; Braga et al., 2014), and overdispersion has the tendency to increase the proportion of zeros. Such overdispersion violates the assumptions of OLS regression.

Testing for zero-inflation

To test the assumption that the sample containing the count of violent incidents at night in MSOA is over-

dispersed and has a high level of zeros, the *score test for zero inflation function* in *R* software has been used. This function carries out a score test (van den Broek, 1995) for excess zeros in an otherwise Poisson distribution of counts. It gives a χ^2_1 statistic on one degree of freedom. Several models have been proposed to handle count data with an unexpectedly high number of zeros: Lee et al. (2001) generalised the zero inflated Poisson model to accommodate the extent of individual exposure; other relevant models can be found in the literature like the hurdle model (Mullahy, 1986) and the two-part model (Heibron, 1994). Zero-inflated Poisson regression assumes that with probability *p* the only possible observation is 0, and with probability 1 - *p*, a Poisson (*A*) random variable is observed (Lambert, 1992). Johnson, Kotz, and Kemp (1992) discussed a simple way of modifying a discrete distribution to handle extra zeros. An extra proportion of zeros, *w*, can be added to the proportion of zeros from the original discrete distribution, *f*(0), while decreasing the remaining proportions in an appropriate way.

A zero-inflated generalised Poisson (ZIGP) regression model is defined as (Famoye & Singh, 2006):

$$P\ (Y = y_i \mid x_i,\ z_i) = \phi_i + (1 - \phi_i)\,f\,(\mu_i,\ \alpha;\ 0),\ yi = 0 = (1 - \phi_i)\,f\,(\mu_i,\ \alpha;\ 0),\ y_i > 0$$

where $f\,(\mu_i,\ \alpha;\ y_i),\ y_i = 0, 1, 2, \dots$ and $0 < \phi i < 1$. In (3.2), the functions $\mu i = \mu_i(x_i)$ and $\phi_i = \phi_i(z_i)$ satisfy log $(\mu_i) = \sum_j^k = 1^{x}{}_{ij}{}^{\beta}{}_j$ and $\text{logit}(\phi_i) = \log\ (\phi i[1 - \phi i])^{-1} = \sum_j^m = 1^{z}{}_{ij}{}^{\delta}{}_j$ where $Z_i = (z_{i1} = 1,\ z_{i2},\ \dots,\ z_{im})$ is the *i*-th row of covariate matrix Z and $\delta = (\delta_1,\ \delta_2,\ \dots,\ \delta_m)$ are unknown *m* dimensional column vector of parameters. In this set up, the non-negative functions ϕ_i and μ_i are, respectively, modelled via logit and log link functions. Both are linear functions of some covariates. Other appropriate link functions that can allow ϕ_i being negative, in the terminology of generalised linear models, may be used.

The effect of the independent variable on the dependent variable can be determined by the estimated coefficient, displayed under the β column in the output tables below. The Poisson regression coefficient β associated with a predictor X is the expected change, on the log scale, in the outcome Y per unit change in X. Therefore, keeping all other variables in the model constant, increasing X by 1 unit multiplies the rate of Y by e^{β}.

Zero inflated models have been used in several criminological studies, ranging from marital and domestic violence (Famoye & Singh, 2006), gun violence (Larse et al., 2017), manufacturing (Lambert, 1992). However, in a study exploring sexual aggressions, (Swartout et al.,2015), the authors concluded that while Ordinary Least Square regressions were definitely not applicable, a Negative Binomial model not only can fit the data, but it also performed better if compared to Poisson and zero-inflated Poisson models, as it was more parsimonious than the zero-inflated negative binomial model. Negative binomial regression combines the Poisson distribution of event counts with a gamma distribution of the unexplained variation in the underlying or true mean event counts, λ_i (Osgood, 2000) . This combination produces the negative binomial distribution, which replaces the Poisson distribution. The formula for the negative binomial is:

$$P(Y_i = y_i) = \frac{\Gamma(y_i + \phi)}{y_i! \, \Gamma(\phi)} \frac{\phi^\phi \lambda_i^{y_i}}{(\phi + \lambda_i)^{\phi - y_i}}$$

where Γ is the gamma function (a continuous version of the factorial function), and f is the reciprocal of the residual variance of underlying mean counts, α (Gardner et al., 1995, p. 400).

Negative Binomial has been used to explore crime trends in the UK (Sivarajasingam et al., 2016), intimate partner violence (Campbell et al., 2002), social disorganization and rural youth violence (Osgood, 2000) and other criminology fields.

Therefore, Zero Inflated Negative Binomial and Zero Inflated Poisson models were compared using the *Akaike Information Criterion* (AIC) test which is based on the estimation of the maximum likelihood (log-likelihood) as a measure of the model fit. The model with minimum AIC is generally considered as the best model to fit the data (Bozdogan, 2000). The AIC value is the result of the following equation:

AIC = *-2log (L) + 2k*

where (*L*) is the maximised likelihood function for the estimated model and offers summary information on how much discrepancy exists between the model and the data, and *k* is the number of free parameters in the model. The AIC assesses both the goodness of fit of the model and the complexity of the model itself. It rewards the model fit by the maximised log likelihood term, i.e., *-2log (L)*, and also prefers a relatively parsimonious model by including *k* as a measure of complexity.

It is also worth considering that both the Zero Inflated Negative Binomial and the Poisson models perform better with actual count data (Coxe et al., 2009). In the present study, instead of using the rate of violent victimisation at night and the rate of people feeling safe at night, the count of violent victimisation incidents and of people feeling safe at night were used in the regression analysis by including the number of CSEW respondents of each MSOA area as control. In this way, the possible effect of different numbers of respondents across the MSOA sample on the number of violent victimisation incidents and people feeling safe at night was taken into account. In the outputs of the regression models the higher number of respondents is therefore expected to be correlated to both a higher number of violent victimisation episodes and a of people perceiving safe while walking alone at night. However, the analysis of the concurrent presence of other independent variables significantly correlated to the dependent variables is able inform the researcher about the possible impact of predictors on the phenomena of interest.

3.4.2 Alternative models

Given the subject of study alternative regression modelling techniques are present and were considered. One of the approaches taken into account was multilevel modelling, based on the concept hierarchical system of phenomena can be present in reality where each group of phenomena influences the phenomena on the level below. For instance, in this study, the relationship between the environmental characteristics of NTE districts and violent victimisation and perception of safety at night could have represented first level of the

model. A second level might have been used to capture the possible effect of being part of different NTE districts on the correlations found in the first level. Alternatively, another multi-level model might have taken into account the different cities which are considered in the study as a level two information. This would have allowed the researcher to take into account the possible influence of different levels of information in exploring violent victimisation and perception of safety at night.

However, in multilevel analysis, the major restriction is often the higher-level sample size (Maas & Hox, 2005) and previous literature shows that a small sample size at level two (less than 50 units) can lead to biased estimates. In the present study, given the small sample of the NTE districts observed (three types of NTE districts for six cities) the multilevel modelling has not been pursued.

In recent years there has been a large increase in the use of Structural Equation Modelling (SEM), which has been employed in fields like behavioural science and criminology (Keil & Vito, 1991). Structural Equation Modelling is "synthesis of path analysis with factor analytic procedures, involving the comparison of hypothesized model covariances with observed covariances" (Coker et al., 2003, p.262). SEMs can be useful to recognise a system of relationships among constructs rather than dependent variables with a set of independent variables. System Equation Models can help recognise indirect and mediation effects of certain covariates on the dependent variable. Again, as for the multi-level modelling, sample size requirements can be an obstacle when applying SEM approaches. One study for example used a series of simulations to explore the sample size requirements in regards to statistical power, bias in the parameter estimates, and overall solution of SEMs. Results revealed a range of sample size requirements, ranging from 30 to 460 cases (Wolf et al., 2013), depending on several conditions. Given the characteristics of the sample of the present research and the complexity with determining whether that sample size is sufficient to achieve adequate statistical power, this approach was discarded too.

3.4.3 The two stages of the statistical analysis

The exploration of the impact of NTE districts on violent victimisation and perception of safety at night followed two stages, which allowed the researcher to consider a wide range of possible interactions between the predictors and the dependent variables. These two stages allowed the researcher to address in a more thoughtful way the questions of the Aim two of the research:

4) *Does proximity with NTE districts influence the level of violence and perception of safety at night in urban areas?*

5) *What are the main environmental factors of NTE districts, and the demographic and routine activity characteristics of the population that can impact violence at night in urban areas?*

6) *What are the main environmental factors of NTE districts, and the demographic and routine activity characteristics of the population that can impact perception of safety at night in urban areas?*

Stage I

Before focusing only on the MSOA areas overlapping with NTE districts, the researcher aimed to test whether the proximity to any kind of NTE districts can have an impact on violent victimisation and perception of safety at night at the MSOA level. The number of violent victimisation incidents happened at night and of people feeling safe after dark in MSOAs which overlap with NTE districts are compared with those in the MSOAs which do not share any area with NTE districts. Therefore, in this first stage of the analysis the entire MSOA sample within the six cities is considered and the main predictor independent variable is the dummy variable *NTE_Any* indicating whether each MSOA is overlapping with any NTE district (*NTE_Any* = 1).

First, partial correlation analysis is used to explore the possible individual influence of the *NTE_Any* variable, the demographic and routine activity characteristics on the two dependent variables. Partial correlation is a measure of the strength and direction of the relationship between two variables whilst controlling for the effect of one or more other continuous variables, also known as covariates or control variables (Brown, & Hendrix, 2005).

Each independent variable is controlled for the Index of Multiple Deprivation (IMD) and the number of CSEW respondents. Then, two multiple regression analysis are carried out independently using the two Blocks of variables - e.g., the demographic and the routine activities characteristics - as covariates of the *NTE_Any* variable. In this way any influence of routine activity and demographic characteristics of the MSOA areas on the influence of being overlapping with NTE districts will emerge.

The IMD is expected to be positively correlated with the perception of safety and negatively correlated with the number of violent incidents, as lower IMD values indicate the MSOA areas in the most deprived quintiles. The presence of young and male individuals has been previously linked with a higher level of violent victimisation at night (Quigley et al., 2003); while a higher number of men is expected to influence the perception of safety after dark, as gender is one of the key characteristics previously found to be significant in the analysis of perception of safety at night. Finally, the size of the population involved in certain activities - i.e., people going frequently to pubs and nightclubs or drinking regularly - is also expected to have an effect on both the dependent variables of interest.

In this Stage, all the other weighted environmental characteristics are not included in the regression models as they were only collected at the NTE districts level. In Stage II, the models constructed will test the significant and independent correlation between the weighted environmental factors, the demographic and routine activity characteristics with violent victimisation and perception of safety at night only for those MSOAs which overlap with at least one NTE district.

Stage II

After having tested the correlation between being overlapped with NTE districts and the two dependent variables (violent victimisation and perception of safety at night), the analysis will focus just on the MSOAs

that overlap with NTE districts (NTE-MSOAs).

Therefore, in Stage II of the analysis, partial correlation analysis will be carried out using each individual weighted environmental characteristics of the NTE districts, the demographic and routine activity characteristics of the MSOAs as possible predictors controlled for the IMD and the number of CSEW respondents. The strength and sign of the partial correlation analysis indicates which variables might explain different level of violent victimisation and perception of safety at night in MSOA areas overlapping with NTE districts (NTE-MSOAs). In these first partial correlation models, the researcher is not testing the possible interaction between variables within the same level of the information (i.e., within each Block of variables).

However, to have a more robust and precise idea of which characteristics significantly and independently can influence the two criminological phenomena of interest, the interaction between variables of the same information block needs to be tested. To prepare the final models (with the inclusion of the independent variables in block), the possible multicollinearity present in each Block of variables is tested. Multicollinearity is a problem which arises when independent variables are closely related to each other, implying that the regression model cannot satisfactorily discern the separate influences of each independent variable on the dependent variable.

Multicollinearity is a statistical phenomenon in which two or more explanatory variables are directly correlated with each other, and as such has the potential to influence the final parameters of a regression model (Field, 2013). Using the function *mctest* in the *R* software, it is possible to obtain the *Variance Inflation Factor* (VIF) statistics, which identifies any collinearity between explanatory variables (Field, 2013). Myers' (1990) criteria for assessing collinearity proposes that a VIF value greater than 10 is indicative of collinearity issues. Therefore, variables with a VIF value over 10 were considered multicollinear and had to be recalculated for the final analysis (Kutner, Nachtsheim & Neter, 2005).Variables showing multicollinearity were simply summed up and recoded into new variables which represent the combined influence of individual characteristics on the model (Osborn et al., 1992). This allowed the researcher to isolate the truly independent variables within each Block of variables and use them in the final multivariate models.

In this final phase of the analysis, the researcher aimed to test the interaction between the variables present in each Block and the phenomena of interest, to isolate the truly significant independent predictor variables. The sign and strength of the coefficient in relation to each predictor, indicates a possible mediation effect of each other variable of the same Block. Indeed, this process allows a comparison between the results of the partial correlations and the information emerged from the final models to demonstrate whether the combination of more characteristics of the same information-level might change the strength and sign of the correlations. This allows the researcher to explain differences in the number of violent victimisation and perception of safety at night with better precision and rigour.

Events per Variable

As multivariate models are sensitive to skewed results, if the sample of the dependent variable is too small in relation to the number of the explanatory variables (Peduzzi et al., 1995), the Stage II of the research calculated the events per variable to ensure that there were at least 10 MSOAs per each independent variable in the multivariate models. Events per variable were calculated by dividing the number of events (the 36 MSOAs overlapping with NTE districts) by the number of explanatory variables analysed. In the Stage II the size of the MSOAs considered limited the exploration of possible inter-Blocks interactions as it was possible to test a maximum of 4 variables in each multivariate model.

The following chapters present the main results of the quantitative and qualitative analysis conducted to address the research aims and questions. It also outlines how each finding can be positioned in the current discussion around Night-Time Economyand environmental criminology.

Chapter 4 first provides the results of the spatial analysis of the distribution of night-time activities in the six cities considered. It shows how they are spatially clustered and how the clusters spatially interact with each other. It also presents the findings from the observations of NTE districts characteristics made through Google Street View. Despite the limitations clearly explained in Chapter 6, the methodology allowed the researcher to acquire information of many aspects of the urban environment in NTE districts.

Chapter 5 explores the relationship between NTE districts and violent victimisation and perception of safety at night. The chapter presents the results of the two steps of analysis involving different types of models and process. The results will be discussed and contextualised using the environmental criminology theories as the main framework.

Limitations of the methodology employed are explored in **Chapter 6** before moving to **Chapter 7**, where concluding remarks are made alongside recommendations for policies and future research.

4 Results and discussion: Identifying and describing NTE districts

To address questions 1-2 – i.e., Q1: *"Is it possible to spatially identify NTE districts in urban ecosystems?"* and Q2: *"Do NTE districts concentrate in one area of the city or do they locate in multiple areas?"* the spatial analysis of the Points of Interest data was the main approach employed.

The *Optimised Hot Spot* analysis tool in ArcGIS has been used to identify clusters of businesses linked to Night-Time Economy. As explained in Chapter 2, this research adopted a recently established classification of Night-Time Economy activities published by the UK Night-Time Industry Association (Night Time Industry Association, 2021), whereby the NTE is recognised as part of the Out of Home Leisure Activities (OHLE). This classification considers the following businesses as part of the NTE:

- on trade outlets – nightclubs, bingo, casinos, public houses, sports and social clubs, licensed restaurants, hotels, performance venues, cinemas;
- unlicensed businesses – Fast foods and Takeaways, unlicensed restaurants, canteens;

- public events and live performances, museums, theme parks and visitor attractions.

The results presented in the following sections highlight that the main Night-Time Economy types of activities are pubs, bars, restaurants and fast foods, which together accounts on average for 85% of the total NTE activities. On the other hand, nightclubs represent just 2% of the NTE businesses on average, while cinema only the 0.5% and theatres the 1.1% of NTE activities.

These prevalent types of NTE businesses clearly cluster in certain areas of the city, forming NTE districts which only partly overlap with each other. Certain NTE districts are more co-located in the city centre while others are found in more peripherical areas.

Spatial analysis of the PoI data helps identify the individual characteristics of these NTE districts in relation to the density and mix of NTE activities present, as well as to coexisting land uses. For instance, some NTE districts show a consistently higher percentage of buildings with residential use compared to other clusters. Also, variation is found when looking at the density of retail activities and the share of NTE venues which are part of larger brands.

This chapter focuses on six UK cities, which were selected according to certain urban characteristics which are deemed to be linked with the consolidation of Night-Time Economies, like the presence of creative clusters (Table 4.1), and of NTE governance and awards programmes (Seijas & Gelders, 2021). The six cities selected were: Birmingham, Bristol, Leicester, Manchester, Nottingham and Oxford (Table 4.1).

City	Population	NTE governance	Creativity cluster
Birmingham	1,144,900	NTE advisor	
Bristol	472,400	NTE advisor / Purple flag	x
Leicester	368,600	Purple flag	x
Manchester	552,000	NTE ambassador	
Nottingham	323,700	Purple flag	
Oxford	162,100	Night Safe Network	x

Table 4-1: The characteristics of the cities selected.

Birmingham

With a population of about 1,144,900, Birmingham is the most populous local authority area in England as of 2021. With a student population reaching more than 75,000 students, the city has been recognised as one of the next possible nodes within the UK's creative geography, given the very fast growth it has experienced in recent years. A new, high-profile business leader role to champion and support the region's pubs, nightclubs, bars, concert venues, theatres, and restaurants has recently been initiated by the city council (Birmingham City Council, 2022). The new role mirrors equivalent roles in London and the

Greater Manchester area and will conduct activities in close relation with the Council, the Business Improvement Districts and local stakeholders to champion Birmingham's thriving nightlife and ensure a safer night-time experience (Birmingham City Council, 2022).

Bristol

One of the 11 core cities in the UK, Bristol is the biggest city of the Southwest. Bristol had the greatest growth rate of all the "Core Cities" in England and Wales over the previous ten years, with a current population of 472,400 in 2021 (Bristol City Council, 2022). Pre-pandemic Bristol had an estimated £368 million invested in the creative economy, being composed by more than 6000 cultural and creative organisations. (Nesta 2018). Bristol is also one of the first UK cities that were awarded Purple Flag status in 2010 and is still "a proud Purple Flag bearer today in recognition of its work towards a more vibrant, welcoming, diverse and safer nightlife" (Inman, 2022). Furthermore, in 2021 Bristol appointed its first Night-Time Economy advisor, and in April 2022 the Night-Time Economy Summit took place in the city involving over 100 speakers with panels and workshops featuring innovators and entrepreneurs from across the sector. (Night Time Industry Association, 2021)

Leicester

In Leicester, the population size has increased by 11.8%, from around 329,800 in 2011 to 368,600 in 2021. This is reportedly higher than the overall increase for England (6.6%) (Office for National Statistics, 2021). The city has been trying to market its night-time offer by earning Purple Flag status for the third time, and it was judged to be outstanding in 19 of the 31 judging criteria, as the Business Improvement District director Simon Jenner declared in a public statement (Jones, 2022). Over the past few years, the city has experienced an increase in the creative sector higher than the UK average, but it has not been recognised as a creative cluster.

Manchester

In Manchester, the population size has increased by 9.7%, from around 503,100 in 2011 to 552,000 in 2021 (Office for National Statistics, 2021). Around one third of the city's workforce is employed in jobs or businesses that are significantly active at night, with 414,000 employees working between the hours of 6pm and 6am. Since 2001, employment in the NTE has grown at a 45% faster rate than the rest of the Greater Manchester area economy (Lord, 2019).

Manchester is one of the major cities in the UK, listed among the creative clusters by NESTA (Chapain et al., 2010), counting 503,127 citizens and 70,086 students. Furthermore, an official Greater Manchester Night-Time Economy adviser has been also appointed in 2018 with the aim of championing Greater Manchester's thriving nightlife with the aid of a panel composed of professionals and NTE business representatives.

Nottingham

In Nottingham, the population size has increased by 5.9%, from around 305,700 in 2011 to 323,700 in 2021 (Office for National Statistics, 2021). In 2016, Nottingham initiated the Creative Quarter (CQ) project, which encompasses university campuses and a diverse set of creative businesses, Night-Time Economy activities and cultural spots. The number of Creative and Digital Industries (CDI) businesses in Nottingham has more than doubled since the start of the millennium from 770 to 2,000 in 2021 (Karagounis & Rossiter, 2022). One in every five businesses in the CQ is a CDI business making this the largest single sector in the area. The CQ area has experienced high growth in the broader business base, particularly in knowledge intensive sectors.

Oxford

In Oxford, the population size has increased by 6.7%, from around 151,900 in 2011 to 162,100 in 2021 (Office for National Statistics, 2021). The 33,430 students enrolled full-time studies to two universities make for the largest proportion of adults in full-time higher education of any city in England and Wales. 26% of residents were born outside of the United Kingdom. Recently, as a partnership of businesses from the night-time economy, universities, police and the city council were established in Oxford under the name Oxford's Night Safe Network. It received a £426,000 fund to introduce measures to help prevent violence against women (BBC, 2022).

4.1 Types and quantity of NTE activities

The Ordnance Survey (OS) Points of Interest (PoI) spatial data was used to map out home leisure activities connected with the NTE. The OS uses a three-levels classification scheme, for a total of nine groups and fifty-two categories broken down in 616 classes (Ordnance Survey, 2020). For the present study, the whole 2019 PoI dataset relating to all six cities was downloaded from the OS website and filtered to represent all NTE related business activities (Table 4.2). In Appendix C the table with the count of each individual PoI class can be found.

PoI Class	Mean	Median	Max	Min	St. Dev.
Off Licences	64.7	53.5	144.0	16	43.2
Casino	4.8	5	7.0	3	1.8
Cinemas	7.5	6	13.0	4	3.6
Fast Foods	631.8	504.5	1289	142	401.7
Hotels	52.7	3	104	21	33.5
Nightclubs	26.2	2	44	7	14.9
Pubs, Bars and Inns	311.8	315	494	145	134.7
Restaurants	304.3	248	587	141	172.2

Social Clubs	39.2	32	86	16	25.1
Theatres/ Concert Halls	18.3	17.5	28.0	10	7.9

Table 4.2: Descriptive analysis of NTE activities in the six cities analysed

These results show that certain types of NTE related activities are quantitatively prominent across all six cities. It is worth noting that, on average, the population of fast foods results is more than 20 times bigger than the number of nightclubs, and two times bigger than the restaurants and pubs and bars samples. As already mentioned in Chapter 2, the population of nightclubs has dwindled down from around 3000 licensed nightclubs in 2006 to just 1000 in 2022, leading to the recent concerns around the disappearance of this type of NTE venue, exacerbated by the recent Covid-19 emergency (Night Time Industry Association,2021).

PoI Class	Oxford	Nottingham	Leicester	Bristol	Birmingham	Manchester	Mean	Median
Off Licences	3.1	4.6	4.6	4.2	5.4	3.5	4	4.4
Casino	0	0.6	0.3	0.2	0.3	0.2	0	0.25
Cinemas	1.2	0.5	0.4	0.8	0.5	0.3	1	0.5
Fast Foods	27.7	43.7	50	34.7	48.3	42.9	41	43.3
Hotels	5.8	3.7	2	2.7	3.9	4.1	4	3.8
Nightclubs	1.4	1.4	1.8	2.2	1.5	2.1	2	1.7
Pubs, Bars and Inns	28.3	24.6	18.8	28.9	14	23.6	23	24.1
Restaurants	27.5	17.6	18.0	21.9	22	20	21	21
Social Clubs	3.1	2.2	2.9	2.4	3.2	2.2	3	2.6
Theatres Concert Halls	1.9	1.2	1.2	2	0.9	1.1	1	1.1

Table 4.3: Rate of individual NTE businesses over the total NTE business population

When considering the percentage of individual NTE categories over the total NTE sample in each city, it is worth noting that the fast foods category is the largest sample in the PoIs dataset. Fast foods account for half of the NTE activity population in cities like Leicester and Birmingham, and on average for 41% across the whole sample. Aside from Birmingham and Leicester, where the figures for pubs and bars tend to be consistently lower than the mean, the rest of the cities show a rate of pubs ranging between 24% and 29% of NTE activities (Table 4.3).

In most of the studied cities, the number of pubs and bars exceed the number of restaurants, except for Birmingham where the restaurants sector shows 50% more activities than pubs and bars. It is worth noting that Bristol has the highest number of theatres and concert halls, as well as more pubs and bars

than Birmingham, while having only less than half of the population of the latter. Casinos and cinemas are the smallest NTE samples, with an average of 8 cinemas per city, which reflects the deep concerns revolving around the live cinema sector (Gaudreault & Marion, 2015). Authors have argued that the recent advancements of home-video and entertainment platforms like Netflix, Amazon Prime Video and YouTube are among the possible causes for the drop in cinema numbers in city centres (Gaudreault & Marion, 2015).

These results show that, across the six cities, pubs, bars, restaurants, and fast foods combined represent around 85% of the total NTE activities (Table 4.3). It also shows that the amount and the type of NTE activities differ across the six cities, which in some case present a very strong music- or pub-oriented offer (respectively in Manchester and Bristol), while in others they tend to be more food-oriented - like in Birmingham. Oxford seems to have a more balanced offer, with almost the same number of pubs, restaurants, and fast foods.

The individual proportion of NTE activities tends to have the mean close to the median, pointing to a tendency towards symmetrical distribution. An increased balance between different types of activities should be a potential objective to be pursued by local councils to avoid the over-saturation of specific NTE ventures at the expense of others (Haydock, 2014). Night-time diversity and inclusion should be reached not only through different themes and styles across the hospitality and drinking sectors, as mentioned in Chapter 2, but also by allowing a more diverse offering in terms of NTE settings. Authors in Italy have recently pointed out how the increasing number of food-related businesses among the "out of home leisure and social activities" (Night Time Industry Association, 2021) is to be considered as a new form of economic gentrification – or *foodification* –, which is reducing diversity of NTE offers in several cities (Loda et al., 2020). Data from the Points of Interest seems to suggest a similar trend in the UK,

Parallel to the *foodification* of NTE experiences, another trend that might have been impacting the activity balance of NTE districts, is the general reduction of alcohol sales (as pointed in Chapter 2), which have been in steady decline since 2005 (Office for National Statistics, 2017). This trend, alongside decades of institutional and media discourse around legitimate, controlled and tension-free models of NTE activities might be among the factors that have most influenced the current *foodification* trends. The cosmopolitan nights concept championed by several authors (Bianchini, 1995; Young et al., 2006) and policy makers might seem to have been translated into a more *dining* nights model, which are themselves eating up other and alternative forms of nocturnal socialities.

4.2 Identification of NTE districts

After having described some of the quantitative characteristics of NTE districts across the six cities, the next phase of the research involved testing which of those businesses significantly co-locate within the urban environment to address Question 1 - i.e., "*Is it possible to spatially identify NTE districts in urban*

ecosystems?”.

The *Average Nearest Neighbour (ANN)* tool in ArcGIS software calculates the average Nearest Neighbour distance Index (NNI) of each point in a sample by dividing the observed average distance among the point features by the expected average distance. The expected average distance is determined by a fictitious random distribution with the same number of features covering the total area. When the NNI value is less than 1, it means that the points in the sample are not randomly distributed and show clustering. The results in Table 4.4 indicate that some of the NTE activities are clustered (NNI < 1) in the cities selected, and were therefore selected for the *Optimized Hot Spot tool* in the following stage of the study. 'Theatres and Concert Halls', 'Casinos', 'Social Clubs', 'Hotels', 'Off Licences' and 'Nightclubs' were the classes which did not show spatial autocorrelation in certain cities (Table 4.4).

PoI Class	Bristol	Birmingham	Leicester	Manchester	Nottingham	Oxford
Off Licences	1	0.7	0.8	0.8	0.7	1.1
Casinos	4	1.9	3.3	4	1.9	NA
Cinemas	1	1.4	2.5	2.2	1.9	2.2
Fast Foods	0.3	0.2	0.3	0.3	0.2	0.3
Hotels	0.9	0.7	1.1	0.6	0.7	0.9
Nightclubs	0.9	0.8	1.1	0.7	1.1	1.2
Pubs, Bars & Inns	0.5	0.5	0.3	0.4	0.45	0.5
Restaurants	0.4	0.4	0.5	0.3	0.5	0.3
Social Clubs	0.8	0.8	1.2	0.9	1.2	0.9
Theatres Concert Halls	1	0.8	1.4	1.3	1.2	1.3

Table 4.4: Spatial Autocorrelation analysis of NTE businesses

Furthermore, the *Optimised Hot Spot* analysis in ArcGIS has some limitations, as it does not allow the user to use the tool on samples which are smaller than sixty point-features. The *Optimised Hot Spot* analysis. The categories which were selected for the identification of NTE districts ultimately were 'Pubs, Bars & Inns', 'Restaurants' and 'Fast Foods'.

NTE districts

Even though researchers in the fields of industrial organisation, organisational ecology, and economic geography have documented the tendency of groups of firms to cluster in geographical space, hot spots are a

generally understudied phenomenon in the organisation sciences (Galbraith & DeNoble, 1992). In this section the results from the hot spot spatial analysis performed in ArcGIS Pro are described, focusing on the spatial characteristics of the areas where NTE activities are significantly co-located.

The *Optimised Hot Spot* analysis created a grid of polygons where the NTE activities are significantly co-located - i.e., Hot Spots. Each polygon size varies to optimally fit the distribution and size of the sample. In the following subsections the results of the *Optimised Hot Spot* analysis and of the descriptive analysis of the NTE districts will be discussed.

Localization of urban NTE districts

The visualisation on the NTE districts on ArcGIS maps revealed that most clusters of NTE activities are located in the city centres of cities. This result is in line with previous research which identified night-time entertainment districts in downtown areas or commercial districts (Campo & Ryan, 2008) and coherent with those studies explaining the role of NTE activities in regenerating post-Fordist city centres (Roberts & Eldridge, 2012). Understandably results show that most of the NTE districts overlap with each other, while others remain spatially located in separate parts of the cities. For instance, in Figure 4.1 the clusters of *Pubs, Bars & Inns* activities are visualised and compared with the *Restaurants* hot spots in Bristol. It can be noticed that while the hot spots of pubs and bars are in the city centre, restaurants are both partly overlapping with the pubs' clusters and located outside of the city centre.

For a complete visualisation of all the Hot-Spot maps of the NTE clusters across the six cities please refer to the Appendix B.
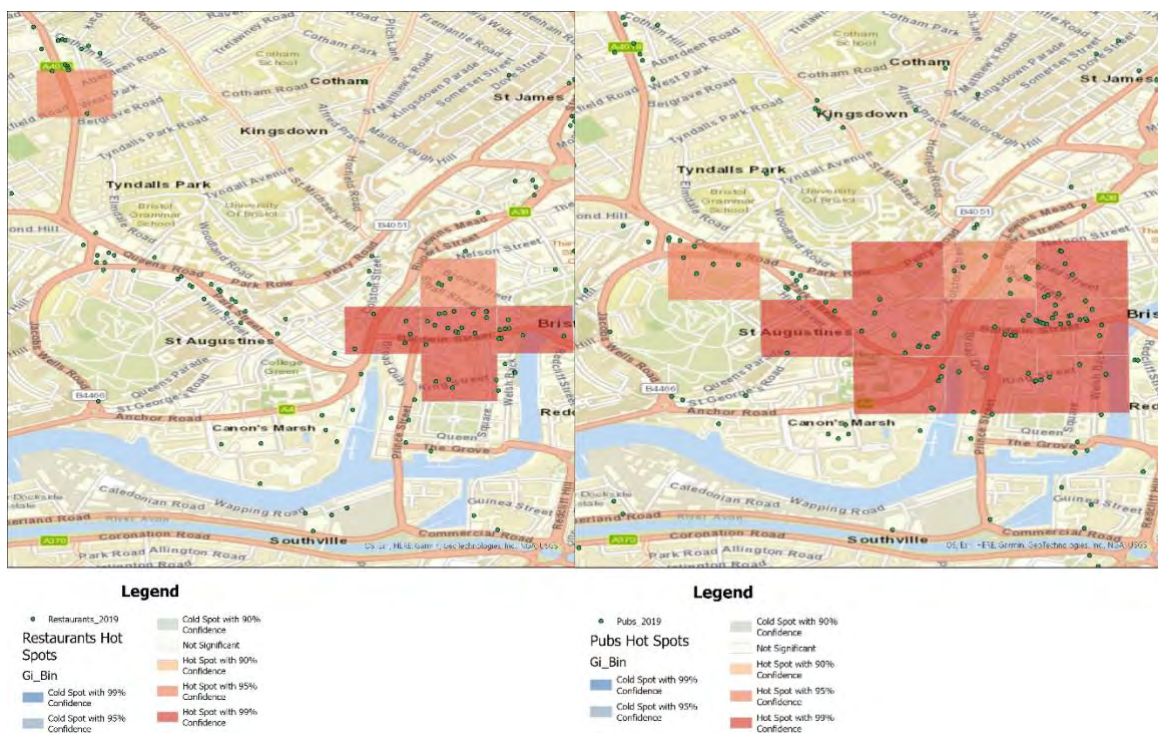
Figure 4.1: Hot Spots of *Restaurants* and *Pubs, Bars and Inns* in Bristol.

General higher levels of overlap - 60% on average - can be found between *Restaurants* and *Pubs, Bars and Inns* clusters, while *Fast Foods* clusters show a more diverse overlapping profile across the sample. For instance, Leicester's *Fast Foods* clusters do not share any portion of their area with the rest of the clusters, while in Nottingham they overlap for about 90% of their area both with the *Restaurants* and the *Pubs, Bars and Inns* clusters. This high level of co-existence between different types of activities in Nottingham, can be explained by the high centrality of all the social and NTE activities in the city, where the university campus and faculties are located. Also in Oxford, *Restaurants* share more than 80% of their areas with *Pubs, Bars* and *Inns* clusters, reflecting a similar centrality like in Nottingham. *Restaurants* clusters share a very small portion of their area (20% on average) with the *Fast Foods* clusters in almost all the cities (Table 4.8).

In Birmingham, Manchester and Leicester some of the *Fast Foods* clusters are located outside of the city centre, indicating possible alternative mixes of activities and functions. For instance, part of the *Fast Foods* cluster in Manchester is integrated in the ethnic neighbourhood of Rusholme, which is also close to the university area in the south part of the city, where pubs and restaurants are less present.

Table 4.5 presents the percentage of area overlapping between the different types of clusters. All the values are expressed in percentages.

Overlapping Districts	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	Mean
Pubs/Restaurants (%)	72	31	21.4	24	61.5	37.4	41.2
Pubs/Fast Foods (%)	31	4.6	0	69	26	20.7	29.4
Restaurants/Fast Foods (%)	37	6	0	13	34.4	26.2	19.4
Restaurants/Pubs (%)	37	76	58.7	24	84.1	83	60.5
Fast Foods-Restaurants (%)	47	19	0	8	89.8	25.8	31.6
Fast Foods/Pubs (%)	21	10	0	42.7	92.6	45.2	35.3

Table 4.5: Overlapping profiles between NTE clusters in the six cities considered.

Cities with more polycentric Night-Time Economy districts, which are considered as a possible solution to the tensions generated by saturated and central NTE districts (MacLean & Moore, 2014), were not observed in the results of the *Optimised Hot Spot* analysis. Delocalising the NTE is deemed to possibly

help relieve neighbourhoods from the excessive pressure generated from noise, pollution, crime and anti-social behaviour that city centres experience at night, especially during the weekends (MacLean & Moore, 2014). However, the process of delocalisation of NTE districts is a delicate matter, as it might result in top-down approaches which can lead to dynamics of exclusion, classism and gentrification. Authors in the past have stressed the importance of taking into account both the communities of people experiencing the night and of those living in the neighbourhood in order to maintain an inclusive point of view and avoid tensions (Homsy et al, 2019).

The concentration of NTE activities in Hot Spots

As part of the descriptive exploration of NTE clusters, the researcher also explored the extent to which specific types of NTE activities can form higher density clusters within the statistically significant hot spots. Indeed, results show that the distribution of activities within the identified hot spots is not equal, and some areas have a higher level of clustering compared to others, reflected by the percentage of activities located in the three hot spot polygons with higher *Gi_Bin value* and *z-score*, which, as explained in Chapter 3, measure the intensity of clustering. The table below (Table 4.6). contains the information the percentage of NTE businesses of each district which are located in the three polygons with the higher *Gi_Bin* value (i.e., *% in the hottest Hot Spots)*.

Districts	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs (%)	83	41	24	43	35	83	52
Restaurants (%)	39	70	93	27	14	48	49
Fast Foods (%)	24	65	38	15	29	80	42

Table 4.6: Rate of NTE venues located in the three hottest hot spots polygons. *Note: the values indicate the percentage of the NTE businesses located in the three hot spots polygons with higher Gi_Bin values.*

The concentration of activities in the three 'hottest' areas – i.e., the areas with the highest *z-score* and *Gi_Bin* values -, it is worth noting how in Birmingham and Oxford's *Pubs* clusters, 83% of the pubs are concentrated in the three hottest hot spots. While these results are explainable by the limited number of significant clusters identified in Oxford, in Birmingham this seems to show the existence of high-density areas within the Pubs clusters. In Leicester's Restaurants clusters almost the totality of restaurants (93%) densely concentrated in the three most significant clusters. Nottingham restaurants seem to be more evenly distributed across clusters, with only 14% of them being in the three hottest thot spots.

The high concentration of specific types of businesses in limited areas, represented here by the three hottest Hot Spots, might mean that in NTE districts there are certain segment of streets or certain blocks where most of the activity takes place.

Many scholars have outlined how mono-target and mono-functional Night-Time Economy areas can have polarising effects on people experiencing them (Crivello, 2011). The dichotomous perception of NTE districts being experienced as playscape for certain demographics and no-go areas for other parts of the population, might be the consequence of these high-density NTE districts, like the ones found in Birmingham or in Leicester.

Overall, these result show that NTE economic activities tend to significantly cluster in specific urban areas. These areas, identified here through the *Optimised Hot Spot* analysis in ArcGIS, contain clusters of NTE activities and can therefore be considered as NTE districts.

The researcher is aware that this conceptualisation of NTE districts has some limitations due to the geographical approximation and the impossibility to verify on-site the actual use of the area. These limitations will be thoroughly discussed in Chapter 6.

In the next subsections, additional descriptive results will be discussed exploring the size and the coexistence of different land uses in NTE districts.

Size of NTE districts

To explore the size of the NTE districts identified, this study has considered the total street length of each cluster, which reflects the actual network of segments where NTE business activities can possibly reside. Unsurprisingly the size of the districts is directly correlated to the size of the city population, with Birmingham showing the biggest NTE clusters and Oxford the smallest ones (Table 4.7).

District	Bristol	Birmingham	Leicester	Manchester	Nottingham	Oxford
Pubs (km)	9.9	11.8	10.9	12	12.1	4.71
Restaurants (km)	21.25	4.98	3.56	10.34	8.89	2.22
Fast Foods (km)	15.8	2.8	1.9	17.2	2.9	1.9

Table 4.7: Total length of streets found in significant NTE districts. *Note: the values indicate the km of streets segments measured in each NTE district.*

The study of the street length of NTE districts might worth some consideration. Indeed, a higher density of NTE venues over the total length of streets in certain neighbourhoods might indicate not only an increased risk of NTE saturation, but also a bigger risk for phenomena like bar-hopping which previous literature identified as a crime precipitator (Felson et al., 1997). Furthermore, authors have previously proposed a correlation between street length and opportunity for crime (Office of the Deputy Prime Minister, 1998); however, more recent research has found that it is the morphology of streets which has a direct impact on crime. Therefore, the length of streets was used in the present study only as a measure to

calculate the density of the districts' characteristics derived from the Google Street View observations and the PoI data.

The rate of buildings with NTE venues

The *Optimised Hot Spot* analysis conducted in ArcGIS shows both significant and non-significant areas where point-feature data are clustered. This research used the significant clusters of NTE activities to identify the NTE districts in each city, while the non-significant clusters were not taken into account for the analysis. However, it is worth considering whether the significant clusters of activities identified though the *Optimised Hot Spot* also show a higher rate of buildings with at least one NTE activity (NTE-buildings).

The Geomni *UKBuilding* dataset is a national database of building characteristics which provides several detailed information about individual buildings and has been employed to measure the rate of NTE-buildings. The dataset includes many attributes of UK buildings, including the use, age, height, residential type, number of floors, location, structural details, and area.

The analysis conducted using the *UKBuilding* shows that the difference of the rate of *NTE-buildings* between significant and non-significant cluster is compelling (Table 4.8). While all the significant clusters have a consistent percentage of NTE buildings, e.g., 27% in Pubs, 29% in Restaurants and 17% in Fast Foods districts, the average percentage of NTE buildings in non-significant clusters ranges from 3.2% (Pubs) to 4.5% (Restaurants).

Districts	Significancy	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs (%)	Significant	36	17	20	36	22	30	27
	Non-significant	2	2.2	3	6.2	3	3	3.2
Restaurants (%)	Significant	25	19.5	32	39	25	36	29
	Non-significant	2.6	3.7	4	7.2	4.3	5	4.5
Fast Foods (%)	Significant	10	19.2	6	15	29	20	17
	Non-significant	2.4	0.1	6	3.7	4.6	4	3

Table 4.8: Rate of NTE buildings in NTE districts. *Note: the values show the percentage of buildings with at least of NTE activity.*

The rate of NTE buildings in pubs and bars clusters ranges from 17% in Bristol to 36% in Birmingham and Manchester, with mean and median close to 27%. In the Restaurants' clusters, the percentage ranges from 19% in Bristol to 39% in Manchester, with mean and median close to 29%.

In the following section the *UkBuildings* dataset has been employed to explore the presence of coexisting building uses in NTE districts and possible differences across the NTE district.

Coexisting buildings uses

The tensions emerging from different temporal-uses of urban areas have been discussed in the first chapter, with the "right to sleep" affected by noise pollution at night and other issues related to the lack of services and infrastructure being among the most urgent concerns in many cities (Ottoz, 2023). For this reason, the present study has explored the different uses of each area at the micro-level, by using the Geomni *UkBuildings* dataset. The dataset has been manipulated and analysed using the ArcGIS software, through the use of the *Tabulate Intersection Tool*, which computes the intersection between two feature classes and cross tabulates the area, length, and count of the intersecting features. For the complete tables including all the land uses present in NTE districts please refer to Appendix D.

From the results of the descriptive analysis, the two main *use* categories in Pubs districts appear to be *Retail* and *Office*

For instance, in the Pubs districts, an average 51% of the buildings fall under the *Retail* category, while this category covers 72% of the area in Manchester (Table 4.9).

The *Office* category is the second most frequent building use in Pubs districts, covering around 17% of the area in Pubs hot spots across the six cities. In Birmingham, one in three buildings are office-purpose only. Overall, when combining the *Office* and the *Retail* categories in Pubs districts, it appears that most of the buildings (70%) do not to have any residential presence.

The *Residential only* category tends to be less relevant, despite one in five buildings in both Oxford and Bristol count as residential. Among the rest of the categories, it is worth noticing that Oxford has a relevant percentage (17%) of buildings falling under the *Community-Educational* category, which can be explained by the higher presence of university-owned infrastructure (Table 4.9).

Pubs, Bars & Inns districts	Birmingham	Bristol	Leicester	Nottingham	Manchester	Oxford	Mean
Office Only (%)	35	14	22	18	7	8	18
Residential Only (%)	5	22	6	11	12	20	13
Retail (%)	44	47	49	51	72	43	51

Table 4.9: Rate of the main building uses in Pubs, Bars & Inns districts. *Note: The values show the percentages of buildings uses in significant clusters.*

The *Restaurants* districts show land-use patterns similar to the *Pubs* clusters, in line with the strong overlapping profile between these two categories (*Pubs/Restaurants* = 41% and *Restaurants/Pubs* = 61% on average) discussed in the previous section. In the *Restaurants* NTE districts, 53% of the buildings appears under the *Retail* class on average, reaching 70% in Leicester and 64% in Manchester and making this

category the most common across all the cities. Differently from the Pubs districts, the *Residential* category here covers one third of the buildings area in Bristol, while the *Office* category maintains a to the Pubs clusters across the six cities, reflecting again a similar area use of the two clusters (Table 4.10).

Restaurants districts	Birmingham	Bristol	Leicester	Nottingham	Manchester	Oxford	Mean
Office Only (%)	27	17	11	15	19	12	17
Residential Only (%)	16	29	1	8	1	12	11
Retail (%)	33	45	69	58	64	47	53

Table 4.10: Rate of the main building uses in Restaurants districts. *Note: The values show the percentages of buildings uses in significant clusters.*

As expected, the fast foods hot spots show different land-use patterns compared to the two previous classes, with which they generally do not share a substantial amount of area. While the *Retail* share of the clusters remains high (on average 47 % of the buildings, with a peak of 70% In Manchester), a completely different value emerges from Residential land-use. The rate of buildings with *Residential* use rises to 36.5% on average with peaks of 59% in Birmingham and 57% in Manchester. On the other hand, the share of office buildings decreases to 4.4% on average compared to more than 50% in both the two other types of clusters, with Leicester having just 0.6% of buildings with office use. The higher percentage of residential buildings reflects the tendency of fast-food clusters to appear in areas distant from the city centres, while in turn offices and retail premises tend to be more concentrated (Table 4.11).

Fast Foods districts	Birmingham	Bristol	Leicester	Nottingham	Manchester	Oxford	Mean
Office Only	7	4	1	4	2	8	4
Residential Only	59	15	75	1	58	12	37
Retail	28	78	23	76	33	43	47

Table 4.11: Rate of the main building uses in Fast Foods districts. *Note: The values show the percentages of buildings uses in significant clusters.*

Existing literature (Roberts & Eldridge, 2012; Ottoz, 2023) have pointed out how the conflicts between residents and NTE visitors can be a major concern. Noise pollution is deemed to not only affect the health of the local population, but it even has an impact on the estate-value of apartments located near pubs and bars (Ottoz, 2023). Fast Food districts with a high percentage of residential-only building classes like in Manchester (58%), Leicester (75%) and Birmingham (59%), are the areas that seem more at risk of such noise-related issues. It must be noted that the Pubs and Restaurants districts in Bristol also have a marked percentage (around 20%) of residential buildings. The purpose of this research was not to explore the possible correlation between coexisting land-uses and NTE issues. However, the researcher has deemed important to highlight these features of urban areas as a promising line of future research.

4.3 Environmental Characteristics of NTE districts

To address the question number three of the research, i.e. *"In terms of environmental characteristics, are NTE districts homogeneous or diverse?,* the study employed Google Street View and the Point of Interest dataset to gather environmental information of each NTE district identified. The characteristics observed will be discussed through the following subsections. These results provide context to the final stage of the study dedicated to exploring the correlation between environmental, demographic and routine activity characteristics and violent victimisation and perception of safety at night. As described in Chapter 2, environmental criminology theories focus on the combination of tangible and intangible factors which interact with the pool of potential victims and offenders in a certain context. To select the environmental characteristics included in the study, the researcher reviewed previous studies employing Google Street View as the auditing tool for exploring different neighbourhood characteristics (Sampson & Raudenbush; 1999; Kan et al., 2012). Moreover, studies related to the analysis of the barroom environment (Graham & Homel, 2012) were reviewed to select the relevant features which are visible from outside NTE venues and can have an impact on violent victimisation and perception of safety at night. The resulting list of factors was divided into three categories:

- Venue-level characteristics
- Disorder characteristics
- Infrastructure and amenities characteristics

A period of self-training was conducted testing Google Street View functionalities to get confident with the instrument. From this stage, the initial list of environmental factors to audit was refined to exclude those characteristics which were too rare or too difficult to observe. For instance, the presence of venue-policy at the entrance of venues (like identification requirements) were removed as the signs observed were too blurred to be read using Google Street View. When it comes to amenity characteristics of the built environment, the differentiation between legal street art and graffiti was not taken into account, as it was not possible to ascertain beyond reasonable doubt whether each piece of work had been legally commissioned or not. Signs of graffiti were counted as possible sign of lack of maintenance and physical disorder. Abandoned residential buildings were similarly not considered due to their scarcity, which reflects the results of the building-use analysis of NTE districts, where residential-only buildings is found to cover only a small percentage of NTE districts. The researcher decided to add any sign of unhoused person or shelter, as previous literature considered the presence of homeless people as a sign of social disorder (Braga et al., 2014). The presence of homeless people in city centres still remains a relevant topic in the UK and might have an impact on how NTE districts are perceived.

In the next sections, the results of the auditing conducted using Google Street View alongside the exploration of economic activities compositions and characteristics through the Point of Interest dataset will be outlined

Venue-level characteristics

As the previous sections outlined, in the NTE districts identified, the level of clustering and density of NTE venues has a direct impact on the use of these urban areas. Different mixes of NTE venues can influence how the area will be experienced and what kind of activities and people will be found nearby.

For instance, offered contents, and selling strategies are among those factors impacting who is going to visit certain venues and their purpose. Due to the high competition between co-locating venues, the need to stand-out and attract NTE visitors leads to a very visible presence of big signs, posters, personalised windows, custom storefronts, which promote the main offer and business selling point very clearly to visitors. Other characteristics influence the way how NTE districts are used, like the presence of chairs and tables outside the premises, which can bot offer an additional service and space to customers and provide additional eyes on the streets. Even if Google Street View pictures were taken in the daytime, when some of the venues were still closed, most signs were highly visible and could inform the researcher about what kind of offer people would find at night. Therefore, the researcher was able to acquire information on marketing promotions related to the consumption of specific types of drinks, e.g., "2-4-1" cocktails (Figure 4.2), or discounted prices in relation to the time of the day, e.g., "happy hour". It was also possible to recognise signs indicating the presence of pool tables, or the livestream of sporting events on tv or the hosting of pub quizzes inside.

Figure 4.2: An example of venue-level characteristic observed (*Alcohol promotion*). *Note: the "2-4-1" indicates a time-sensitive promotion in relation to cocktails price.*

Venues hosting music programmes display generic messages related to the presence of "live sets" or "djsets" inside, as well as proper programming entailing a list of artists alongside the dates of the performances. Very

few venues advertised different activities, like theatre plays, cabaret, stand-up comedy or other kinds of performance.

Alcohol promotion

In previous studies, the Google Street View tool has been found to be reliable when auditing large, static alcohol-related elements of the built environment, like large advertising signs and boards (Clews et al., 2016); thanks to recent improvements in image quality of the tool it was possible to detect with high accuracy the venues' marketing strategies which are based on alcohol promotions and discounts – e.g., the "Happy Hour", which indicates the time windows when prices of selected or all alcoholic drinks are reduced, or the popular "2-4-1" signs which indicate the offer of two cocktails for the price of one.

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	Mean
Pubs	2.21	1.1	0.82	1.67	2.07	1.7	1.59
Restaurants	2.1	0.6	1.7	0.5	2.8	2.3	1.65
Fast Foods	0.5	1.1	0	1.2	2.8	1.1	1.10

Table 4.12: Density of venues with alcohol promotions signs in NTE districts. *Note: the values show the number of observations per km of street in NTE districts.*

Nottingham is the city with the highest density of alcohol discounts being promoted outside of NTE venues - in both *Restaurants* and *Foast Foods* clusters - with almost one venue every 300 metres - showing signs of drinks promotions compared to an average of one every 600 metre across the sample (Table 4.12). Similarly high values can be found in Oxford's and Birmingham's city centres clusters - i.e., *Restaurants* districts. Expectedly, *Fast Foods* clusters tend to have fewer venues with alcohol sales marketing promotions, with Leicester's *Fast Foods* districts having no signs of drinks discounts at all. These results indicate that venues offering drinks promotions tend to be found closer to pubs, bars and restaurants clusters which are more concentrated in city centres. High footfall leads to the need for standing out among large numbers of similar venues, and the significant presence of alcohol discounts can be one of the main solutions adopted by NTE venues to attract visitors. As previous literature has found, alcohol promotions and discounts can lead to increased and faster alcohol consumption (Kaplan & Reed, 2018). Marsh and Kibby pointed out that aggression in the NTE is facilitated "by encouraging young men to drink large volumes of alcohol in a very short period and in a traditional macho style where such patterns of consumption and manliness are reinforced by the marketing and advertising" (Marsh & Kibby, 1992 cited in Dehan, 1999, p. 14). Other studies linked the phenomena of binge-drinking and excessive alcohol consumption to crime and anti-social behaviour (Kaplan & Reed, 2018).

Although it was impossible to detect the atmosphere of the venues or other messages which might encourage machos-attitudes through Google Street View, it is highly probable that NTE districts with more venues displaying drink promotions may influence the binge-drinking habits of visitors.

Entertainment activities

In Chapter 2, the study explored existing literature on the correlation between NTE venues offer and violence for instance, drawing from the attention-allocation theory it is posited that distractors – like entertainment activities or music – can have a positive impact on preventing alcohol related violence in NTE settings (Giancola et al., 2009). Comfortable and entertained patrons have been seen to display less hostility and consume alcohol at a slower pace (Homel & Tomsen, 1993), whilst a lack of quality entertainment can increase boredom, which is also argued to be a generator of frustration capable of leading to violence. In the picture below (Figure 4.3), different types of contents being advertised outside of venues are presented.
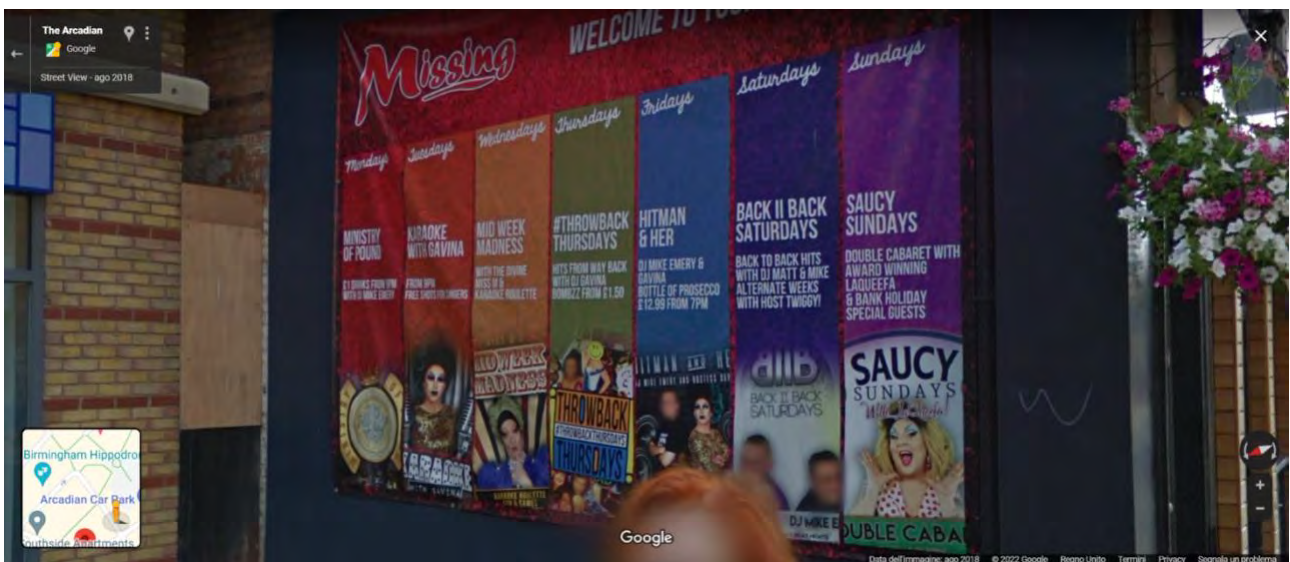
Figure 4.3: Picture of an entertainment programme displayed outside of a NTE venue.

Surprisingly, venues with entertainment activities tend to be denser in *Fast Foods* districts (Table 4.13). Nottingham's *Restaurants* and *Fast Foods* clusters as well as Bristol's *Fast Foods* clusters, report the highest density of venues with entertainment. This, however, should take into account the reduced sizes of fast foods clusters, particularly in terms of street length in Bristol and Nottingham. The absolute number of venues is higher in the *Pubs*' clusters.

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs	1	0.59	1	1.50	0.1	0.42	0.77
Restaurants	0.9	0.8	0.8	0.2	1.7	0.9	0.89
Fast Foods	0.6	1.8	0	0.9	1.7	0.5	0.94

Table 4.13: Density of venues with entertainment programs in NTE districts. *Note: the values show the number of observations per km of street in NTE districts.*

Music activities

Given the attention received in previous literature by the decline of music venues and the impact that specific types of music might have on attracting certain target populations (Homel et al., 1997; Forsyth, 2006), the presence of music performances promoted outside of venues was considered as a specific venue-level factor (Table 4.14).

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs	0.50	1.27	0.64	1.42	0.74	0.42	0.83
Restaurants	0.2	1.6	0.8	0.1	0.9	0.9	0.76
Fast Foods	0.3	1.4	0.0	0.9	0.3	0.5	0.58

Table 4.14: Density of venues with music programmes in NTE districts. *Note: the values show the number of observations per km of street in NTE districts.*

The density of venues with music resulted higher in Bristol *Restaurants* districts and Manchester *Pubs* clusters, while the *Fast Foods* clusters tended to be the ones with less music contents being showcased.
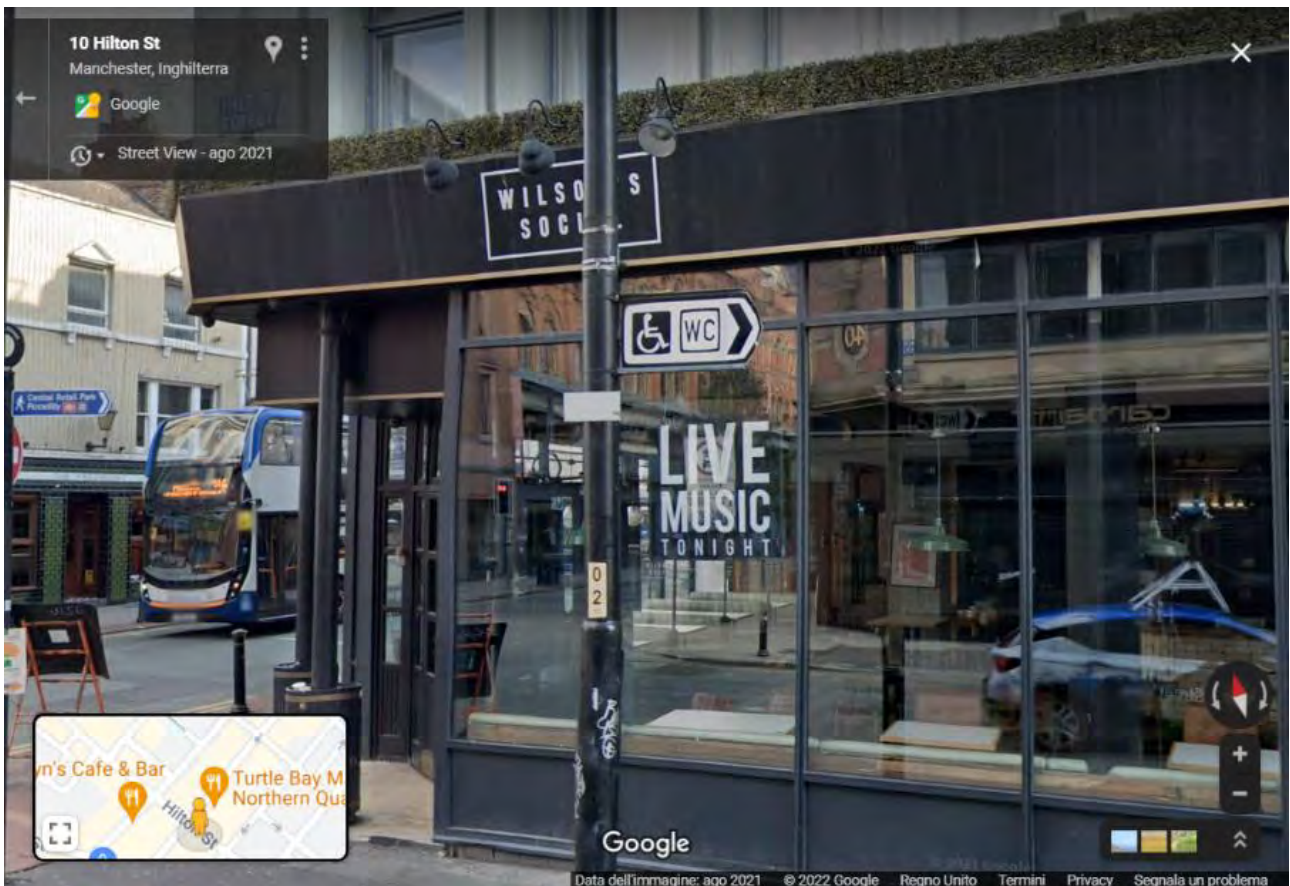
Figure 4.4: Picture of a music venue observed.

In fact, Leicester *Fast Foods* clusters do not have any venue with music programme, while Manchester and Birmingham showed that music performances in those districts are very rare – with only one venue

with music programme per ten km and one over five km of streets respectively. It is interesting to note that despite *Pubs* and *Restaurants* clusters being located both in the city centre of Manchester, the latter has around fifteen times less venues with music per km than the former. These results show that music and entertainment offers are not evenly distributed across NTE districts. This can have a determinant impact on how - and by who - those areas are experienced.

Chairs and tables outside

Drawing from Jacobs (1961) theory of the eyes on the streets, the presence of chairs and tables outside of venues were observed as they can potentially provide increased street guardianship in NTE districts. It was also posited that increasing the area of consumption outside of venues might have a beneficial impact on preventing overcrowding and frustration inside of the venue, which might lead to less violent incidents around the premises.

Traditional pubs' benches and tables as well as restaurants and more stylish cocktail bar's *dehors* were taken into account. In the picture below, an example of the *dehors* observed using google street views is displayed (Figure 4.5).
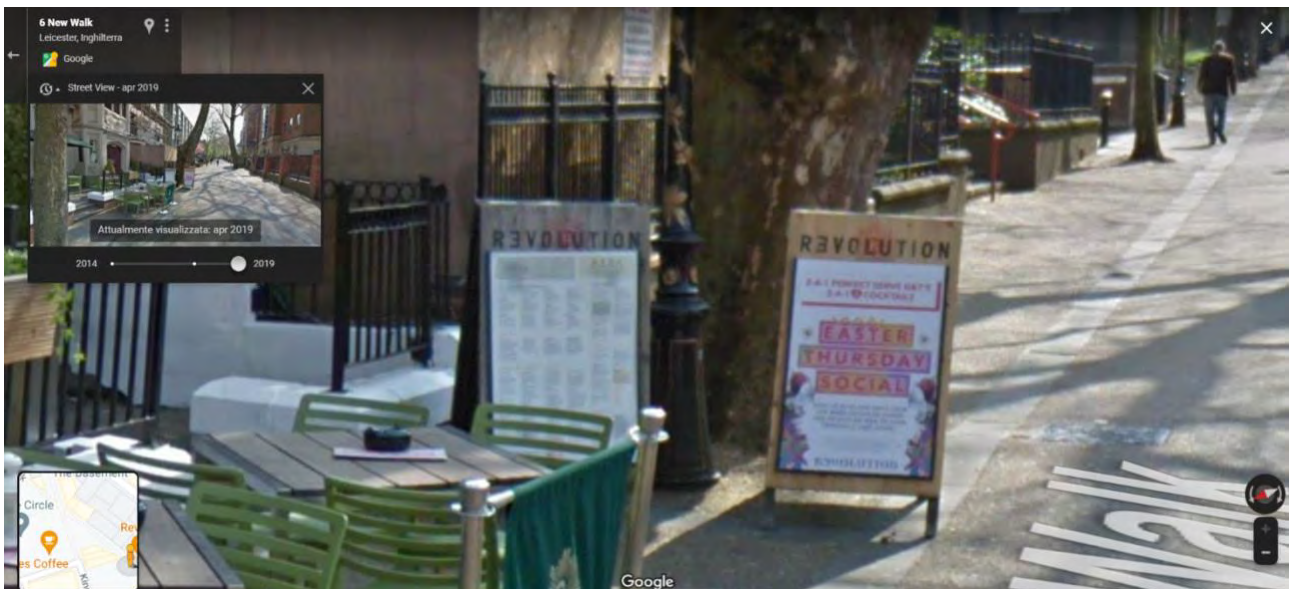
Figure 4.5: Image of a tables and chairs outside of a bar.

The average density of venues with chairs and tables outside was definitely higher than venues with any type of entertainment or music offer across all the cities (Table 4.15).

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs	3.91	3.23	5.30	4.00	1.65	2.55	3.44
Restaurants	3.3	3.6	9.3	4.6	1.9	2.7	4.24
Fast Foods	2.6	3.6	1.5	2.9	3.1	1.6	2.55

Table 4.15: Density of venues with chairs and tables outside in NTE districts. *Note: the values show the number of observations per km of street in NTE districts.*

Understandably, *Restaurants* districts had the highest density of tables outside of venues, with Leicester's clusters with an average of 9 venues per km. On the other hand, Leichester's *Fast Food* clusters showed the lowest density of chairs and tables outside, which is in line with the overall lower average (2.5 per km) found in the category. Bristol showed more inter-clusters homogeneity with density of chairs and tables outside ranging from 3.2 to 3.6 across the different districts.

Venue policy

The venue policy variable originally was meant to include any sign informing visitors about any rule, restriction, code of conduct to be followed by entering the venue. These generally include messages promoting a safer consumption of alcohol, encouraging respectful behaviour to prevent noise, enforcing age restrictions or any signage communicating identification requirements for all alcoholic purchases (Cozens & Grieve, 2014). However, very few signs were visible from outside the venues observed (Figure 4.6).
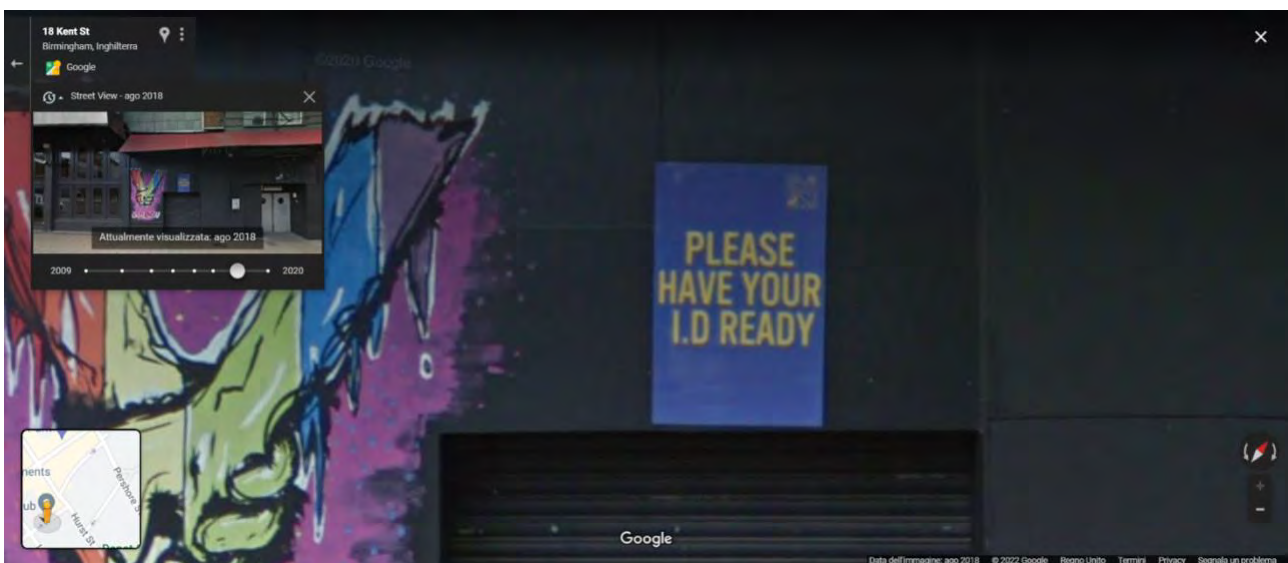
Figure 4.6: Image of one of the few venue policy signs observed.

In most cases, the observer could notice the presence of signs outside the premises, however the text was often blurry, leading to possible misrepresentation. Therefore, the venue policy variable was removed from the observations. What is worth noting about this absence is that, despite serving alcohol to underage patrons is forbidden by the law and harm reduction communication is encouraged by licensing authorities, the actual adoption of these approaches is still residual in NTE districts. Indeed, those types of messages do not have a central role in NTE venues' strategies to attract visitors. On the other hand, literature about the impact of these messages on visitors is still limited, making it hard to justify policies requiring the adoption of such practice.

Disorder

Perceived neighbourhood disorder refers to visible cues indicating a lack of social control and physical maintenance and upkeep in urban areas. Physical disorder refers to the overall chaotic physical appearance of a neighbourhood. Previous literature has associated physical disorder with noisy, dirty, and run-down neighbourhoods, with buildings in disrepair or abandoned and where vandalism and graffiti are common (Welsh & Farrington, 2012). Social disorder generally accounts for those social interaction which are considered signs of incivility and decency, like prostitution, drug dealing and the presence of homeless and shelters in the streets.

This study has taken into account several elements that could be observed with high accuracy through Google Street View images. The results show that disorder distributes unevenly among different types of clusters and will be discussed below. However, even though previous studies have concluded that Google Street View can be reliably used as a virtual audit tool for assessing certain physical disorder, small-scale observations, like the condition of the sidewalks, cigarette butts, people drinking in the street, prostitution and other characteristics, could not be observed (Vandeviver, 2014).

Graffiti

Tag graffiti, creative works, stencil art, unlawful sprayings on public or private property, and murals on legally designated walls are just a few examples of many different types of graffiti (Vanderveen & Van Eijk, 2016). Many municipal governments aim at preventing and removing graffiti in accordance with the broken windows theory, as signs of lack of maintenance have been generally linked with decreased guardianship and perception of safety (Snyder 2006; Uittenbogaard & Ceccato, 2014). However, discerning murals on legally designated walls from other forms of graffiti was not very straightforward from the analysis of Google Street View.

In previous research, scholars noted that the evaluation of the artistic attribute of graffiti is not simple, due to their interstitial nature (Vanderveen & Van Eijk, 2016). Positive evaluations are mostly connected to aesthetic qualities, while negative evaluations are connected to moral judgments, where some more elaborated pieces can be perceived as art while others as vandalism (Vanderveen & Van Eijk, 2016).
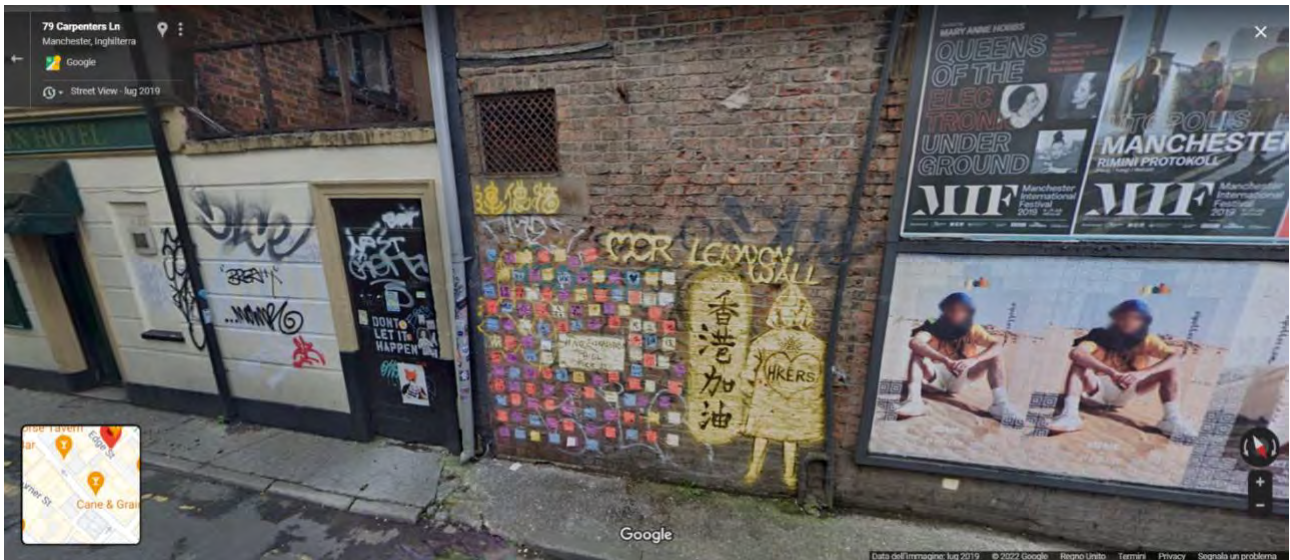
Figure 4.7: Image of Graffiti observed via Google Street View.

Street tags and graffiti of different size, shape and level of complexity were present in almost all types of NTE clusters, and they were recorded as graffiti (Figure 4.7). Manchester *Pubs'* clusters were the areas with the highest presence of graffiti (Table 4.16), which can be found on more than 80% of the streets, while Nottingham was the city with the lowest value – 0% in *Fast Foods* and 3% in *Pubs* districts. The average across the sample resides firmly around 40% of the streets in NTE districts.

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs (%)	50	68	59	81	3	33	43
Restaurants (%)	60	60	20	40	10	50	39
Fast Foods (%)	60	60	30	70	0	20	43

Table 4.16: Rate of streets with at least one sing of graffiti on the walls in NTE districts. *Note: the values show the percentage of streets where the characteristic was observed in NTE districts.*

Previous research has theorised that "graffiti breeds graffiti" (Rawlinson & Farrell, 2010, p.362), meaning that wherever graffiti starts to appear, it is likely that others will follow; other studies observed that people are more likely to litter an environment with tag graffiti on a wall, compared to a perfectly clean street.

Unhoused people

Unhoused people are generally understood as a socially excluded group consisting of non-migrant, vagrant, and otherwise outcast people (Anderson 2013). In Britain, England and Wales, albeit not Scotland, homelessness is regulated under the Vagrancy Act 1824, which lists vagabonds as arrestable people (Fitzpatrick & Jones, 2005). Dealing with the social disorder associated with homeless populations is a central concern of certain policing strategies following the broken window theory (Braga et al., 2014). However, Rowe and O'Connell (2010) criticised the application of this theoretical framework to the

homeless population, since this can result in policies more concerned with decorum than with improving homeless conditions and precarity. Through Google Street View it was possible to distinguish homeless people, mainly residing outside retail businesses and in public parks and squares. Interestingly, observations of unhoused persons were made in around 10% of the streets, predictably in those clusters overlapping with central areas where general footfall tends to be higher (Table 4.17). There was not much variation across the sample, despite some *Fast Foods* clusters presenting a high density of unhoused people while others - like in Nottingham and Oxford – not presenting any.

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs (%)	6	8	24	13	6	8	10
Restaurants (%)	10	10	30	10	10	10	12
Fast Foods (%)	20	20	0	10	0	0	7

Table 4.17: Rate of streets with at least one sing of unhoused people on the street in NTE districts. *Note: the values show the percentage of streets where the characteristic was observed in the NTE districts.*

Construction sites

Construction sites were taken into account as they can limit the eyes on the streets and the level of guardianship coming from residential and retail activities without scaffolding. They can also attract graffiti, littering and vandalism as they can generally offer opportunities for hiding and commit crime. For instance, studies have discussed property theft in construction sites in relation to machinery and other valuables, while no studies have researched the possible correlation between construction sites and violent crime. In the present study, results show that in NTE districts there is a large portion of streets with at least one construction site. For instance, construction sites can be found on average in around one in three streets within *Pubs* clusters (Table 4.18). Certain *Fast Foods clusters* on the other hand did not show any sign of scaffolding or construction activities.

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs (%)	40	31	24	37	32	17	30
Restaurants (%)	30	30	20	30	30	10	25
Fast Foods (%)	30	30	0	30	0	20	18

Table 4.18: Rate of streets with at least one construction site in NTE districts. *Note: the values show the percentage of streets where the characteristic was observed in the NTE districts.*

This variation and the high percentage of streets with construction sites in certain clusters can be explained by the localization of NTE districts. City centres tend to have a higher turnover of buildings economic use, e.g., changes of ownership, changes of economic activities, which can explain the need for a frequent change of the building's facades.

Unsupervised private parking lots

Unsupervised private parking lots have been found to be possible crime-attractor areas. Closed-off car parks are areas in which the lack of natural surveillance due to absence of shops, offices or frequent pedestrian, can lead to a lower level of guardianship. Previous research found for instance that these sites can be ideal areas for committing vehicle theft (Bromley & Thomas, 1997). At night, non surveilled parking lots can be perceived as unsafe, especially when they are isolated and without enough illumination. Google Street View made possible the recording of parking lots adjacent to sidewalks with any physical barrier or delimitation, like a gate or a sign, communicating the private nature of the parking area. Multi-storey underground car parks were not considered in the study as they were not visible from the street. Around 10% of the streets audited have a private parking lot adjacent to the sidewalk (Table 4.19), with Oxford having as much as 40%.

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs (%)	10	3	11	9	8	10	7
Restaurants (%)	10	0	10	0	10	40	10
Fast Foods (%)	10	10	0	10	0	20	6

Table 4.19: Rate of streets with at least one unsupervised private parking lot site in NTE districts. *Note: the values show the percentage of streets where the characteristic was observed in the NTE districts.*

Variation across the sample was not very high, indicating that all the types of clusters teen to have similar levels of private parking lots, despite being in different parts of the city.

Litter

Certain physical components such as vandalism, rubbish, or graffiti can be perceived as concerning factors directly affecting their perception of criminality and unsafety (Kelling & Wilson, 1982). Even when reported crimes are low, the presence of physical disorder or incivilities is linked to an increase in crime perception, and a greater fear of crime. Additionally, if problems are not addressed, locals may think that the collapse of their neighbourhood is worse than it actually is. Incivilities seem to function as an intermediary variable, with the presence of physical disorder causing residents to worry more about local crime and feel greater anxiety (Lewis and Maxfield, 1980; Skogan and Maxfield, 1981; Skogan, 1990).

Litter was found in more than half of the streets observed in several cities – Birmingham, Bristol, Leicester and Manchester – while in Leicester's *Fast Foods* area it was recorded in almost all (90%) the scrutinised Google Street View shots (Table 4.20).

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs (%)	44	45	37	57	6	30	31
Restaurants (%)	50	40	50	60	10	0	34
Fast Foods (%)	60	30	90	60	0	20	42

Table 4.20: Rate of streets with at least one unsupervised private parking lot site in NTE districts. *Note: the values show the percentage of streets where the characteristic was observed in the NTE districts.*

Oxford and Nottingham were the only cities with a central area almost devoid of litter, which can be indicative of a marked propension for maintaining a civil and clean public image.

Infrastructure and amenities

According to Nijkamp constructed infrastructure refers to all the "material public capital" (2000, p.88) that offers essential services and allows for connections in an urban ecosystem. Public works like roads, bridges, ports, airports, subways, and railways are examples of infrastructure capital. Other examples include community facilities like prisons, schools, parks, hospitals, and libraries. Utility buildings include those employed for gas and electricity, water supply and sewage, waste collection and disposal, as well as telephone, internet, and television technologies.

Infrastructure is generally expected not only to increase the liveability and vibrancy of an area, but also have an impact on crime and perception of safety. Indeed, previous literature has found factors like the presence of more public transports to be correlated with less crime (Garius, 2016).

Google Street View allowed the researcher to gather certain details about infrastructural elements of the urban environment, like the presence of benches and bus shelters with seating, bike racks, cycling lanes, public parks and squares. These elements are part of the infrastructural capital of urban areas as they can influence how people circulate, as well as the kind of activities encouraged and permitted in it. Regarding transportation infrastructure like bus stops with seating, Garius (2016) examined that bus shelters may also minimise overcrowding, which can be a precipitator of violence. Parks and public squares were also included in this category of variables, as they can have a central function in allowing groups of people to meet and socialise both during daytime and night-time. Squares also tend to be the venue for important public events or more seasonal manifestations like Christmas markets, which are very common in many countries across Europe and can shape how areas are perceived. Parks and public squares have been also found to be linked with perception of unsafety at night especially when they are not well-lit and left deserted (Newton et al., 2018).

Parks and squares

Parks or public squares can be found in most NTE districts, with the exception of *Fast Foods* clusters, which tend to be in areas with low to no parks and public squares in most cities. *Pubs* districts on the

other hand present a higher percentage of parks and squares, with an average of one in five streets facing either one of the two (Tables 4.21).

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs (%)	8	12	16	3	11	11	19
Restaurants (%)	10	10	30	20	10	10	15
Fast Foods (%)	0	10	0	0	10	0	3

Table 4.21: Rate of streets facing either a park or a public square in NTE districts. *Note: the values show the percentage of streets where the characteristic was observed in NTE districts.*

Parks and public squares can have opposite relationships to crime and perception of safety. Indeed, parks and open spaces can have a crucial impact on society's quality of life, as they allow for interactions between city users (Chiesura, 2004). However previous studies found that due to a lack of supervision at night, parks and public squares can also become crime attractants and generators. As already mentioned before, mixes of activities are crucial in this respect; for instance, reported crime rates were found lower in areas where parks have a more varied mix of activity generators (Newton, 2018), such as sports grounds and courts, being utilised for organised athletic events.

Public benches

Street furniture has a huge impact in the way people experience urban areas, both during their mandatory and optional activities (Chen et al., 2016). The existence of stationary activities creates high use and vitality in public open spaces. Not much variety was found across the sample, with the density of benches remaining almost constant on average in the different clusters. However, it is worth noting that benches at night have been observed as possible gathering points for young people drinking and some concerns have been expressed by scholars about the necessity to make these areas visible and not isolated to avoid illegal activities and possible crime hot dots (Mahadevia & Lathia, 2019).

Restaurants districts in Leicester were the ones with the highest availability of benches (Table 5.11), with half of the streets presenting at least one benched area.

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs (%)	25	24	29	4	29	28	23
Restaurants (%)	20	20	50	30	30	10	27
Fast Foods (%)	30	30	10	10	30	20	22

Table 4.22: Rate of streets with at least one public bench area in NTE districts. *Note: the values show the percentage of streets where the characteristic was observed in NTE districts.*

Benches have been observed on average in 25% of the streets, except in Manchester *Pubs* districts, were only 4% of the streets had public seatings. This might have an influence on the inclusivity nature of the area, as stationary activities would be mainly allowed by pubs, bars and restaurants while the rest of the

areas would probably be characterised by people flowing from one place to another. This context might impact both the level of guardianship outside of those venues allowing people to seat outside, as well as prevent those people who don't want to engage with NTE venues from experiencing the area.

Bus stops with seatings

Previous research has found that the design of urban bus stops aims at improving the waiting area of bus stops (Zhang, 2012). Other than walkability, also a supportive active transportation infrastructure for local residents can lead to a safer environment (Zhang, 2012).

Indeed, bus stops are a form of public capital which does not only impact passengers, but also the local community and the way how the nearby area is experienced. Furthermore, greater rider satisfaction and lower perceived waiting times can result from the presence of a more comfortable waiting area, thereby decreasing frustration in city users.

On the other hand, urban nodes with high density of public transports and, more generally, places with many bus stops, can show higher levels of crime (Brantingham & Brantingham, 2016; Weisburd et al., 2014; Ceccato & Uittenbogaard, 2014; Bernasco & Block, 2011), but as noted by Ceccato et al. (2013) this appears to be largely an effect of the number of people, at least with regards to the number of violent incidents.

The table below shows that the density of bus stops with seating is almost homogeneous across the sample (average between 14% to 20% of the streets), with the exception of Nottingham *Fast Foods* clusters, where almost half of the streets has at least one bus stop with a seating area (Table 4.23).

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs (%)	13	12	8	15	22	14	14
Restaurants (%)	20	10	10	10	20	10	13
Fast Foods (%)	20	30	10	10	40	10	20

Table 4.23: Rate of streets with at least one bus stop with seatings in NTE districts. *Note: the values show the percentage of streets where the characteristic was observed in NTE districts.*

Bike racks

Bike racks and cycling lanes are infrastructural elements which are becoming increasingly important in relation to urban planning, in order to foster more sustainable and liveable cities.

Previous studies highlighted how the presence of these elements can actually change how urban areas are experienced (Chen, Liu, & Sun, 2018). For instance, the lack of bike racks was found to be associated with undesired parking habits. Bicycles secured to streetlights, telephone poles, fences, and trees can lead to the decreased walkability of sidewalks where obstacles and/or damaged street furniture are present. This can also have an impact on frustration of people and provide an occasion for vandalism and physical disorder. Areas with more efficient cycling lanes and furniture can improve the perception of safety and of urban civility among the population (Simpson, 2017). The bike racks variable was considered as a

possible indicator of urban vitality, reduced illegal parking and increased footfall in urban areas.
From the present study results, is interesting to observe that, on average, almost one in two streets tend to have bike racks, with a peak of 67% of the streets in Oxford *Pubs* clusters and 70% in the *Fast Foods* districts in Bristol. On the other hand, Leicester clusters located outside of the city centre show the lowest density in the sample, with just 10% of the streets providing bike racks (Table 4.24).

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs (%)	27	50	40	29	22	67	39
Restaurants (%)	30	40	60	30	20	40	37
Fast Foods (%)	40	70	10	30	20	20	32

Table 4.23: Rate of streets with at least one bike racks area in NTE districts. *Note: the values show the percentage of streets where the characteristic was observed in NTE districts.*

Cycling lanes

Bike lanes are another urban element that can lead to an increase in cyclists and in reduced car traffic in urban areas (Parker et al., 2013). Car traffic is one of the main issues connected with noise pollution in night time districts, and can have a negative impact on the general quality of the area (Ottoz et al., 2023).

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	Mean
Pubs (%)	6	19	17	10	6	6	10
Restaurants (%)	10	30	10	10	0	90	24
Fast Foods (%)	10	40	0	10	0	40	16

Table 4.24: Rate of streets with a dedicated cycling lane in NTE districts. *Note: the values show the percentage of streets where the characteristic was observed in NTE districts.*

Restaurants clusters have a higher density of cycling lanes, with almost 25% of the streets having a dedicated lane for bicycles (Table 4.24). On the other hand, Nottingham *Restaurants* and *Fast Foods* clusters in the city centre as well as Leicester *Fast Foods* clusters don't show any sign of cycling lanes.

NTE businesses and corporate-owned venues

As outlined in Chapter 2, the NTE experienced a steady expansion since the end of the '80s, connected to the deep urban restructuring phenomena connected with the crisis of the model of the Fordist industrial city (Roberts & Eldridge, 2012). Researchers and policy makers championed the creation of cosmopolitan NTE districts following the examples of cities like Rome and Barcelona (Bianchini, 1995). More lively and inclusive areas at night would have beneficial effects not only on the regeneration of urban areas, but they would also prevent crime and anti-social behaviour (Bianchini, 1995). These beliefs resonated with the work of Jacobs (1961) who promoted the mixed use of public space, noting a higher number of activities can provide a more guardianship in urban areas, which can help boost a sense of security and

deter crime. However, many authors have linked the number and density of NTE venues - especially licensed venues - with a higher level of crime and anti-social behaviour (Babor, 2010). Furthermore, Taylor (2003) argues that a rise in the number of outsiders—i.e., people who don't reside in the neighbourhood—would also enhance anonymity on city streets, leading to a lack of the necessary bonds which are crucial for effective social guardianship. For these authors, NTE districts with high footfall and activities do not necessarily translate in less crime. The results of the present study highlight how the density of NTE venues is overall similar across different cities, as showed by the Table below (Table 4.25). However, some differences emerge as in certain areas - like in the *Restaurants* districts in Nottingham and Bristol - there is one pub or bar every 100 mt., while in other *Fast Foods* clusters the density of those venues decreases substantially (Table 4.25).

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	Mean
Pubs	7.12	6.8	6.6	8.7	9.6	7.2	7.66
Restaurants	4.1	10	6.7	5.7	10	9	7.6
Fast Foods	2.8	4.3	0	6.6	9.4	7.9	5.17

Table 4.25: Density of pubs and bars in NTE districts. *Note: the values show the number of NTE venues per km of street in NTE districts.*

In terms of restaurants, the Oxford *Restaurants* district has more than 10 restaurants per km, outperforming all the rest of the clusters and cities. Aside from Nottingham, the *Fast Foods* clusters are the areas where restaurants are less dense (Table 4.26).

District	Mean	Median	St Dev	Max	Min
Pubs	5.6	5.7	1.6	8.0	3.7
Restaurants	7.8	8	2	11	5
Fast Foods	4.7	4	2.9	10	2

Table 4.26: Density restaurants in NTE districts. *Note: the values show the number of NTE venues per km of street in NTE districts.*

Expectedly, fast foods activities are denser in the *Fast Foods* districts, with Leicester clusters showing around one fast food activity every 50 meters (Table 4.27). In the *Pubs* and *Restaurants* districts, on average fast foods tend to be 50% less frequent than in the *Fast Foods* clusters.

District	Mean	Median	St Dev	Max	Min
Pubs	4.9	4.9	0.9	6.1	3.7
Restaurants	4.7	4.6	1.2	6.3	3.2

Fast Foods	9.6	8.3	5.9	20	2.6

Table 4.27: Density of fast foods in NTE districts. *Note: the values show the number of NTE venues per km of street in NTE districts.*

Rate and density of corporate-owned venues

In 2003, Chatterton and Holland started questioning how the broad market dominance of a few players in the NTE arena has led to the commercialisation and homogenisation of night-time experiences (Chatterton & Hollands, 2003). They pointed out how corporate-owned venues thrive by maximising profit through the sale of alcohol and food, therefore developing strategies to encourage consumerism through cheap prices and aggressive marketing strategies (Chatterton & Hollands, 2003). On the other hand, alternative grassroots and residual venues which have a stronger focus on creative expression and niche products tend to suffer and remain in a more precarious state (Chatterton & Hollands, 2003). Among the different information contained in the PoI dataset, it is indicated the brand affiliation of each individual business. In this way it was possible for the researcher to filter those NTE venues that are part of larger brands - e.g. All Bar One, Wetherspoon, Burger King etc. - and analyse their distribution among the NTE districts. The presence of corporate-owned venues in NTE districts was therefore calculated as the rate of NTE venues which are owned by larger brands, and the number of branded venues per km of street (*Brand density*). The table below (Table 4.28) shows how the rate of branded venues across all the types of clusters which is worth some attention. Apart from the *Fast Foods* clusters in Leicester – located outside the city centre – the rest of the clusters have an average of 30% of corporate-owned NTE venues. The two peaks are found in Oxford's *Restaurants* clusters (50%) and in Nottingham *Fast Foods* clusters (54%).

This means that in those areas' half of NTE venues are not independent businesses, but are part of larger brands which can influence the type of offer to be found inside those premises as well as all the strategy behind the location of those venues. The average *Brand rate* in NTE clusters ranges from 30 to 38 per cent across the six cities, demonstrating an almost homogeneous trend in NTE ownership, indicating a very small variation across the samples (Table 4.16).

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs (%)	26	22	25	24	32	47	29
Restaurants (%)	38	25	46	36	33	51	38
Fast Foods (%)	36	47	14	21	54	29	34

Table 4.28: The rate of corporate-owned NTE venues in NTE districts. *Note: values show the percentages of corporate-owned venues over the total amount of venues of the same class.*

In terms of brand density, Oxford again seems to outperform the other cities, with around 17 venues per km of street in both *Restaurants* and *Pubs* clusters, while the average in the rest of the cities remains around 5.3 and 7.6 respectively (Table 4.29). *Fast Foods* clusters have a lower density of branded venues

on average, with the exception of Nottingham, where the *Fast Foods* clusters are in the city centre which confirms the propensity of brands to conglomerate where the footfall tends to be higher.

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	*Mean*
Pubs	5.6	4.2	4.5	5	7.4	12	6.4
Restaurants	5.7	6.3	10.7	7	8.5	16.7	9.1
Fast Foods	6.3	8.6	3	4	19	6.3	8

Table 4.29: The density of corporate-owned venues in NTE clusters. *Note: values are number of corporate-owned venues per km of street*

These results seem to confirm what Chatterton and Hollands (2003) were pointing out in terms of the homogenisation and commercialisation of the NTE. In Chapter 2, it has been observed that NTE companies tend to create sub-brands to diversify their offer. The top four pub brands in the UK own around 26% of the market which is fully mirrored by the results found in the analysis of the brand-composition of the NTE districts identified in this study. The concentration of NTE activities in a small number of big brands does not seem to reverse, as demonstrate by the recent acquisition of the Ei Group by the Stonegate group which has become the biggest player in the pub market owning around 4,500 pubs of the total 47,200 pubs present in the UK (Stonegate, 2022).

The consolidation of these mega groups raises many questions about fair competition, political advocacy, and the availability of space for other types of activities. The Stonegate group's official website for instance states that "Stonegate is the largest operator of late-night venues in the UK. Our venues format contains everything from LGBT+ bars to Latin venues, themed retro bars, and huge iconic nightclubs" (Stonegate, 2022).

Another mega group, the Mitchells & Butlers plc, owns seventeen sub-brands NTE venues which offer different types of products – food, drinks – and atmospheres (Mitchells & Butlers, 2021).

The approaches used by these large groups of NTE activities, might offer the illusion of a balanced and inclusive diversity, with sometimes great value/price offers and uniformed standards of quality and service. However, the liminal potential of grassroots and independently owned night experiences and cultures are likely to be sacrificed in the current scenario. It remains to be established what kind of outcomes will emerge from the apparent heterogeneity led by this concentration of capital into a few large brands.

Retail

In the UK the consolidation of retail-focused high streets went hand in hand with the repopulation of city centres after the industrial crisis of the early '80s, justified by the assumption that more vibrant city centres will also prevent crime and foster the local economy (Schmidt, 2011). Indeed, existing literature has explored the relationship between the presence of retail activities and trends of violent crime, proving

that above certain thresholds, increasing commercial and residential density serves to diminish the likelihood of violent assaults (Bowes, 2007). Other researchers (Perkins et al., 1993) also pointed that neighbourhoods perceived as unsafe will also be unattractive for retail development.

In the present study, the PoI data was manipulated to extract the list of economic activities which fall under the *Retail* class, to explore the distribution of retail activities among the NTE districts. The retail density in NTE clusters was then calculated dividing the number of retail businesses by the length of the streets in each cluster (Table 4.30).

District	Birmingham	Bristol	Leicester	Manchester	Nottingham	Oxford	Mean
Pubs	21	9	22	25	29	47	26
Restaurants	26	10	43	28	31	37	30
Fast Foods	37	44	16	22	67	36	37

Table 4.30: Density of retail activities in NTE districts. *Note: the values show the number of retail businesses per km of street.*

Interestingly, some cities show a remarkably lower retail density compared to the average, with Bristol *Pubs* districts having less than 10 shops per km against the average of more than 20 in the rest of the cities. On the other hand, Oxford has the densest retailing area, with almost 50 shops per km in the *Pubs* clusters. Moreover, the *Fast Foods* clusters in Nottingham and Bristol have a very high amount of retail activities compared to the rest of their clusters, showing a high level of inter-cluster variation within the same city. Despite in Nottingham all the clusters overlap with each other by a significant portion of their areas, the density goes from 67 shops per km in *Fast Foods* down to 29 per km in the *Pubs* clusters. These different densities of retail activities might influence the trends relating to violent victimisation and perception of safety at night in relation to NTE districts in two possible ways: on one hand, a higher density of retail shops might increase the footfall in the daytime and early evening hours, therefore reducing the opportunity and conditions for violent assaults. On the other hand, a high retail density might leave the area more deserted at night, and increase its anonymity, therefore reducing the potential guardianship in public areas.

5 Results and Discussion: Violent victimisation and perception of safety at night

To address the Aim Two of the research, the data extracted and manipulated from the CSEW was employed. The variables related to completed and threatened assaults have been combined to filter only incidents that happened at night and within fifteen minutes walking distance from the respondents' household. In this way, a variable containing the number of CSEW respondents for each MSOA who were victims of violent incidents at night was created. Since violence is not a frequent event (Garius, 2016) and given that the average number of respondents per MSOA for every sweep of the CSEW is around 30 people, different CSEW sweeps (2012-2019) were merged to obtain a number of NTE violent victimisation cases sufficient

for the analysis.

Furthermore, the environmental and routine activity frameworks act synergically in trying to explain complex interactions between persons-situations which can translate into opportunities for crime (Cohen & Felson, 1979). Environmental criminology stresses the fact that "the immediate environment is not just a passive backdrop" but rather "it plays a fundamental role in initiating the crime and shaping its course" (Wortley & Townsley, 2017, p. 2). Routine activity approaches focus on the everyday movements of offenders and non-offenders and try to identify paths and nodes which are able to increase the opportunity for crime (Sampson & Lauritsen, 1990). A key part of the routine activity framework is the concept of lifestyle, as the complex combination of behaviours, symbolic values and choices that express an individual's identity (Wilska, 2002). Lifestyle is intertwined with several demographic factors like age and sex, as well as the socio-economic environment of certain areas and their level of deprivation. It can be said that routine activities and characteristics of the urban environment are not completely separated, and they tend to influence and interact with each other. Indeed, infrastructural elements, and different combinations of specific activity generators can influence the kind of habits and lifestyles that will be performed in such areas, or at least have an impact on the desirability for people to live in close proximity with those activities.

Descriptive-level analysis has been employed in Chapter 4 to present the location and the characteristics of NTE districts across the six cities considered. Regression analysis is adopted at the next stage of the research to test the interaction between those environmental characteristics and the level of violence and perception of safety at night. Parallely, the researcher aims to explore the possible impact of the demographic and the routine activities of the population on the same social phenomena.

Therefore, different steps will be taken to identify the independent explanatory power of environmental, socio-economic and routine activity features when predicting the risk of night-time assault victimisation and perception of safety at night. The current chapter uses partial correlation analysis and multivariate modelling techniques to identify which of the available environmental, socio-economic, and routine activity characteristics are significant, independent predictors of violent victimisation and perception of safety at night. Model-fit statistics will therefore test three central theoretical questions which examine the application of environmental criminology and routine activity frameworks to NTE violent victimisation and perception of safety at night:

- whether the presence of NTE districts can influence violence and perception of safety at night in nearby urban areas (MSOAs);
- whether environmental, demographic and routine activity characteristics independently influence violence in nearby urban areas (MSOAs);
- whether environmental, demographic and routine activity characteristics independently influence the perception of safety at night in nearby urban areas (MSOAs).

This analysis was performed through two stages:

1) Stage I analysed the possible correlation between violent victimisation and perception of safety at night in the entire MSOA sample. This was conducted first to test if by simply overlapping with NTE districts MSOA areas showed any increased level of violent victimisation incidents and people perceiving safe at night. At this stage only the demographic and routine activities characteristics of MSOAs were taken into account as they were the only variables available for the entire MSOAs sample. This stage involved a first set of partial correlations between individual predictors and the dependent variables. Then multiple regression models were constructed to explore the effect of independent variables when grouped together (routine activities and demographic in two separate models), after having considered eventual multicollinearity.

2) Stage II explored the possible correlation between environmental, demographic and routine activity characteristics with violent victimisation and perception of safety at night in the NTE-MSOAs. Therefore, only the MSOAs overlapping with NTE districts were taken into consideration, as the observations using Google Street View only concerned the NTE districts. As for Stage I, the analysis was split into two phases: a set of partial correlation models was used to explore the correlation of each individual independent variable with violent victimisation and perception of safety at night. Then, a set of multiple regression models explored the relationship with the Block of variables within the same information level (e.g., venue-level characteristics, infrastructure characteristics, disorder, demographic and routine activities in separate multiple models) and the dependent variables. Here multicollinearity among each Block of variables is tested to avoid misinterpretation of the results.

5.1 Stage I: Proximity with NTE districts, violent victimisation and perception of safety at night

To address question number 4 - i.e. *"Does proximity with NTE districts influence the level of violence and perception of safety at night in urban areas?"* - the dummy variable (*NTE_Any*), indicating the presence of overlapping between MSOA areas and NTE districts, was used as a possible explanatory variable for violent victimisation and perception of safety at night. Indeed, previous studies have found correlation between being close to areas where NTE venues are more concentrated and a higher number of night-time violent victimisation (Babor, 2010). On the other hand, perception of safety at night might increase in those areas which are more active at night. As Roberts (2006) and Jacobs (1961) pointed out, emptiness of streets might be the factor that can make people avoid and fear certain areas. The MSOAs which overlap with NTE districts (*NTE_Any* = 1) are therefore expected to show an impact on the number of violent victimisation and of people feeling safe at night.

The results emerging from the descriptive analysis show that violence at night effects on average around 7% of the respondents and that some MSOAs are more criminogenic (Max=50%) than others (table 5.1). In terms of perception of safety, around 62% of people feel safe while walking alone after dark in their neighbourhoods. Certain neighbourhoods are perceived as safer than others, even though results related to

maximum and minimum values might be influenced by the small size of the sample of the respondents in certain MSOAs.

Variable	Mean	Median	Standard Deviation	Max	Min
Violent victimisation at night (%)	7	0	10	50	0
Perception of safety at night (%)	62	63	28	100	0

Table 5.1: Descriptive analysis of violent victimisation incidents and perception of safety at night. *Note: the values show the rate of incidents and the rate of people perceiving safe at night in the CSEW sample .*

Across the total sample of 472 MSOAs, the demographic and routine activity characteristics of the population were also explored. It is interesting to notice that while around 20% of MSOAs respondents is aged under 30 years old (Table 5.2), there are exceptions where there was not any respondent aged under 30 years old, while in another area almost all the respondents (95%) were less than thirty years old. The findings about alcohol consumption habits are also noteworthy, as in one MSOA almost 50% of the population interviewed declared to drink at least three to four times a week, while in other areas the percentage was close to 0 (Table 5.2). Also visiting nightclubs and pubs is a habit that varies quite remarkably over the MSOA sample, as in certain areas almost half of the respondents go frequently to nightclubs while the average percentage is 2%. Going frequently to pubs has the same mean and median across the sample (19% of respondents), with peaks in certain MSOAs (>69%) and 0 frequent pub goers in others.

Variable	Mean	Median	Standard Deviation	Max	Min
Nightclub visit (%)	2	0	4	46	0
Pub visit (%)	19	19	11	68	0
Under 30 (%)	19	1	13	95	0
Alcohol (%)	13	12	9	50	0
Male (%)	46	47	11	1	13

Table 5.2: Demographic and routine activity descriptive analysis. *Note: the values show the percentage of the CSEW respondents' sample.*

The correlation between proximity and violent victimisation at night in the entire MSOA sample

To explore the correlation between proximity to NTE districts and violent victimisation at night the data sample was explored to decide which kind of model would better fit the data.

Therefore, the linearity test was conducted in the software *R* using the *Global Validation of Linear Models Assumptions* function. The function was used to test the relationship between the dependent variable (i.e., the number of violent victimisations at night) and the variable *NTE_Any,* and whether it was possible to use a

OLS model. The results show that four out of five assumptions were not satisfied (Table 5.3), therefore the Ordinary Least Squared model was discarded.

	Value	p-value	Decision
Global Stat	3.883e+02	< 0.001	Assumptions not satisfied
Skewness	2.169e+02	< 0.001	Assumptions not satisfied
Kurtosis	1.669e+02	< 0.001	Assumptions not satisfied
Link Function	-7.931e-13	1	Assumptions acceptable.
Heteroscedasticity	4.549e+00	0.03	Assumptions not satisfied

Table 5.3: Results from the Global Validation of Linear Models Assumption test.

To test the assumption that the distribution of the count of violent victimisation incidents at night across the MSOAs sample is over-dispersed and has an excess of zeros, the *score test for zero inflation function* in the *R* software was used. The results for the number of violent victimisation incidents at night (Chi-square = 8.36985, p-value: 0.003815) show that the excess of observed zeros is statistically significant (*p-value* < 0.05) and therefore a Zero-Inflated regression models might be preferable. Following previous research focused on crime data with an excess of zero and overdispersion (Sherman et al., 1989; Barr & Pease, 1990; Braga et al., 2014), Zero-Inflated Poisson and Zero-Inflated Negative Binomial distributions were compared using the *AIC test* on the *R* software to select the model with the best fit; the Zero-Inflated Poisson distribution performed better compared to the Zero-Inflated Negative-Binomial model (AIC = 884.7 vs. AIC = 886.6 respectively).

Therefore, the *zeroinfl* package with Poisson distribution was used in *R* software to perform Zero-Inflated Poisson regression. Partial correlation analysis was employed to explore the correlation between violent victimisation at night and each independent variable available at the MSOA level (Model I). The variables used as control were the number of the CSEW respondents (*CSEW_resp*) and the Index of Multiple Deprivation (IMD).

In Model I overlapping with NTE districts (*NTE_Any = 1*) is not found to be positively correlated with the amount of episodes of violent victimisation at night (Table 5.4). This seems to question the concerns around NTE districts, and the negative impact of living close to areas where NTE venues are clustered (Babor, 2010). When exploring the other possible independent predictors, the amount of people aged under 30 years old was found to have a significant positive correlation with the number of violent incidents. Indeed, this supports previous findings which link young people with increased violent incidents at night (Quigley et al., 2003).

Expectedly the IMD variable has a negative correlation with the dependent variable, demonstrating that the least deprived areas (higher quintiles) tend to have fewer numbers of violent incidents at night. Indeed, living in socially deprived areas with high levels of offences in the surroundings has been seen to increase the risk of being victim to different crime types (Sampson & Lauritsen. 1990).

	Model I (partial correlations)			
Variable	β	SE	p-value	AIC
NTE_Any	0.36	0.24	0.13	869
Under30	**0.05**	**0.024**	**0.04****	869
Male population	0.016	0.02	0.46	868
Nightclub_visits	0.001	0.06	0.98	871
Pub_visits	0.027	0.019	0.17	868
Alcohol	0.03	0.03	0.32	866
IMD	**-0.24**	**0.05**	**< 0.001 *****	867

Table 5.4: Regression Analysis results Association between violent victimisation and overlapping with NTE districts, controlled for demographic, routine activity and IMD. *p < 0.1; **p < 0.05; *** p < 0.01.

Model II involved the inclusion of the two blocks of variables - respectively the demographic characteristics Block and routine activities Block - in two separate multiple models. In this way, possible interactions between variables within the same information Block level might help better explain the correlation between overlapping with NTE districts and violent victimisation at night. There was no multicollinearity among the independent variables.

Interestingly, in the results of the multiple regression model considering the demographic characteristics together (Table 5.5), only the IMD remains negatively correlated with violent victimisation at night. However, when considering the routine activities, overlapping with NTE districts becomes positively and significantly correlated with night-time violent victimisation alongside alcohol consumption (Table 5.5). Therefore, while in Model I only the number of people aged under 30 and the IMD showed significant correlation – the final multiple models partly reversed those results, showing significance correlations in relation to some of the routine activity characteristics of the CSEW respondents and the overlapping with NTE districts.

	Model II (multiple regressions)			
Variable	β	SE	p-value	AIC
NTE_Any	0.283	0.24	0.25	
Under30	0.02	0.019	0.2	863
Sex	0.02	0.021	0.3	
IMD	**-0.21**	**0.05**	**<0.001*****	
NTE_Any	**0.46**	**0.23**	**0.04****	
Nightclub_visits	**-0.13**	**0.07**	**0.09***	
Pub_visits	0.03	0.02	0.13	859
Alcohol	**0.08**	**0.03**	**0.03 ****	
IMD	**-0.33**	**0.06**	**< 0.001 *****	

Table 5.5: Results from the multiple regression models with the two blocks of the independent. *p < 0.1; **p < 0.05; *** p < 0.01.

These results can have different explanations. Drinking more often might expose people to riskier behaviour or higher vulnerability, which can lead to an increased number of violent victimisations at night. On the other hand, a higher number of people who drink more frequently can increase the number of potential offenders, as previous research confirms (Tseloni & Ganpat, 2015). This is aligned with previous findings which outline the importance of having active policies aimed at reducing the frequency as well as the volume of alcohol consumption among the population (Sanchez-Ramirez & Voaklander, 2018). Nightclub visits have a negative effect on violent victimisation, which is not unanimously supported by the existing literature. Some authors have pointed out how more entertained patrons can be less frustrated (Homel & Tomsen, 1993), while others have highlighted how increased sexual competitiveness on the dancefloor can be one of the main causes behind more violent crime (Quingley, 2003; Homel et al., 1992; Graham et al., 1980; Homel & Clark, 1994).

Finally, the proximity between MSOAs and NTE districts becomes a significant predictor for a higher number of violent incidents in the multiple model considering the routine activity Block. This seems to support the idea that NTE districts can have a negative impact on nearby areas, when certain drinking habits are considered. The presence of a higher number of venues which encourage a heavy drinking habits among their visitors, might be one of the explanations of these results. Previous research has found correlation between certain types of NTE venues and the amount of alcohol consumed among patrons and the manifestation of violent and anti-social behaviour (Graham et al., 2012).

The outputs of the analysis conducted using the weighted characteristics of NTE districts in the Stage II might help better explain these results.

The correlation between proximity and perception of safety at night in the entire MSOA sample

To test whether the presence of NTE districts can impact the perception of safety of nearby urban areas, the variable containing the number of people feeling safe at night has been employed as the dependent variable in the following statistical models. Tthe variables *NTE_Any* was used alongside demographic, routine activity characteristics and the IMD of the MSOAs as possible predictors (independent variables). The variables used as control were the number of the CSEW respondents (*CSEW_resp*) and the Index of Multiple Deprivation (IMD).

Following the same steps of the previous section, linearity and overdispersion were tested to analyse whether a OLS model would fit the perception of safety variable distribution. The *Global Validation for Linear Model Assumptions* function performed in the *R* software returned all acceptable values, therefore supporting the decision to use an OLS model to fit the perception of safety at night distribution (Table 5.6).

	Value	p-value	Decision
Global Stat	2.1	0.71	Assumptions acceptable
Skewness	0.5	0.46	Assumptions acceptable
Kurtosis	1	0.31	Assumptions acceptable
Link Function	0.43	0.51	Assumptions acceptable
Heteroscedasticity	0.12	0.73	Assumptions acceptable

Table 5.6: Results of the Global Validation for Linear Model Assumption.

The model used for the perception of safety was the *lm* package in *R*, which allows to fit linear models. *Lm* stands for *linear model* and can be used to carry out regression, single stratum analysis of variance, and analysis of covariance.

In the partial correlations (Model I) only frequent pub visitations and the IMD were found to be positively and significantly correlated with increased perception of safety at night in urban areas (Table 5.7). Living in a less deprived area increased the sense of safety at night, while in those areas where more people go to pubs at least once a week perception of safety tends to be higher. On the other hand, living in an area close to a NTE district does not change the sense of safety at night among the respondents of the CSEW.

	Model I (partial correlations)			
Variable	**β**	**SE**	**p-value**	**AIC**
NTE_Any	0.38	0.37	0.3	2096.7
Under30	-0.01	0.03	0.7	2097
Male_population	0.03	0.03	0.3	2096
Pub_visits	**0.07**	**0.03**	**0.03****	**2092**
Nightclub visits	-0.03	0.09	0.8	2097
Alcohol	0.05	0.05	0.27	2096
IMD	**0.5**	**0.07**	**< 0.001*****	2095

Table 5.7: Results of the partial correlation analysis of perception of safety at night. Note: *p < 0.1; **p < 0.05; *** p < 0.01.

Interestingly, when testing the routine activity variables together in multiple regression model (Model II), both the variables related to pubs and nightclubs visits become significant (Table 5.8). The amount of people going frequently to pubs remain positively associated with an increased sense of security, while a higher number of people going to nightclubs shows a negative β coefficient.

	Model II (multiple regressions)			
Variable	**β**	**SE**	**p-value**	**AIC**
NTE_Any	0.47	0.4	0.23	
Under30	-0.02	0.03	0.39	2098
Male	0.04	0.04	0.31	
IMD	**0.47**	**0.07**	**< 0.001*****	
NTE_Any	0.39	0.37	0.3	
Nightclub_visits	**-0.17**	**0.1**	**0.09***	
Pub_visits	**0.1**	**0.04**	**0.02****	2094
Alcohol	0.005	0.05	0.9	
IMD	**0.38**	**0.08**	**< 0.001*****	

Table 5.8: Results of the multiple regression analysis of the correlation between perception of safety and overlapping with NTE districts. *p < 0.1; **p < 0.05; *** p < 0.01.

This might support the idea that certain NTE activities and habits might actually have a positive influence on how urban areas are perceived. Jacobs (1961) argued that the presence of eyes on the streets was one of the key components to ensure people's safety in urban areas. A lively and vibrant NTE district might create a sense of security in those people living in the area, as previously argued by several authors. For instance, Roberts and Eldridge (2012, p.16) argued that "city at night may be avoided, not because of the drunken crowd, but because of the barrenness and lack of sociality". On the other hand, a higher number of people visiting nightclubs seems to have a negative impact on how the area is perceived. This result does not have a

straightforward explanation and more research should be conducted to interpret these results. In previous research authors have pointed out how certain music genres influence what kind of people visits certain nightclubs and might be correlated with certain issues, like violence or anti-social behaviour (Homel et al., 1997; Forsyth, 2006). Other research has found that going to nightclubs can increase the chance for victimisation (Tseloni & Ganpat, 2015). However, how these aspects can be correlated to how people perceive urban areas is not straightforward, and conclusions should be taken cautiously.

On the other hand, the results do not show any correlation between perception of safety and living in proximity to NTE districts.

Expectedly, the IMD was positively associated with perception of safety in both models. This indicates that a less deprived area tends to be perceived as safer at night, aligning with the findings of other authors regarding fear of crime and deprivation levels in neighbourhoods (Kelling & Wilson, 1982).

In the next sections, the results of the Stage II will outline the main findings in relation to the correlation between the environmental characteristics observed in NTE districts and night-time violent victimisation and perception of safety. Here, the study engages only with those MSOAs which overlap with the NTE districts identified, and explore the effect of environmental characteristics observed on the dependent variables considered. From the total 472 MSOA sample, the researcher filtered only those areas identified through the variable *NTE_Any = 1*. The resulting sub sample of MSOAs overlapping with NTE districts (NTE-MSOAs) was composed by 39 MSOAs across the six cities.

5.2 Stage II: violent victimisation and perception of safety at night in NTE-MSOAs

Stage I analysed how urban areas experience different trend of violent victimisation and perception of safety at night depending on their proximity to NTE districts. In Stage II the results of the analysis will show whether the characteristics of NTE clusters can impact violent victimisation and perception of safety at night in NTE-MSOA areas.

First, descriptive analysis was conducted to explore the distribution of violent victimisation, perception of safety at night, demographic and routine activity characteristics of the 39 NTE-MSOAs considered. The rate of violent victimisation at night shows similar values compared to those of the entire MSOA sample (Table 5.8). Perception of safety at night remains quite similar compared to Stage I, with a majority of people feeling secure at night in their neighbourhoods (62% on average).

Variable	Mean	Median	Standard Deviation	Max	Min
Violent victimisation at night (%)	2	0	3	11	0
Perception of safety at night (%)	62	63	27	100	0

Table 5.8: Descriptive statistics of violent victimisation and perception of safety at night in NTE MSOAs.

Note: the values show the rates of the CSEW respondents

In terms of demographic characteristics, the male population is symmetrically distributed with an average 46% of male respondents across the sample close to the median value which is 47% (Table 5.9). The rate of respondents aged under 30 years old ranges from 10% to 75% of the respondents, and shows an average of 38% of people across the sample. Again, the median value is close to the mean as it differs by only 4%. The rate of people frequently visiting nightclubs remains on average four time lower than the rate of frequent pub goers across the NTE-MSOAs (Table 5.9). Interestingly there are no MSOAs without any respondents aged under 30 years old and the average percentage of people frequently consuming alcohol is slightly smaller than the mean value found in the total MSOA sample. By comparing these results with the outcome of the descriptive analysis of the entire MSOA sample, it is also interesting to point out that the MSOA with the highest rate of respondents frequently attending pubs and nightclubs were found in the MSOAs which do not overlap with NTE districts (Table 5.2).

Variable	Mean	Median	Standard Deviation	Max	Min
Nightclub visits (%)	5	3	6	33	0
Pub visits (%)	22	2	14	52	0
Under 30 (%)	38	34	18	75	10
Alcohol consumption (%)	11	10	8	35	0
Male population (%)	46	47	11	100	13

Table 5.9: Descriptive statistics of the demographic and routine activity characteristics in NTE MSOAs. *Note: the values in the table indicate the rates of the CSEW respondents.*

Testing for zero-inflation and linearity considering the violent victimisation at night variable

The *Global Validation for Linear Model Assumptions (gvlma test)* package in *R* software was performed to check whether an OLS model could fit the data distribution. The test shows that for the two first parameters the assumptions are not satisfied, therefore the OLS model cannot properly fit the distribution of violent victimisation at night data in the NTE-MSOAs sample (Table 5.10).

	Value	p-value	Decision
Global Stat	11.92	0.02	Assumptions not satisfied.
Skewness	8.29	0.004	Assumptions not satisfied.
Kurtosis	0.48	0.5	Assumptions acceptable.
Link Function	1.62	0.2	Assumptions acceptable.
Heteroscedasticity	1.53	0.2	Assumptions acceptable.

Table 5.10: Results of the Global Validation for Linear Model Assumptions test.

The *score test for zero inflation function* package in *R* has been used to test the presence the excess of 0s in the distribution of the count of violent victimisation at night in the NTE-MSOA sample. The outputs showed that the excess in the number of zeros is statistically significant (Chi-square = 3.47, p-value: 0.052).

After having considered the distribution of the count of violent victimisation at night in the dataset, the *AIC test* package in the *R* software was employed to select the regression model with the best fit. The Zero-Inflated Poisson distribution performed better compared to the Zero-Inflated Negative-Binomial model (AIC = 82.8 vs. AIC = 84.8 respectively). Therefore, the function *zeroinfl* on the *R* software was used to perform Zero-Inflated Poisson regression using the NTE-MSOA sample.

The correlation between environmental characteristics and violent victimisation at night in NTE-MSOAS

To address question number 5, *" What are the main environmental factors, demographic and routine activity characteristics of NTE districts that can impact violence at night in urban areas?"* the analysis followed a two steps process. First a set of partial correlation analysis was performed to explore the possible correlation between each independent variable and violent victimisation, controlled for the IMD and the number of CSEW respondents. Here all the weighted environmental characteristics, the demographic and routine activity variables are considered.

The results from the partial correlation analysis show that, among the venue-level characteristics, only the variable concerning the presence of chairs and tables outside is significantly and positively correlated with violent victimisation at night (Table 5.11). Indeed, the presence of chairs and tables outside of venues might have a dichotomous effect. On one hand it can increase the efficacy of public guardianship, by making streets more crowded; on the other hand, they can lead to overcrowding, noise and frustration which can create tension among visitors and passers-by.

Model I also showed that the presence of unhoused people positively and significantly correlates with higher violent victimisation at night. This result does not find any link with previous literature studying violent crime at night.

Interestingly, the partial correlation analysis also found that also the variable related to the presence of squares and parks predicts a higher number of violent victimisations at night, even though the *p-value* is not very close to the 0.05 significant threshold (Table 5.11). Existing literature has found that public squares, parks and benches can have contrasting effects on the activities present in an area. While during the day people can use these spaces for several reasons, like walking, having lunch, contemplation or resting, at night the fruition of these same public areas can change depending on other environmental factors and characteristics of the neighbourhood (Newton, 2018). For instance, parks with a diverse mix of activity generators, like sport facilities, can show lower levels of criminality compared to those left empty, which can offer opportunities for crime and be perceived as risky locations (Melbourne Parks, 1983; Grahn, 1985; Bixler and Floyd, 1997).

The results of the partial correlation analysis in Model I show also that the density of corporate-owned venues has a significant impact on violent victimisation at night. Furthermore, the density of individual venues and retail activities did not show any correlation either (Table 5.11).

| Variable | Model I (partial correlations) | | | |
	β	SE	p-value	AIC
Music	2.8	4.8	0.56	76.4
Drink_promo	1.5	1.6	0.36	80.1
Entertainment	3	3.1	0.33	77.7
Chairs_outside	**1.01**	**0.6**	**0.096 ***	**76.2**
Construction	5.4	9.4	0.57	78.3
Graffiti	2.2	4.7	0.63	78.7
Litter	2.3	5.5	0.68	79
Parking	24.3	24.8	0.32	85.6
Unhoused_people	**27.8**	**16.2**	**0.09 ***	**80.4**
Bus_seating	4.3	18.4	0.83	79.4
Square_park	**3**	**1.75**	**0.08 ***	**81**
Bench	11.1	9.5	0.24	75.2
Bike_racks	8.7	8.7	0.31	76.8
Cycling_lane	22	26.2	0.4	77
Retail	0.09	0.09	0.35	80.1
Brand	0.35	0.44	0.43	75.6
Pubs	0.5	0.48	0.27	77.3
Restaurants	0.6	0.51	0.26	79.6
Fast foods	2.9	0.5	0.34	77.3
Under30	**0.17**	**0.05**	**0.004***	70.7
Male population	**0.3**	**0.14**	**0.034 ****	72.8
Pubs_visits	**0.14**	**0.05**	**0.005****	75
Nightclub_visits	0.13	0.16	0.4	78
Alcohol	-0.11	0.13	0.4	79
IMD	**0.56**	**0.29**	**0.05 ****	82.8

Table 5.11: Results of the partial regression analysis using violent victimisation at night and environmental, demographic and routine activity characteristics. *Note: *p-value < 0.1; **p-value < 0.05; *** p-value < 0.01.*

On the other hand, the strength of the association between both the demographic variables considered and the number of violent victimisations at night is significant (*p-value*<0.05). There is a wealth of literature supporting the existence of a link between age, sex and violence at night (Quigley et al., 2003; Homel et al., 1992; Graham et al., 1980; Homel & Clark, 1994). Authors have been extensively criticising the current NTE

dominant model, based on the consumption of high volume of alcohol and several strategies - including drink promotion offers - aimed at young patrons (Kaplan & Reed, 2018; Baldwin et al., 2014). Indeed, certain authors have also argued that the correlations found between young male patrons and violence in NTE are actually one of the effects of certain environments aimed at encouraging binge-drinking among young individuals (Homel et al., 1992; Graham et al., 1980; Homel & Clark, 1994).

A significant association between regular pub visits and violent victimisation at night is also found, while both alcohol consumption and visiting nightclubs do not show any significant correlation. Previous research has found a significant correlation between attending pubs and increased victimisation rates (Tseloni & Ganpat, 2015). Those who reported frequenting pubs or bars at least once a week had significantly higher odds of victimisation than those who reported never visiting a pub in the month before the survey.

The Index of Multiple Deprivation was found to be positively and significant correlated with violent victimisation at night. This contradicts previous findings in the literature and reverses the results emerged from the analysis made using all the MSOA sample. This result seems to imply that, by focusing only on areas that overlap with NTE districts, the relationship between violent victimisation incidents at night and deprivation changes compared to the rest of the city. One reason might be that given the centrality of NTE districts, the IMD does not vary enough among the MSOA sample as much as in the rest of the city and other urban characteristics emerge as stronger predictors for violence at night.

As explained in Chapter 3, most of the independent variables of the study were organised in six different Blocks to facilitate the exploration of the possible interactions between environmental characteristics within the same information-level. The density of retail activities variable remained outside of the blocks as it stands out from the rest of the groups in terms of information carried. The resulting six blocks were:

1) Block A: venue-level characteristics (drink promotions, entertainment, music, chairs and tables outside)
2) Block B: disorder chracteristics (graffiti, litter, unsupervised private parking lots, construction sites, unhoused people)
3) Block C: infrastructure and amenities (bike racks, bicycle lanes, bus stops with seatings, public benches and parks/public squares)
4) Block D: NTE businesses and corporate-owned venues
5) Block E: demographic features of the population (under 30 and male population)
6) Block F: routine activity of the population (nightclub visits, pub visits, alcohol consumption).

However, it is not uncommon in multivariate analysis to incur in situations where independent variables are highly intercorrelated with each other, showing therefore multicollinearity. Multicollinearity is a problem which arises when regressors are closely and linearly related to each other, implying that regression cannot disentangle the separate influences of each variable. Multicollinearity diagnostics using the *variance inflation factors* (VIF) function in the *R* software was therefore employed to identify multicollinearity within

each Block of variables. The multicollinear variables of each Block were combined into new variables by summing their respective values, a method adopted in previous research (Osborn et al., 1992) which does not bear particular statistical issues.

Recoding The Multicollinear Variables

When considered together, most of the venue-level variables showed multicollinearity.
Among the venue-level variables, the drink promotion, the chairs and tables outside, and the entertainment variables resulted highly correlated with each other, with the *VIF test* returning a value greater than 10. This result might be explained by the popularity of the so-called sport bars, which are licensed venues where various entertainment activities, like watching sport matches and pool table, are present alongside affordable drink prices (Wenner, 1998).

Therefore, the three variables were collapsed into a new variable called *Sport_bars*, while the variable *Music* was kept as the other venue-level independent variable in Model II. The fact that music venues do not correlate with the rest of the venue-level variables might indicate that music activities can represent be a standalone selling point for NTE venues.

When performing the *VIF* test on the Block B variables, the results showed that all the variables except for *Unhoused_people* showed multicollinearity (VIF>10). This can be explained by the general concurrence of elements like graffiti, litter and private parking lots and construction sites. For this reason, those four variables were collapsed in one called *Physical_Disorder* to be used as the second independent variable.

When tested with the *VIF* test, all the infrastructure and amenity variables – aside from *Bus_seating* – shows multicollinearity (*VIF*>10). Indeed, during the Google Street View observation, it was evident that streets facing to public squares and parks also had public seating areas with benches as well as bike racks. Even though cycling lanes were not generally very common, they were found close to areas with bike racks.

For this reason, the multicollinear variables were summed into a new variable called *Infrastructure* which was tested in Model II alongside the *Bus_seating* covariate.

The *VIF* test, showed that all the NTE venues variables were highly correlated with each other (*VIF*>10) apart from the *Fast Foods* variable. This might be explained by the fact that *Fast Foods* activities did not always cluster close to the rest of NTE venues. The three variables' *Pubs, Restaurants* and *Brand* were combined into a new variable called *Pubrestobrand* which was tested alongside the *Fast Foods* covariate.

As already found in Stage I neither the demographic variables not the routine activities variables were multicollinear, and in Model II they were considered in two separate multiple models to test any change in the strength, significance and sign of their individual β coefficient of Model I.

Block	Variable	Multicollinearity	Recoded Variable
Venue-level	Music	no	
	Drink_promo	yes	*Sport_bar*
	Entertainment	yes	
	Chairs_outside	yes	
Disorder	Unhoused_people	no	
	Construction	yes	*Physical_Disorder*
	Graffiti	yes	
	Litter	yes	
	Parking	yes	
Infrastructure and amenities	Bus_seating	no	
	Square_park	yes	*Infrastructure*
	Bench	yes	
	Bike_racks	yes	
	Cycling_lane	yes	
NTE businesses and corporate-owned venues	Fast foods	no	
	Brand	yes	*Pubrestobrand*
	Pubs	yes	
	Restaurants	yes	

Table 5.12: Recoded independent variables after the VIF multicollinearity test.

The new blocks of variables containing only the truly independent variables were explored in the final multiple models while using the IMD and the number of CSEW respondents as control variables.
In the next subsections the researcher will go through the results of the multiple regression analysis of each Block of variables.

Results of multiple regressions using the Block of variables

Model II shows that, among the venue-level variables, music might have a significant impact on violent victimisation at night (Table 5.13), as the variable *Music* becomes significantly correlated with violent victimisation at night (*p-value* < 0.05). This seems to support previous literature which found venues with music contents to be positively correlated with violence and disorder at night (Forsyth, 2006; Hughes et al., 2011).

	Model II (multiple regression)			
Variable	**β**	**SE**	**p-value**	**AIC**
Music	**14.41**	**6.7**	**0.03 ****	
Sport_bars	-0.66	0.7	0.37	80.7
IMD	-0.47	0.28	0.10	
Physical_Disorder	-3.9	3.5	0.26	
Unhoused_people	**53**	**25.6**	**0.04****	78.8
IMD	**0.65**	**0.29**	**0.025 ****	
Bus_seating	-34	28.4	0.2	
Infrastructure_combined	**8.7**	**4.6**	**0.06 ***	78.1
IMD	0.44	0.28	**0.12**	
Pubrestobrand	**1**	**0.44**	**0.01****	
Fast foods	**-2.7**	**1.4**	**0.05***	80
IMD	-0.45	0.28	0.1	
Under30	**0.2**	**0.05**	**< 0.001*****	
Male_population	0.19	0.12	0.11	72.6
IMD	-0.23	0.24	0.34	
Pub_visits	0.15	0.12	0.19	
Nightclub_visits	-0.1	0.26	0.67	
Alcohol	-0.21	0.18	0.23	81
IMD	0.54	0.38	0.15	

Table 5.13: Results from multiple regressions analysis using violent victimisation at night and blocks of environmental, demographic and routine activity characteristics. *Note: *p-value < 0.1; **p-value < 0.05; *** p-value < 0.01*

The explanation for this can be manyfold: music venues tend to close later at night compared to bars and pubs, and this might lead to more people being out in the street when the level of guardianships is limited. Furthermore, authors have found the increased sexual competition in nightclubs to be one possible explanation for increased incidents of violence (Quingley, 2003; Homel et al., 1992; Graham et al., 1980; Homel & Clark, 1994). Also increased frustration among visitors caused by overcrowding and noise in music venues has been found by previous authors (Forsyth & Cloonan, 2008). Finally, venues which offer certain music programmes - focused for instance on radio hits selection - cater for very general and large crowds which might impact again on the level of intoxication and frustration (Purcell & Graham, 2005). Areas with a higher number of those venues might suffer from a higher level of possible offenders venturing out at night.

Some of the limitations imposed by Google Street View, like the impossibility of exploring the actual atmosphere within music venues, did not allow the researcher to differentiate venues based on their music genre or indoor atmosphere. The *AIC* value of the venue-level multiple regression, does not show a higher robustness compared to Model I. There might be other venue-level variables impacting the risk for violent victimisation that were not obtained by the observations made by the researcher.

The *Unhoused_people* variable remained significantly and positively associated with violent victimisation at night. However, as for the venue-level models, Model II does not show a substantial improvement compared to Model I when it comes to the *AIC* value. Model II (AIC = 78.8) is slightly more robust than the partial correlations using respectively the variable *Parking* (AIC = 85.6) and *Unhoused_people* (AIC = 80.4), and *Litter* (AIC = 79), while performing almost identically to the regressions using *Construction* (AIC = 78.3) and *Graffiti* (AIC = 78.7).

Both first and second models showed that the only sign of disorder significantly connected to higher violent victimisation at night is the presence of unhoused people, with Model II having a higher level of significancy (i.e., a smaller *p-value*). While there is no literature finding correlation between night-time aggressions and the presence of homeless people, this result can be explained by the fact that unhoused people were observed close to areas with high level of footfall as well as in public parks and squares.

It can be assumed that these results show a possible correlation between very crowded areas and chances for violent victimisation at night, which has been theorised in the criminal pattern theory explained in Chapter 2 (Brantingham & Brantingham, 2016). Places which are constantly visited for various reasons can be considered as nodes of activities which are connected by paths. Certain nodes, such as parks, transit hubs (like public squares), where both possible offenders and victims gather, provide several chances for criminal behaviour, thereby possibly leading to crime hotspots (Newton, 2018).

Indeed, Model II showed a positive and significant correlation between *Infrastructure* and violent victimisation at night (Table 5.13). The *β* coefficient of *Infrastructure* increased compared to the *β* resulting from the analysis of the square and parks variable in Model I. Also, the *p-value* in Model II decreased (*p-value* = 0.06) compared to Model I (*p-value* = 0.08) demonstrating an increased significancy in relation to this variable. These results combined might prove that the presence of more activity nodes might be the characteristic that impacts the number of violent victimisation at night, as previous research has proposed (Newton, 2018).

As for the previous Blocks of variables, Model II proved to be just slightly more robust than the partial correlations performed in Model I. Model II performed better (AIC = 78.5) than the partial correlation of the bus stops with seating variable (AIC 81.4), while did not show more robustness compared to the rest of the regressions in Model I.

The new *Pubsrestobrand* variable has a significant positive correlation with violent victimisation at night, while the density of *Fast Foods* seems to actually have a negative effect on violence at night, as reflected in its negative *β* coefficient. These results contradict in some measure previous findings which identified fast

foods activities as potential NTE risky businesses (Tuck, 1989), as when NTE visitors leave venues at similar times, they can cluster around fast-foods and increase the risk of random encounters and violent incidents (Tuck, 1989). In the current study, *Fast Foods* districts were located both in central and peripheral areas, which probably show a general less footfall compared to the more central NTE districts of the study, which might translate in less overcrowding and occasion for violent victimisation at night.

On the other hand, the correlation between the rest of the NTE venues, including corporate-owned venues, and violent victimisation, is in line with the existing literature. For instance, Garius (2016) noted that licensed premise-density may prove as a stronger predictor of victimisation risk (Livingston, 2008; Hope, 1985) – "with increased licensed outlet-density serving to increase 'bar hopping' practices and alcohol consumed" (Garius, 2016, p.150).

As explained in Chapter 3, there are multiple evidence supporting the correlation between a higher number of alcohol outlets and violence (Babor, 2010). Through longitudinal studies, authors have demonstrated that a gradual increase in the number of alcohol outlets has translated in more violent incidents in several countries, even when controlling for alcohol per capita intake (Norström & Skog, 2005).

Interestingly, no routine activity variables show any significant correlation with violent victimisation at night. On the other hand, the results show that the amount of people aged under 30 (*Under30*) is the only statistically significant predictor for more violent victimisation at night among the demographic variables. Again, this is in line with previous research condemning the current mono-demographic NTE model, which targets young people with cheap drink offers and specific activities which do not encourage other parts of the population to engage with nightlife (Quigley et al., 2003; Homel et al., 1992; Graham et al., 1980; Homel & Clark, 1994). For instance, Garius when analysing the CSEW data, noted that age has a significant effect on the risk of assault victimisation, and "in that a unit (year) of increase in age is associated with a *decrease* in the odds of victimisation" (Garius, 2016, p.159). She found a decrease of the odds of victimisation by 7.0% for each unit increase in age of CSEW respondents. However, some research on this topic have indicated that while areas with a higher percentage of young patrons can be more affected by violence and anti-social behaviour, more serious episodes usually occur when older people are involved (Forsyth, 2006). The current research did not investigate the seriousness of violent incidents and victims wounding.

Model II proved to be more robust than partial correlation regressions including the male-only variable, performing better (AIC = 72.6) than the former ones (AIC = 72.7 and 82.8 respectively).

The correlation between environmental characteristics and perception of safety at night in NTE-MSOAs

To address question number 6, *"What are the main environmental factors, demographic and routine activity characteristics of NTE districts that can impact the perception of safety at night in urban areas?",* the final part of the analysis tested the interaction between the weighted environmental characteristics, the routine activity and the demographic characteristics, with the perception of safety at

night of people living in areas overlapping with NTE districts (NTE-MSOAs).

First, the assumptions of linearity have been tested using the *gvlma package* - Global Validation of Linear Models Assumptions in the *R* software. The *gvlma test* showed that all the conditions for linearity were satisfied (Table 5.14).

	Value	p-value	Decision
Global Stat	2.12	0.71	Assumptions acceptable.
Skewness	0.53	0.46	Assumptions acceptable.
Kurtosis	1.03	0.31	Assumptions acceptable.
Link Function	0.43	0.51	Assumptions acceptable.
Heteroscedasticity	0.12	0.73	Assumptions acceptable.

Table 5.14: Results of the Global Validation for Linear Model Assumption.

The variable related to the number of people which feel safe while walking outside after dark does not show an excess of zeros and overdispersion. Indeed, the zero-inflation test in the *R* software returned a *p-value* of 0.50224 which is distant from the significance threshold of 0.05.

The model used for the analysis of the perception of safety at night was the *lm* package in *R*, which allows to fit linear models. Following the same multi-steps approach, first partial correlation analysis was performed using each independent variable controlled for the number of the CSEW respondents and the Index of Multiple Deprivation. Then in Model II the multiple regression analysis were carried out using the Blocks of variables which had already been manipulated after being tested for multicollinearity.

The partial correlation results show that only few independent variables have a barely significant correlation with the perception of safety at night. Interestingly, the presence of bike racks, cycling lanes and unhoused people are negatively correlated with perception of safety at night (Table 5.15). Currently, no existing research explores the possible correlation between fear of crime and the presence of bike infrastructure; it is however possible that these partial correlation models did not capture other environmental effects influencing perception of safety at night. The presence of unhoused people was negatively correlated with perception of safety at night, with a *p-value* very close to the significance threshold (*p-value*=0.07). Existing research pointed how homeless people tend to be more victimised and also experience more fear of crime (Coston & Finckenauer, 1993; Kinsella, 2012;). However, the CSEW does not include unhoused people in the possible respondents sample, so these results might be explainable by the fact that unhoused people were spotted through Google Street View especially close to public squares and parks which were also found to be negatively correlated with the perception of safety at night.

The Index of Multiple Deprivation (IMD) was found to be positively correlated with perception of safety at night which supports existing research showing that social deprivation of neighbourhoods has an

important role in shaping how urban areas are perceived (Mason et al., 2011). Less deprived areas tend to be perceived are safer.

Variable	Model I (partial correlation)			
	β	SE	p-value	AIC
Music	-8.8	6.5	0.17	163
Drink_promo	-2.4	2.4	0.33	164
Entertainment	-6.3	4.3	0.15	163
Chairs_out	**-1.6**	**0.9**	**0.08***	**162**
Bus_seating	-29	25.1	0.25	164
Square_parks	-54	33.2	0.1	163
Bench	-23	14	0.1	163
Bike_racks	**-20**	**11**	**0.08***	**162**
Cycling_lanes	**-55**	**31.7**	**0.09***	**162**
Construction	-17	13.2	0.19	164
Graffiti	-9.7	6.7	0.15	163
Litter	-10	7.8	0.18	164
Parking	-50	37	0.18	164
Unhoused_people	**- 47**	**25**	**0.06***	**162**
Retail	-0.22	0.14	0.13	163
Brand	-0.9	0.6	0.18	163
Pubs	-0.9	0.7	0.2	163
Restaurants	-0.9	0.7	0.2	164
Fast Foods	-1.2	0.7	0.5	163
Nightclub_visits	0.3	0.2	0.1	163
Pub_visits	0.13	0.09	0.2	164
Alcohol	0.14	0.16	0.37	165
Male_population	-0.07	0.11	0.5	165
Under30	-0.05	0.7	0.5	165
IMD	**0.57**	**0.3**	**0.06***	**164**

Table 5.15: The results of the analysis of the partial correlation between perception of safety and environmental, demographic and routine activity characteristics. *Note: *p < 0.1; **p < 0.05; *** p < 0.01.*

In the multivariate models, after having collapsed the multicollinear variables within each Block into the new variables, no variables showed significant correlation with perception of safety at night. Also, the AIC did not show improvements in the model (Table 5.16).

Variable	Model II (multiple regressions)			
	β	SE	p-value	AIC
Music	-1.8	11.2	0.9	
Sport_bars	-0.8	1	0.4	165
IMD	**0.63**	**0.3**	**0.05****	
Bus_seating	23	45	0.6	
Infrastructure_combined	-11	8.5	0.16	164
IMD	**0.14**	**0.03**	**<0.001*****	
Disorder	1.9	5	0.7	
Unhoused_people	-64	48.6	0.19	163
IMD	**0.15**	**0.03**	**<0.001*****	
Pubrestobrand	0.2	0.7	0.7	
Fast Foods	-2	2.1	0.7	165
IMD	0.15	0.03	**<0.001*****	
Nightclub_visits	0.2	0.3	0.3	
Pub_visits	0.03	0.1	0.8	167
Alcohol	0.05	0.2	0.7	
IMD	**0.15**	**0.03**	**<0.001*****	
Male_population	-0.06	0.07	0.5	
Under30	-0.05	0.1	0.6	167
IMD	**0.19**	**0.06**	**0.003****	

Table 5.16: Results of the multiple regressions analysis using perception of safety at night and blocks of environmental, demographic and routine activity characteristics. Note: *$p < 0.1$; **$p < 0.05$; *** $p < 0.01$.

Previous studies have found complex relationships between urban environmental factors and fear of crime (Mehta, 2014; Madanipour, 1996). Perceptions of safety or unsafety are often influenced by the historical and political contexts of a given time, and are determined by the social, economic and cultural background of the population. It is probable that the scope of the study and the location-based variability did not allow the researcher to find potential correlation among environmental, demographic, or routine activities and the perception of safety at night. Moreover, since the dataset presents aggregate data derived from seven CSEW sweeps, variations in the perception of areas might have occurred from one year to another, given the highly volatile nature of this sentiment. As argued in Chapter 2, media campaigns, political discourses or changes in political agenda have deeply shifted the populations' perceptions around specific topics and urban areas in the past (Hale, 1996).

6 Limitations

This study has used a mix of methodologies which included both primary collection of data through Google Street View, and the sue of secondary dataset - the CSEW and the PoI - which were manipulated to extract the information of interest. The design of the study had to adapt to the ongoing Covid-19 emergency which required a deep transformation of the initial research protocol. Both the initial approach and the adapted one are not devoid of limitations, which are going to be explained in the present chapter.

The limitations of a study design are the systematic biases that the researcher did not or could not control for and that may have affected the results in an unintended manner. Researchers are meant to present the limitations of a study in a thorough and forthright manner, by considering both the internal validity and external validity of the research. A research design with internal validity is one that achieves accurate results by assessing what it intends to measure free of bias and systematic error. External validity, also known as generalisability, denotes that the sample results accurately represent the results one would obtain if able to assess the entire target population (Ferguson, 2004). The two are interconnected, and in the words of Fink: "for a study design to be externally valid and yield accurate results, it must be internally valid" (Fink, 2003, p. 60).

There are several limitations to this study which are discussed in detail in the next subsections.

First, the bias concerning the identification of NTE districts, their geographic extensions and shapes using the *Optimised Hot Spots* analysis in ArcGIS and the Point of Interests dataset is discussed.

Also, the use of the PoI as the main dataset to investigate the spatial distribution of NTE districts was another key issue as Point of Interest data lack of information related to closing times and licensing that can be useful when analysing NTE related phenomena.

Google Street View is a very handful tool which allows the user to assess urban characteristics remotely avoiding time-consuming travels and auditing protocols (He et al., 2017). However, it has certain limitations especially in relation to the study of Night-Time Economy characteristics and they will be commented.

The limits of using the Crime Survey for England and Wales in the analysis of violence and perception of safety at night are also discussed. One of the primary issues linked to the use of CSEW dataset is the impossibility to get precise geolocated information about violent incidents, which are reported by the victims in the Victimisation Module section of the survey. In this study the impossibility to geographically match the data regarding violence at night and the NTE districts identified was one of the main limitations. Approximations had to be made to investigate the possible impact of NTE districts characteristics on violent victimisation at night and perception of safety. Also, the small size of the CSEW respondents' sample at the MSOA level and the impossibility to use only one sweep to have enough variation in the numbers of violent victimisations at night at the MSOA level was another issue. The overall small samples of the MSOA areas and NTE districts might question the external validity of the findings obtained.

6.1 Spatial identification of NTE districts

As observed by previous authors (Rowe & Bavington, 2011; Chatterton & Hollands, 2003; Hadfield, 2015), the heterogeneity of NTE clusters is determined by the complexity of several tangible and intangible factors involved in shaping NTE districts. NTE venues can be clustered on a single street, like in the case of NTE high streets or waterfronts Lovatt & O'Connor, 1995), or be more dispersed in neighbourhoods like the Northern Quarters in Manchester and Soho in London (Roberts & Turner, 2005; Montgomery, 2006).

Tracing the boundaries of NTE districts is however very complicated, and the present study decided to identify NTE districts with the polygons returned by the *Optimised Hot Spot Analysis* in ArcGIS.

This tool presents some limitations, like the impossibility of performing the analysis on datasets with less than 60-point features. For this reason, it was not possible to explore clusters of nightclubs, or other types of activities. Furthermore, in smaller urban areas, the absence of a sufficient number of activities might completely impede this type of analysis. However, in the existing literature it was not possible to find alternative solutions for delimiting significant clusters of NTE activities.

Indeed, the present study aimed at exploring those urban areas where NTE activities are significantly more clustered and that can be classified as NTE districts. The *Optimised Hot Spot analysis* seems to be the most convenient technique to address this aim. Previous studies have used the same technique in relation to other types of urban districts, linked with fashion and creative sectors (Williams & Currid-Halkett, 2011).

An alternative approach could have been employing the official documents produced by licensing authorities in their Cumulative Impact Assessment (Manchester City Council, 2021). Since 2005, the Department of Culture Media and Sport allows local authorities to consider introducing special policies, known as saturation policies, in certain areas where the combined impact of licensed premises is recognised to cause certain negative issues. Saturation policies need to be updated every five years and are based on a document named Cumulative Impact Assessment where local authorities indicate which are the areas where the special policies will apply. In those documents the delimitation of those areas is often visualised on maps where it is possible to recognise the exact boundaries of the areas of interest. However, the present study was not concerned about analysing the characteristics of areas where the impact of NTE venues is recognised have negative effects on several issues (like noise pollution, anti-social behaviour and other types of crime. Furthermore, these areas are always very limited in space - sometimes they represent hot dots of crime - which investigation would require a completely different methodological approach and would address completely different aims.

Furthermore, it is worth noting that one of the aims of these regulations is to prevent possible issues related to the formation of new NTE areas - like in the Ancoats area in Manchester (Manchester City Council, 2021) and do not always consider more established NTE districts, which in turn was one of the aims of the current study.

6.2 The Point of Interest dataset

A current limitation of the PoI dataset is that it does not provide the opening times of economic activities, which in this case might have resulted in an overrepresentation of NTE activities. However, this study has considered all those economic activities which typically function in the evening and at night (NTIA, 2021), like restaurants, fast foods, pubs and bars. Furthermore, the present research did not aim at exploring night-time violent trends in relation to different night-time segments - i.e., evening, early night and late night - like other researchers did in the past (Mazerolle et al., 2012). This study focused instead on the possible impact of districts of those venues which are part of the Out of Home Leisure Activities (OHLA) (Night Time Industry Association, 2021) in line with the definition made by previous authors exploring entertainment districts, night-time entertainment districts, late night economy areas. (Campo & Ryan, 2008; Mazerolle et al., 2012; Van den Nouwelant & Steinmetz, 2013; Miller et al., 2013; Devilly, 2022).

An alternative source of data might have been the Licensing Lists provided by local authorities. In the UK, any operating premise selling or supplying alcohol must have a licence registered and approved by the corresponding licensing authority. Activities are charged a fee based on the rateable value of the property and licensing authorities need to make the list of registered premise licences available for the public. However, the type of information disclosed, the classification of premises as well as the types of activities are not consistent across different licensing authorities. For example, while Manchester licensing list (Manchester City Council, 2022) displays not only the name and address of each premise, but also the venue classification – i.e., "Restaurant", "Nightclubs", "Off licence" etc., Birmingham's authorities only share the name and the address of each venue, without the inclusion of any information on their classification, or on the type of licence granted (Birmingham City Council, 2022). The datasets from Sheffield, Liverpool and Oxford had the same issues. Furthermore, it is also worth noting that even the classification of Manchester's licensing list shows some limitations. For example, it is not clear what are difference between the venues classified as "Nightclubs" and the venues which fall under the "Pub/Bar/Club" class. Also, 223 venues appear under the rubric "Other", including places like record stores, as well as "hall complexes" (Manchester City Council, 2022). Indeed, the presence of a consistent, coherent and standardised licensing dataset would allow for a more precise mapping and for easier identification of NTE clusters and their composition. However, the present research did not aim to restrict its focus only on those activities licensed to sell alcohol. Of course, a great wealth of literature has found alcohol consumption to be the main issue related to NTE districts, violence, anti-social behaviour and perception of crime (Homel et al., 1992; Graham et al., 1980; Homel & Clark, 1994; Lister et al., 2000; Graham et al., 2006). However, certain types of venues, which do not sell alcohol, tend to stay open at night (like many fast foods and restaurants) and are worth of inclusion in the exploration of NTE districts.

Another aspect that might have been useful, would have been information regarding the venues' capacity, which indicates the maximum amount of people which is legally allowed to visit the venue simultaneously. Indeed, not only the density, but also the size of NTE venues might have a huge impact on violent

victimisation trends and the perception of NTE districts, which the current study could not take into account. However, data about the capacity of venues is not readily and publicly available in UK cities, and any attempt to access those data was unsuccessful. Alternative datasets could have been the Open Street Map (OSM) point of interest dataset, which however does not include a standard classification like the Geomni PoI dataset employed in the present study.

6.3 Google Street View observations

Google Street View provided a time-saving method to remotely audit NTE clusters characteristics during a time when physical observations and travelling were severely affected by the restrictions imposed by the Covid-19 emergency.

There is currently no study employing Google Street View to assess the urban characteristics in the study of NTE phenomena. Intuitively, the main reason might be that GSV does not provide pictures of the public space at night. The exclusive use of daytime data may in fact alter the capacity of the observer to draw conclusions on NTE phenomena, since many venues do not open or set up their outdoor areas until evening. Therefore, in the present study, an underrepresentation in the amount and type of signals and characteristics observed might have happened. Furthermore, characteristics related to the level of crowding, street traffic, the use of public areas - like parks and squares – at night could not be audited. Indeed, social activities, like the number of pedestrians or vehicles traffic, are time-sensitive information, with their levels fluctuating during the day. Also, certain activities which impact on the perceived maintenance of the area, like trash removal, are inherently unstable over short time periods. The levels and characteristics of these items may be subject to both diurnal, seasonal, and weather-related variation and Google does not publicly provide information on the timing of the Street View photo shoots.

In previous research Google Street View has been employed to audit environmental features linked both with physical and social disorder. Many studies concluded that Google Street View is a feasible method to audit the built environment, while being less reliable for characteristics related to social interactions and the social composition of neighbourhoods. Social disorder elements considered in previous literature, such as street fights and drunk people and prostitution were not visible in Google Street View.

Another drawback encountered concerns the impossibility to observe certain traits frequently examined in previous literature, like syringes, or other features of the pavements, like stains or signs of vomit (Marco et al., 2017). Also, property owners may request Google to blur or remove images of certain aspects of their property that they might not want to be publicly displayed. This could lead to the undercounting of items associated with physical disorder, and this selective data removal could skew research findings.

Vehicles capturing GSV images may not be able to access pedestrian-only zones or areas with difficult road conditions access, resulting in suboptimal image quality or angle.

Furthermore, Google Street View is a mono dimensional tool which can provide information only on visible signs, while all other senses are neglected. Noise, smell, pollution levels, crowding and other characteristics are not observable through Google images.

Also, most of the studies employing Google Street View for auditing aspects of urban neighbourhoods involve a process to test the inter-rater's reliability of the tool. The limited nature of the resources and time available to the researcher impeded to invest energy in this process. To limit the issues deriving from not testing the inter-rater's reliability of GSV in relation to the list of the characteristics considered, the researcher reviewed the existing literature adopting GSV for auditing the urban environment and selected only those characteristics which authors linked with a high level of inter-rater reliability.

Other dataset might have been employed, like geotagged social media public pictures taken at night which might add certain information around the way how urban areas are experienced, but that process would have required technological skills and time resources which were beyond the researcher's possibilities.

6.4 Using Crime Survey for England and Wales for detecting violence

The current study employed the Crime Survey for England and Wales as the main dataset to explore violence and perception of safety at night. The primary goal of the CSEW is to present reliable trends for the crime types it covers; however, there are significant exclusions and limitations that must be taken into account. First, the CSEW does not provide information about violent crime officially reported to authorities, but only about the number of victimisation incidents that respondents decide to include in the Victimisation Module. Victimisation surveys are for instance linked to issues like "external telescoping," a memory recall phenomenon that has the potential to artificially lower or raise the incidence of crime (Schneider, 1981). Cohen and Java (1995) claim that telescoping is exacerbated when asked about personal experiences and gets worse as the recall period for the reference event gets longer (Huttenlocher, Hedges & Prohaska, 1988). By asking respondents about their experiences of victimisation within the previous six months, the CSEW creates a picture of crime which does not necessarily correspond to reality. Therefore, incorrectly placing incidents outside of the survey's reference period can occur due to external telescoping, which can lower or increase the crime rates.

Second, the CSEW's inability to record crimes experienced by populations living outside of the parameters of "private accommodation" eliminates the possibility of exploration o of people in prisons, nursing homes, university halls of residence, and mental health facilities. The victimisation survey is also unable to detect trends in homicide (Pickering et al., 2008).

Third, the variable created in the present study to detect the number of violent incidents happened nearby the respondent's household at night did not distinguish between violence happening in the street and violence happening in private locations. This might have led to an overrepresentation of victimisation related to incidents happened in the public space.

Furthermore, the CSEW is designed to focus on representative samples for large geographical areas, while they become less accurate when it comes to low geographical levels. In the present study approximation needed to be made to allow for enough variance in the number of violent victimisation incidents happened at night across the MSOA sample. The researcher decided to merge different sweeps of the CSEW (2012-2019) to produce an effective sample size. However, this process did not allow the researcher to have a clear

understanding of violent victimisation at night related to the year 2019 only, which was used for the data collection of the PoI and the observations through the Google Street View. Certain characteristics related to the NTE districts might have changed over time.

When it comes to the analysis of the perception of safety at night, Hale (1996) pointed out that single item global measures of fear of crime do not specifically relate to any type of crime but are subjective measures of possible risks associated with specific conditions or areas. Respondents are asked to think about their perceived safety when walking alone after dark, an activity which may be rare for many of them and the response might not be very reliable.

6.5 Matching different geographical levels

Working with different geographic levels across datasets was another obstacle encountered, which might have led to distorting the outputs and the understanding of the independent impact of each variable studied on violent victimisation trends and perception of safety at night.

The impossibility to access geo-located and time-stamped data on violent assaults from local authorities and the impossibility to find a national-level data on perception of safety at night led the researcher to adopt the Crime Survey for England and Wales at the MSOA level. As explained in Chapter 3, MSOA areas only partly overlapped with the NTE districts identified through the use of the *Optimised Hot Spot* analysis.

The study of the correlation between the NTE districts characteristics and the MSOA level variables involved the necessity to weight and recalculate the NTE districts characteristics to fit the MSOA geographical level. The resulting weighted characteristics however bear some limitation. For instance, it might be argued that the actual impact of certain characteristics observed on those MSOAs which overlap by a very small area with NTE districts is probably inconsistent.

The resulting adaptation of NTE districts characteristics based on the overlapping profile of each NTE area might nonetheless have masked the influence of specific environmental traits in predicting violent crime and perception of safety depending on the percentage of overlap between MSOA and clusters.

6.6 Alternative regression models

As explained in Chapter 3, alternative regression models could have been employed to analyse the complex interaction between the NTE districts characteristics and the two social phenomena of interest - violence and perception of safety at night. For instance, regression models that take into account the multi-level nature of the dataset used might have been considered.

However, due to the small size of the sample and for practicality, the use of more complex statistical models has been discarded. This might have been prevented the researcher to explore the interaction between different hierarchies of information contained in the variables of the study. The datasets used for this study were nested data and could have been organized through more than one level in the regression models (Aarts et al., 2014).

For instance, the research failed to consider the possible impact of belonging to a different type of NTE

district – i.e., *Pubs, Fast Foods* and *Restaurants* - in the analysis of the correlation between individual environmental characteristics and the two phenomena of interest. Another nested aspect that was not taken into account in the models, was the fact that NTE districts belong to different cities, which could have been used as a higher hierarchical information. More complex and accurate models using bigger samples of NTE districts might be considered in the future.

In the next chapter, the final remarks, theoretical and policy implications study will be presented after summarising the main results of the research.

7 Conclusion: theoretical and policy implications

The present research set out to explore the relationships between NTE districts, violence and perception of safety at night by (1) identifying NTE districts through the analysis of how NTE venues cluster in the urban environment, (2) by exploring the environmental characteristics of the NTE districts identified using Google Street View and the PoI dataset and (3) by exploring possible independent and significant correlation between environmental characteristics and violent victimisation and perception of safety at night using the CSEW dataset.

The findings of the analysis were outlined within the respective results and discussion chapters (Chapter 4 and Chapter 5) and the main results are hereby summarised to introduce the final chapter which includes the conclusions of the study, alongside some theoretical and policy implications:
- there are three types of economic activities which are quantitatively predominant among NTE related activities: pubs and bars, restaurants and fast foods. Those three classes of venues combined represent on average the 90% of the total NTE activities in the cities considered.
- These NTE venues form identifiable clusters in the urban environment. These clusters can be identified through spatial analysis, which can be used to locate urban NTE districts. The Optimised Hot Spot analysis is a convenient, practical way to remotely identify NTE districts.
- NTE districts are mainly located in city centres, except from certain *Fast Foods'* clusters which can be found in more peripheral areas. NTE districts coexist mainly with buildings with retail, office and only secondarily with residential or other uses. Within in each type of cluster, there are certain areas where the activities are more co-located. Indeed, when analysing the polygons created by the *Optimised Hot Spot* analysis, around 50% of activities are found in the three polygons with the highest *z-score* and *Gi_bin value*-which indicate the intensity of clustering. This means that NTE venues were not uniformly distributed within the districts identified, but there are micro-areas of high-density NTE activities.
- In the NTE districts identified the average amount of buildings which has at least one NTE activity ranges from 16% - in *Fast Foods'* districts - to almost 30% - in the *Restaurants'* districts.
- NTE districts have different mixes of environmental characteristics in terms of activities offered, sign of disorder and infrastructure. For instance, venues with music programmes and/or entertainment tend to be

rarer than venues with drink offers and chairs and tables outside. Signs with alcohol restrictions or any code of conduct messages were almost impossible to observe through Google Street View.

- Among the disorder characteristics category, litter and graffiti were quite common in the streets observed in almost all the NTE districts, except for certain areas - e.g., 0% of streets with litter in the *Restaurants* districts in Oxford. Also unhoused people tend to be more present in the *Restaurants* and in the *Pubs* districts (10% of the streets on average), and rarer in the *Fast Foods* clusters.

- In terms of infrastructure and amenities, parks and squares are more located in the *Restaurants* and in the *Pubs* clusters, which are more central, while in most *Fast Foods* districts the percentage of streets facing any public square or park was 0%. On the other hand, public benches were present in around one in four streets in almost all the districts observed. Bus stops with seatings are not very common. The average rate of streets having at least one bus stop with seating ranged from 14% to 20%. Bike racks on the other hand are very popular, and can be found in almost 40% of the streets in the districts audited.

- NTE districts of the same type tend have a similar density of venues across different cities, indicated by very similar mean and median values.

- In terms of the rate and density of corporate owned venues, NTE districts have on average around 30% of venues being corporate-owned, with Oxford and Leicester *Restaurants* clusters reaching around half of the total amount of the venues. The density of corporate-owned venues ranges from 6 to 9 venues per km on average.

- The density of retail activities is very high in all the NTE districts, with on average 30 retail activities per km of streets.

- In terms of violent victimisation and perception of safety at night, results show that on average 2% of the CSEW respondents reported being victimised near their habitation at night, while the majority of the respondents feel safe while walking alone after dark.

- when analysing the demographic and routine activity of the population, on average around 2% of the respondents visit nightclubs at least once a week, while almost 20% of people go frequently to pubs and bars. Around 50% of the respondents were male, and 20% were under 30 years old. On average more than one in ten respondents consume alcohol at least three times a week.

- when analysing the entire MSOA sample, both partial correlation and multiple regressions show that more deprived areas experience a higher level of violent victimisation at night. In the multiple regressions combining the routine activity characteristics, it emerges that areas with more people visiting frequently nightclubs experience less incidents of violent victimisation at night. Furthermore, in the same model, those areas being overlapped with NTE clusters experience a higher level of violent victimisation alongside those areas with more people drinking frequently. In the multiple model which considers all the demographic characteristics together, only the IMD remains significantly correlated with violent victimisation at night.

- when considering the perception of safety at night using the entire MSOA sample, both in partial correlations and multiple regressions, areas with more people visiting pubs and bars frequently show a higher

level of perception of safety. In the regression model where all the routine activity are tested together, it seems that areas with more people going frequently to nightclubs experience less sense of security at night. The Index of Multiple Deprivation remains positively correlated to perception of safety at night, indicating that less deprived areas impact positively the perception of safety.

- when focusing only on those MSOAs which overlap at least with one NTE district (NTE-MSOAs), the partial correlations show that certain environmental characteristics are correlated with higher victimisation at night. The presence of chairs outside, square or parks, and unhoused people showed all a positive and significant β coefficient. Also, the number of people aged under 30 years old, the size of the male population and the number of people visiting frequently pubs or bars were positively correlated with violent victimisation.

- in the multiple regression models, the variables related to unhoused people and infrastructure resulted positively associated to violent victimisation at night. The variable related to the fast foods density has a negative coefficient when tested in combination with the density of pubs, bars and corporate-owned venues, which in turn shows a positive correlation with violent victimisation at night. The effect on the number of people aged under 30 remains significantly and positively correlated while the rest of the routine activity and demographic characteristics did not.

- when considering the perception of safety at night, partial correlation analysis shows a weak and negative significant correlation with chairs and tables outside, bike racks, cycling lane and unhoused people. The Index of Multiple Deprivation remains positively correlated with higher perception of safety.

- in the multiple regressions, however, none of the independent variables show significant correlation, aside for the IMD which remains positively and strongly correlated with perception of safety at night.

The following sections will draw the conclusions of the results of the present study, by considering existing theories around NTE districts, environmental criminology, violent victimisation and perception of safety at night. The contribution of the present research to the understanding of NTE districts and suggestions for future research in this field will be also outlined. Finally, the implications for urban strategies and interventions to foster and improve the experience and safety of NTE districts will be presented.

7.1 The spatial clustering of Night-Time Economy districts

The findings of this study support previous research regarding the spatial evolution of NTE activities. NTE activities tend to form urban districts as other economic sectors, like innovation, creativity and fashion (Williams & Currid-Halkett, 2011).

For instance, Crivello (2011) empirically observed how bars, restaurants, pubs and nightclubs tended to co-locate in central areas in Turin, by comparing the distribution of NTE activities between 1993 and 2008, she could notice the formation of clusters of NTE venues in the city centre. Other studies have highlighted how also in the UK the total capacity of venues increased over the same period of time (Roberts, 2006), with the number of nightclubs peaking in 2006 (Night Time Industry Association, 2021). Even though previous

literature has introduced concepts like "entertainment zones" (Campo & Ryan, 2008) "entertainment districts" (Babor et al., 2010; Mazerolle, et al., 2012), "late night economy areas" (Van den Nouwelant & Steinmetz, 2013) or "night-time entertainment districts" (Miller et al., 2013; Devilly, 2022), research about where they are located and the characteristics of these areas remains limited.

The current research argues that the spatial organisation of the NTE has led to a functional differentiation of NTE districts, based on the co-location of different NTE activities. Clusters of pubs and bars do not necessarily correspond to districts where more food-oriented activities are co-located. This does not imply that there is a sharp distinction between NTE districts, but generalisations around the composition and nature of these areas should also be avoided.

NTE districts tend to be found near the city centre, in line with previous research arguing that NTE activities were encouraged to regenerate central areas, alongside cultural quarters, commercial high streets and other touristic attractions (Bianchini, 1995). Certain clusters can also be found outside of the city centre - especially fast foods - and they probably show different environmental dynamics.

Furthermore, the distribution of activities within the identified districts is not homogeneous. Within each district, there are micro-areas with a higher density of NTE activities, which might constitute a red-flag to local authorities about the possible risk of saturation. Indeed, saturation is one of the key concerns of licensing authorities, which need to produce a cumulative impact assessment as the basis to introduce Special Saturation policies to manage local NTE districts (Oxford City Council, 2023). Spatial analysis techniques might be used to explore and compare the effect of micro-areas of high-density NTE activities on issues related to crime across different cities.

Indeed, cities with a more decentralised NTE offer are sometimes championed as a possible solution for NTE saturation by policy makers and professionals (MacLean & Moore, 2014). However, planning strategies aiming to desaturate or relieve certain areas from the high pressure of NTE activities constitute a very delicate matter. Indeed, analysing the spatial distribution and complementarity of NTE activities and their development over time can help better understand how to encourage certain mix of venues or better communicate with stakeholders about possible interventions and solutions.

7.2 Land uses in NTE districts

Overall, considering the building-use of NTE districts, the two prevailing uses found in the study are the *office-only* and *retail* classes. Most of the buildings of the study did not include any residential use, except for Bristol and Oxford where the *residential-only* class were found in 20% of the buildings in the *Pubs* clusters. On the other hand, a higher percentage of residential buildings found in the *Fast Foods* districts probably reflects the tendency of fast-foods to cluster in areas distant from the city centres.

In terms of the effect of land uses on crime, on one hand the presence of retail activities might prevent certain crimes (Bowes, 2007) and the absence of residential buildings could translate into less tension with residents (Ottoz, 2023). However, the anonymity of central NTE districts, can also be problematic. The absence of active communities of residents and the lack of eyes on the streets after certain hours (Jacobs,

1961) - i.e., when most shops close - might lead to more opportunities for crime and anti-social behaviour, and to people perceiving the public space as less safe.

The challenge for policy makers would be to facilitate a sense of community and care among visitors in central NTE districts despite the transitory nature of their use of the area. Indeed, as people coming from different areas and backgrounds visit NTE districts for a certain amount of time, they might not find any connection to the area, its permanent residents and other existing daytime uses. The disconnection between visitors and urban areas where NTE districts locate, might lead to careless behaviours and a general *laissez-faire* atmosphere which can translate into more anti-social behaviours and crimes (Crivello, 2011).

A possible solution to this issue might be to include local communities and non-profit organisations in the management and development of activities in the public space of central NTE districts in order to facilitate a sense of belonging and tackle the anonymity of those areas.

7.3 The offer of NTE districts

NTE districts are contested areas, not only for the coexistence and interaction between different uses, but also because NTE venues rely on similar business models and they need to use aggressive strategies to stand out in a competitive market.

The results of the study show that alcohol is the main selling point of NTE districts, an aspect which was highly criticised by previous authors as one of the main obstacles to a more diverse, inclusive and safer NTE (Shaw, 2014). Indeed, it is difficult to imagine a more diverse Night-Time Economy if the "elision with the alcohol and leisure industry" (Shaw, 2014, p. 89) is going to remain undisputed.

Furthermore, since 2006, the number of nightclubs and music venues has been in steadily decline (Night Time Industry Association, 2021). In this study, this phenomenon was visible both through the results of the analysis of the Point of Interest data, which show a very limited number of nightclubs compared to the rest of NTE activities, and the GSV observations. Indeed, the research found a majority of venues offering entertainment and alcohol promotion instead of music or other cultural activities. This homogenisation of the NTE offer can be one of the factors responsible for the current exclusion of certain parts of the population from NTE areas. Indeed, as Roberts (2006) pointed out in her research, certain city users avoid city centres mainly because the lack of alternative offers. While the proliferation of themed bars in the UK might suggest the presence of an increasing demand for these venues, their expansion can probably be explained by the increasing marketing and lobbying power that these large corporates can rely on.

How to tackle this homogenisation phenomenon and lack of diversity in the NTE offer should need to be prioritised by policy makers if they want to achieve more diverse and inclusive cities at night.

Finally, communications about codes of conduct, conditions of entry and proof of age identification requirements, were practically impossible to recognise using GSV. This highlights the current tendency to consider these types of information as non-priority . Studies have demonstrated how prevention campaigns, like equipping door-staff with breathalysers to prevent drunk persons from entering the venue, had an effect in decreasing violence and anti-social behaviour (Boyd et al., 2018; van Amsterdam et al., 2020). Certain

policy makers are acting in that direction, as proven by the recent change in the Irish licensing law, which introduced a new category of objection for license renewals, relating to the lack of conditions necessary to protect staff, patrons and performers from harassment, including sexual harassment (Department of Justice, 2022).

In the future, these interventions should become systematic in order to encourage more responsible and aware NTE experiences.

7.4 The relationship between diversity and market dominance

Apart from some exceptions, NTE clusters have an average of 30% corporate-owned NTE activities. This supports the warnings that many authors raised in previous research (Chatterton and Hollands, 2003) in relation to the constant commodification and homogenisation of NTE. These mega brands are constantly differentiating their offer by creating sub-brands targeting specific types of customers, and only a 'cultural militant' would draw a distinction between cultural and entertainment venues (Kunzmann, 2004, p.389). It is therefore important to question whether this type of diversity, controlled and piloted by a handful of actors, can guarantee enough space for expression and innovation at night.

Authors have previously criticised the negative impact of the expansion of corporate-owned venues on traditional and independent venues. "Branded allure has essentially devoured many alternate forms of youthful leisure experience" (Hobbs et al., 2005, p. 167) and the recent Covid-19 emergency seems to have posed an additional threat to grassroots venues (Zarur Guarisa et al., 2023).

Policy makers currently do not have many tools to intervene in this scenario. Brands and large corporations are now able to lobby licensing authorities by taking advantage of the British licensing framework (Chatterton & Hollands, 2003) and policy makers cannot prioritise independent and grassroots venues over corporate-owned ones. There is a need for the introduction of new policies which consider also the offerings, the independency and practices employed by NTE venues when granting licenses or any type of economic support.

7.5 Footfall at night and activity nodes

In this study, most of the variables directly linked with increased footfall appeared to be correlated with more violent incidents at night. Higher level of infrastructure, the density of squares and parks, alongside the density of pubs, restaurants, music venues and branded venues are all correlated to increased violence at night. This seems to indicate that intense night-time public use in specific activity nodes might be one of the main predictors of more violent victimisation at night. Policy makers might try to map these nodes in the public space and test the introduction of certain activities or permanent structures, like food stalls, emergency vans or street tutors.

Furthermore, policy makers need to take seriously the change of use of public space, as for instance, parks and squares allow a diverse range of activities during the day while becoming crime attractors at night, if left unguarded (Newton, 2018).

Furthermore, these results are also in line with the extensive existing literature which correlates increasing night-time violence with a higher number of NTE venues (Gruenewald & Remer, 2006 ; Livingston, 2008; Babor, 2010).As extensively argued in previous literature, currently NTE venues - especially corporate-owned venues - rely on high levels of alcohol and food consumption (Hobbs et al., 2005) and for this reason, are directly connected to – and partly responsible for – high level of footfall. In the current study, fast foods are the only venues which were negatively correlated with violent incidents at night, probably because they were more located in peripherical areas where the intensity of footfall at night is lower.

Interestingly, previous research has come to different conclusions in relation to the impact of fast foods on night crime. Certain authors found these venues to be correlated with more crime at night (Tuck, 1989), while others linked a higher presence of food availability in neighbourhoods to decreased crime (Scott & Dedel, 2001).

If high footfall, density and centrality of NTE districts are the main causes of a higher level of victimisation at night, delocalisation and desaturation of areas seem to be among the main viable solutions in the current scenario. However, designing and planning new NTE districts is not a task that policy makers can take lightly. There is indeed a risk of even worsening the current homogenisation and commercialisation of NTE districts by using top-down approaches (Eisinger 2000) favouring large companies and chain businesses. For instance, the financialization of NTE venues recently observed by Koulionis (2018), where big music venues are planned and created by developers to regenerate urban areas, is a clear example of how planning can result in the financial exploitation of NTE venues at the expense of local cultures and communities.

On the other hand, public owned venues assigned to independent actors and non-profit organisations willing to operate in decentralised areas can be an interesting solution for the saturation of NTE districts in city centres.

For instance, the city council of Berlin has recently announced a remarkable increase in the public investments dedicated to building new cultural venues (Kelly, 2023). This is an example of how city councils can influence the availability of accessible NTE creative venues which have the potential to foster a more diverse and inclusive NTE.

Other short-term approaches to better manage and prevent overcrowding in high-density NTE districts can also be taken into account. For instance, the city of Amsterdam introduced street stewards in the Rembrandt square which was suffering from high level of night-time anti-social behaviour and violence (Seijas & Gelders, 2021). These personnel have the aim to provide indications and de-escalate situations of tensions and frustration among NTE visitors and were successful in help preventing episodes of violence and anti-social behaviour (ibid.).

7.6 Physical and social disorder of urban neighbourhoods

According to the broken windows theory (Wilson & Kelling, 1982), signs of disorder in neighbourhoods can have a critical impact on both the social cohesion of the area and the opportunity for crime (ibid.) as they can be interpreted as the absence of capable guardianship. Physical disorder elements generally include those

signs which are considered the result of deviant behaviours, as well as evident signs of neglected or unmanaged public space. For instance, trash-filled streets, burned cars, crumbling parking lots, broken streetlights, graffiti and deteriorated buildings can all be clues of physical disorder (ibid.). In terms of social disorder, all those activities which are not deemed appropriate, legal or socially acceptable - e.g., prostitution, gambling, drug dealing and the presence of unhoused people - are also considered signs of lack of order and decor (Sampson & Raudenbush, 1999). In this study, signs of physical disorder were frequently found in most NTE districts. However, none of the physical disorder characteristics significantly correlated with violence at night.

These results should not serve to question the importance of urban maintenance and decor. However, they seem to suggest that other factors have a bigger influence on violence at night. Policy makers might focus on how the use of the public space changes over the day and monitor whether certain acts of night-time vandalism can influence how the area is perceived.

On the other hand, GSV allowed to observe the presence of unhoused people and shelters in the public space. This variable remained significantly, positively and strongly correlated to a higher number of violent victimisation incidents at night. Even though previous research has found that unhoused people tend to be more victimised (Larney et al., 2009), the CSEW does not include homeless people in their sample of respondents. It is therefore possible that the correlation found can be interpreted as another element supporting the importance of activity nodes and footfall in relation to violence at night. Indeed, unhoused people were mainly observed in central areas with high footfall and in parks and public squares.

7.7 The Index of Multiple Deprivation in NTE districts

In existing literature, the deprivation of urban areas has been associated to crime and perception of unsafety, as it is directly linked with absence of capable guardians and community ties (Sampson & Raudenbush, 1999). Interestingly, the Index of Multiple Deprivation showed a complex correlation with violent victimisation at night. When considering the entire MSOA sample, less deprived areas correlated with less violent crime, a result which is extensively supported by previous research (Sutherland et al, 2013).

On the other hand, when focusing only on those areas overlapping with NTE districts, less deprived areas actually experienced a higher number of violent victimisations at night. This result is not straightforward and needs further exploration. However, it is possible that given the centrality of NTE districts, other factors become more important when trying to explain violent crime at night. It is also possible that less deprived areas experience a higher intensity of NTE activities, as visiting pubs, bars, restaurants and clubs or simply going out at night generally necessitate a higher level of income among the population. More research investigating the correlation between NTE experiences, wealth, deprivation and possible opportunities for violent crime should be conducted.

Policy makers should always consider the level of deprivation experienced by urban areas when analysing crime phenomena. However, other demographic and routine activity characteristics among the population can have a bigger impact on violence at night in those areas which are mainly close to city centres.

7.8 The influence of the population's demographics and habits

Existing literature has extensively pointed out how violence in NTE is linked with young patrons, and especially with the presence of young males. For some authors, the utopia of a balanced and cosmopolitan NTE (Young et al., 2006) failed to become reality as in the UK nightlife has been populated prevalently by an 18–to-24 years old visitors (Roberts & Eldridge, 2012; Roberts, 2015; Van den Nouwelant & Steinmetz, 2013; Tiesdell & Slater, 2006; Bromley et al., 2000).

The correlation between younger individuals and violence, has been explained by different traits of younger people, like the increased sexual competition among peers or the presence of machos' values and of specific drinking patterns – i.e., binge drinking (Quingley, 2003; Homel et al., 1992; Graham et al., 1980; Homel & Clark, 1994). However, some researchers have also highlighted that younger patrons might be encouraged by the contextual factors of NTE venues which aim to create a permissive atmosphere while inducing alcohol consumption (e.g., through special offers, happy hours, entertainment games etc.) without providing alternatives - like non-alcoholic beverages or food (Kaplan & Reed, 2018).

While this study did not find any correlation between alcohol promotion signs and increased numbers of violent victimisation at night, all the results from the analysis seem to support previous findings linking NTE violence and the presence of a younger population.

Therefore, there is an urgent need to further explore which is the precise role of those NTE contextual factors targeting young patrons in facilitating or preventing violent victimisation at night. Policy makers might implement certain interventions aimed at reducing behaviours like binge-drinking and at fostering alternatives among young NTE visitors. Furthermore, in line with Roberts' findings about the excluded NTE population (Roberts, 2006), policy makers might encourage a more mixed NTE offer which includes activities for other populations' targets – like couples with young children.

In terms of routine activities, when considering the whole MSOA sample, this study found a positive correlation between the number of people frequently consuming alcohol and violent victimisation at night, supporting previous findings on alcohol and violence (Tseloni & Granpat, 2015).

Furthermore, in previous research, the frequency of visiting pubs and nightclubs was considered as a significant predictor of violent victimisation at night (Tseloni & Ganpat, 2015). Interestingly, in this study, when considering the entire MSOA sample, a higher number of frequent nightclub-goers was negatively correlated with violent victimisation at night. Certain studies found that nightclubs with less use of illegal drugs also experience less violence (Hughes et al., 2011), and that music and entertainment might have a positive effect in preventing frustration and aggressivity (Homel & Tomsen, 1993). On the other hand, in countries like the Netherlands and France, loud music was associated with increased drinking speed and alcohol intake, which are strongly correlated with increased violent incidents and aggressive behaviour (Hughes et al., 2011). Also, the genre of music being played has been pointed as a contributing factor to alcohol intoxication and alcohol-related harm in several studies (Homel et al., 1997; Forsyth, 2006).

The results of the present research are not sufficient to improve the current understanding between nightclub

visits and violence at night; in fact, when considering only the NTE-MSOAs, the present study did not find a significant correlation between routine activities and a higher number of violent victimisation at night.

7.9 Perception of safety at night: a complex matter

Perception of safety is a highly complex matter, which is situated in time and place, and shaped by political and cultural phenomena that makes it very difficult to explore. In the words of Roberts, "fear is always historically and culturally specific, and not a universally shared emotion. As much as there are different fears, so too there can be different intensities of fear associated with different parts of the city" (Roberts, 2009, p.16).

In previous research, certain public environments have been identified as possible generators of fear and insecurity. For instance, public places which are not well lit at night can cause a sense of insecurity especially among women (Hardley & Richardson, 2021). Overall, the expansion of NTE districts has been supported by the belief that more lively cities at night would lead to an increased sense of safety among the population (Roberts & Eldridge, 2012). Indeed, in the work of Jacobs (1961) it was already possible to find claims supporting these assumptions, as she wrote that "on successful city streets, people must appear at different times" (ibid., p.152).

Interestingly, when considering the entire MSOA sample, the amount of people visiting frequently pubs alongside the Index of Multiple Deprivation were significantly correlated with a higher perception of safety at night. This supports previous literature pointing out that the presence of more people in the street can translate into a more sense of safety at night. Also, deprivation seems to have a significant role in explaining people's sense of safety at night, as in both stages of the analysis, less deprived areas were correlated to an increased number of people feeling safe at night.

On the other hand, the multiple regression analysis did not find any independent predictor for increased perception of safety while walking alone at night. However, some characteristics of NTE venues - i.e., the presence of chairs and tables outside, the presence of certain environmental characteristics related to the bicycle use and the presence of unhoused people, were slightly significantly correlated with less sense of safety. There might be other factors that the research did not take into account which can help better explain the feeling of safety at night among the population.

7.10   Public data availability

The present research tried to analyse the environmental characteristics of NTE districts and how they can influence the level of violent victimisation and perception of safety at night in urban areas. Due to limitations of the data available and the abrupt restrictions put in place during the pandemic, it was very hard to rigorously test the possible correlations between environmental elements and the two social phenomena of interest. The impossibility to physically (or virtually) visit NTE venues in operation, or to record those urban characteristics which are only available at night, was a major obstacle for the research.

However, the process also allowed the researcher to ponder on the availability and quality of existing data to

explore NTE related phenomena.

For instance, one of the main challenges encountered was to consider the pool of potential victims which are present in a specific place at a certain time of the day. In other research, this was approximated by counting the number of people living in an area or by considering the amount of people having specific habits (Garius, 2016). In the current study, these approaches could not be applied as the residents of certain areas might not be involved in any of the local NTE activities, or they might visit NTE venues in areas far from their neighbourhood. The existence of information regarding the capacity of venues, or other dataset regarding the mobility of people might have helped the researcher in estimating the potential pool of victims and offenders in relation to NTE districts.

In the future, licensing authorities, might consider including information about the capacity of each licensed venue in their lists of licensed venues, which would allow researchers to approximate the amount of the population visitng NTE districts.

Therefore, a recommendation of the present research is to create a national database of licensed venues with standardised and consistent information and classification rules, providing for each venue (1) the class of activity (e.g., a nightclub, a pub, a restaurant, a fast food etc.), (2) the type of the license, the (3) capacity and possibly (4) the operating times.

Previous research already recommended to triangulate different dataset - for example victim surveys, police crime data, point of interest data, footfall estimates, and licensing data - to achieve a more complete understanding of assaults in or around licensed premises (Garius, 2016). Given the constant rise of new digital technologies, environmental scholars might adopt – and adapt – new digital tools to the exploration of crime-related issues in the NTE.

Interestingly, recent studies have found that burglars started to use Google Maps (Langton & Steenbeek, 2017) to find and select more vulnerable households. Also, it is probable that social media platforms are already having a huge impact on how people perceive NTE experiences and their tangible and intangible values. For instance, expectations about the atmosphere of certain economic activities are now built – and reinforced - online through other users' reviews and contents posted (Gunden, 2017).

Therefore, another recommendation of this research is to better explore new possibilities provided by digital tools - e.g. like machine learning, topic modelling for the analysis of online reviews, Google Street Views, social media platforms analysis etc. - that can be integrated into more standard methodologies.

Currently, how to assess NTE districts and what characteristics they should have in order to encourage a more balanced and inclusive night-time environment is still not clear. However, some promising case studies exist. For instance, the private consulting agency Vibe-lab has developed an instrument called the *Creative Footprin*t, which aims to study the cultural strength and impact of nightlife (Johnson & Gloor, 2022).

Another recent research conducted by the BOP consulting agency (BOP Consulting et al., 2021) studied the Night-Time Economy in New York, Tokyo, Amsterdam, Melbourne and Nanjing and developed a 'Night-Time Economy Index'. This index is mainly based on quantitative data about Night-Time Economy activity

performances in terms of visitors, number of venues and events, but it also includes other environmental characteristics like transportation and the attractiveness of urban areas . In Korea, other researchers have recently considered the night-lighting consumption, the number of entertainment facilities, transports and credit-card sales to develop a night-time vitality index (Kim & Kim, 2022).

Other cities have also paved the way to more holistic approaches involving multi-actors' partnerships with different stakeholder to have a better understanding of NTE phenomena and possible interventions. Amsterdam, Stockholm, Berlin and Paris are among the leaders in terms of best practices in night-time management (Möhle et al., 2019; Seijas & Gelders, 2021).

However, NTE plans which include ways to assess and analyse urban environments in relation to NTE social phenomena and that are able to measure their impact are currently very rare, if non-existent.

The final recommendation of this research is to advance new data-informed policy making approaches which allow to measure and explore NTE environments and the impact of NTE strategies and interventions on social phenomena.

7.11   The future of night studies

The tale of modern Night-Time Economy has its roots in the industrial revolution and the subsequent urbanisation of modern society in the nineteenth century. The rise of new modes of industrial productions led thousands - and then millions - of people to abandon the countryside and move to urban centres. Technological advancements allowed urban nights to be enlightened and made night life possible.

However, the study of urban night-time phenomena remained relatively secondary in the political and academic agenda and only with the explosion of NTE activities and NTE districts, started to become more prominent in the public discourse. Over the past thirty years, many researchers in night-studies fields have been advancing the understanding of socio-cultural and economic phenomena in connection to NTE activities. If most of them have been mainly active in the UK, Canada, Australia, France, and US (e.g., Graham et al., 2006; Newton, 2018; Roberts & Eldridge, 2012; Gwiazdzinski, 2015), now also studies in Asia, South America and Africa are starting to emerge (Acuto et al., 2021).

For instance, by 1st October 2020, China had issued 197 policies related to the NTE throughout the year—four times greater than the number of policies published in 2019 (China Tourism Academy, 2020). In addition to the government's strong support to the NTE development, many studies have shown Chinese urban tourists' growing propensity for night-time spending: 92% of tourists reported participating in night-time tours, and 53% of domestic tourists who stayed for an average of three days spent two nights experiencing local nightlife (China Tourism Academy, 2019).

The increased institutional recognition of the importance of the NTE is probably leading to a de-centralisation of night-studies. The western narrative around the NTE has been mainly concerned on alcohol consumption, crime, violence and anti-social behaviour and probably it is going to be complemented – and questioned – by these other emerging narratives.

Furthermore, new modes of sociality, new drinking cultures and technological innovations will be probably

changing the ways how NTE experiences are lived. New phenomena like the emergence of the 'sober rebels' (Nicholls, 2021; p.54) seem to be not just the consequences of marketing strategies, but are supported by data showing that younger people are drinking less alcohol and less frequently (Office for National Statistics, 2017). Certain authors are also arguing that these new trends are also reflected in contemporary popular music lyrics, which, compared to the past, are avoiding the celebration of certain social behaviours related for instance to excessive alcohol and illegal drugs use (Jones, 2022).

Furthermore, the traditional distinction between different drinking cultures – e.g., wet Mediterranean versus dry Nordic drinking cultures – seems to be blurring (Room, 2010). Studies are demonstrating that also in countries in south Europe, phenomena like binge-drinking are becoming more normal, even though certain local characteristics still exist. On the other hand, at the recent Berlin international conference of night-time cities (Stadt Nach Acht) in a panel one speaker argued that German nightlife is undergoing a phenomenon of 'mediterraneisation'. This referred to the adoption of a more social use of the public space at night by German younger generations, a habit which was traditionally associated to regions like Spain and Italy (Gómez-Fraguela et al., 2008).

Also, awareness around certain topics related to inclusion and gender equality are becoming more common and are already shaping dynamics of inclusion and exclusion at night. These trends are probably going to influence how policy makers will make decisions and plan NTE urban environments in the future.

Finally, contemporary NTE has developed during the transition from the Fordist urban model into the contemporary creative city at the end of the '80s (Roberts & Eldridge, 2012). But what will happen when other urban - or maybe rural – general economic trends will emerge and most of the previous industrial conversion process will be completed? Which shapes, size and characteristics will have the NTE venues and districts of the future? And how policy and practitioners might help guide these processes in the current economic context where elements of instability and crisis are becoming increasingly frequent?

All these questions should probably inform the future of NTE studies and open new possibilities for public transnational, intergenerational and intercultural conversations and discourses in this field.

Appendices

Appendix A – PoI classes filter in ArcGIS

The following Structured Query Language (SQL) codes were used to filter the PoI dataset of each city and extract the classes and categories of interest to be used as independent variables.

NTE PoIs

classname = **'Nightclubs'** Or classname = **'Pubs, Bars and Inns'** Or classname = **'Restaurants'** Or classname = **'Fish and Chip Shops'** Or classname = **'Fast Food and Takeaway Outlets'** Or classname = **'Fast Food Delivery Services'** Or classname = **'Hotels, Motels, Country Houses and Inns'** Or classname = **'Cinemas'** Or classname = **'Social Clubs'** Or classname = **'Theatres and Concert Halls'** Or classname = **'Alcoholic Drinks Including Off Licences and Wholesalers'** Or classname = **'Casinos'**
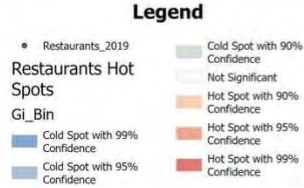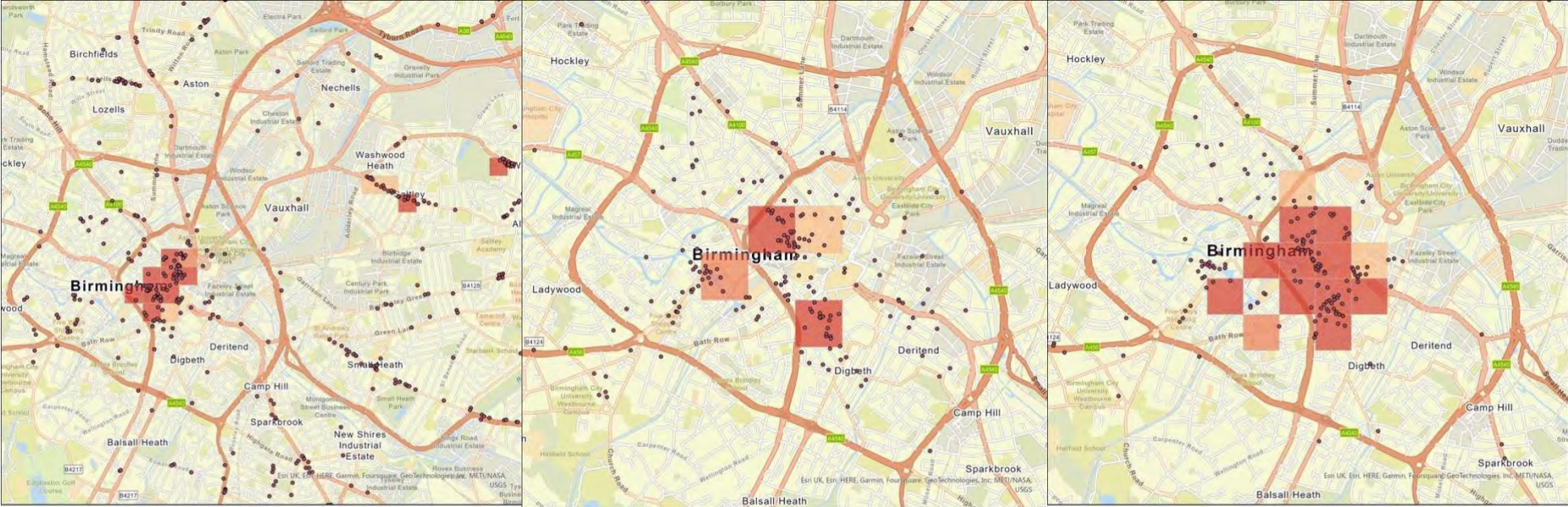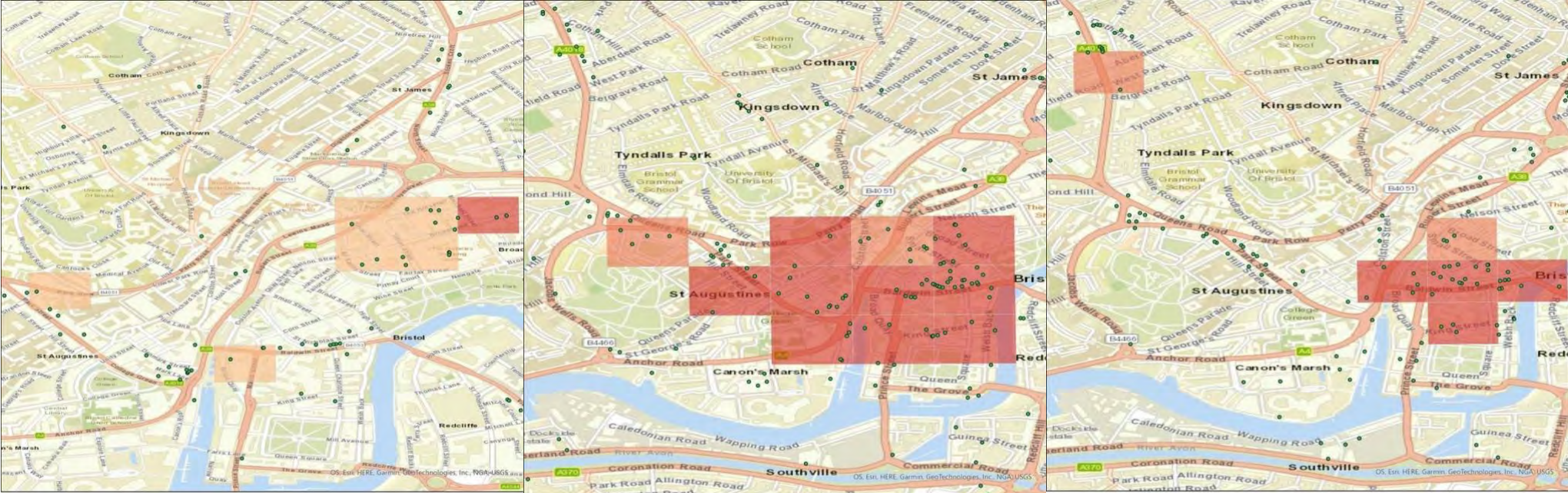
Brand

brand IS NOT NULL

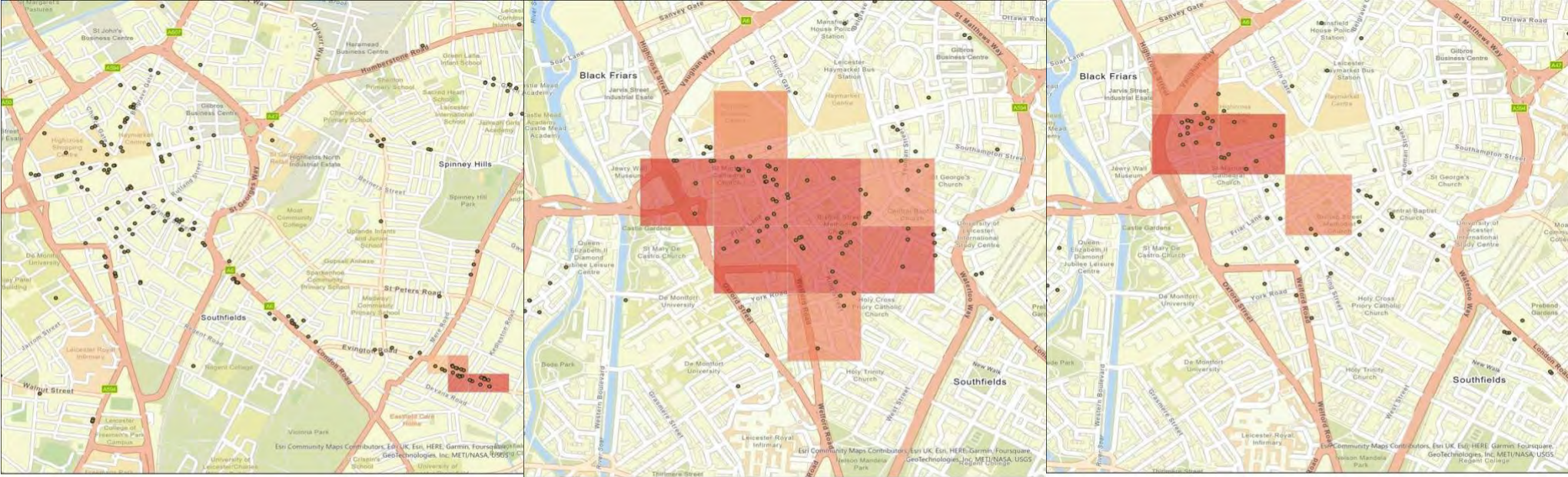**Retail**

groupname = **'Retail'**

Appendix B – NTE clusters
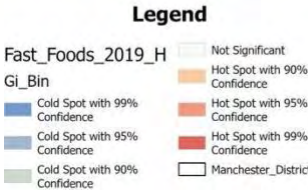
Birmingham NTE Clusters.
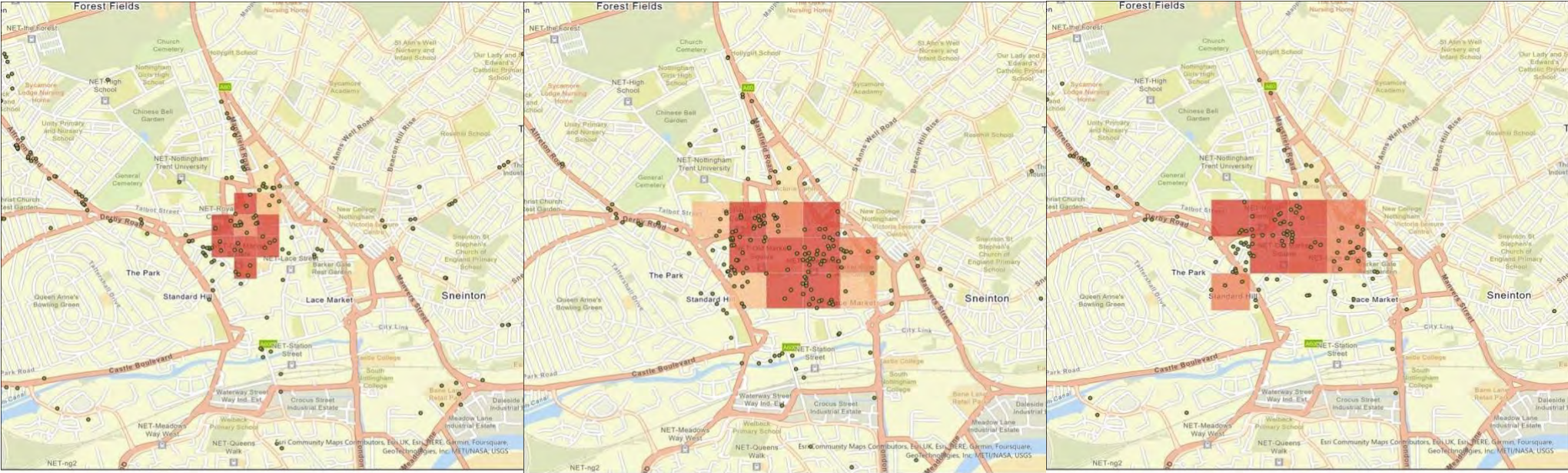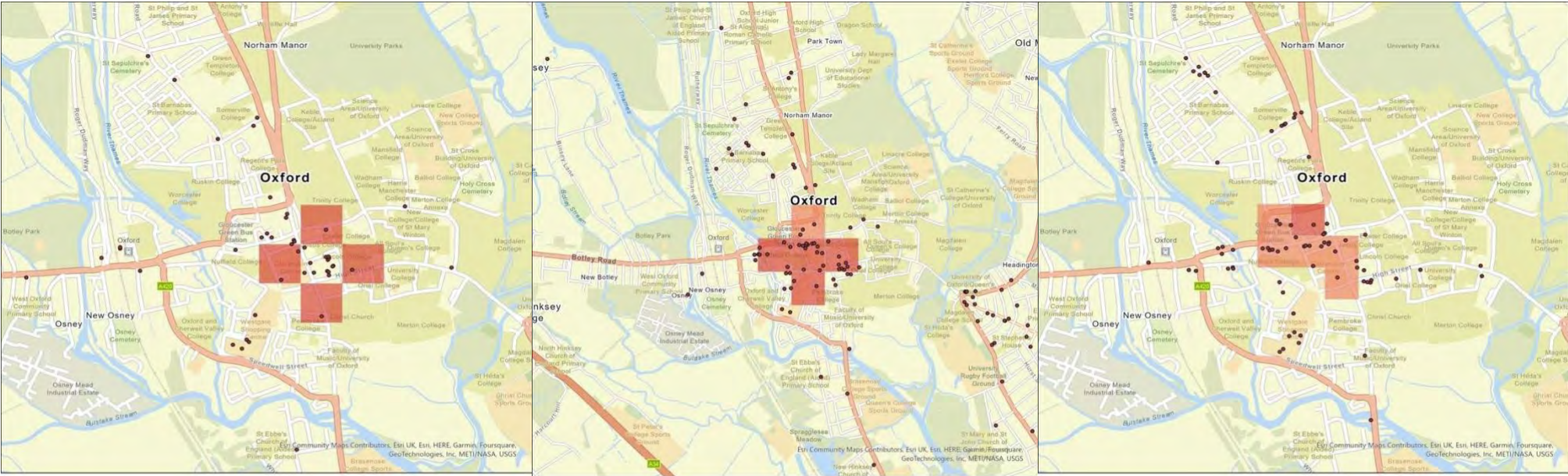
Bristol NTE Clusters.

Leicester NTE clusters.

Manchester NTE clusters.

Nottingham NTE clusters.

Oxford NTE clusters.

Appendix C – Count of individual PoI classes

PoI Class	Oxford	Nottingham	Leicester	Bristol	Birmingham	Manchester
Off Licences	16	48	48	59	144	73
Casino	0	6	3	3	7	5
Cinemas	6	5	4	11	13	6
Fast Foods	142	454	520	489	1289	897
Hotels	30	38	21	38	104	85
Nightclubs	7	15	19	31	41	44
Pubs, Bars and Inns	145	256	195	407	374	494
Restaurants	141	183	187	309	587	419
Social Clubs	16	23	30	34	86	46
Theatres/ and Concert Halls	10	12	12	28	25	23

Appendix D – Land uses in NTE districts

Land uses in Pubs, Bars & Inns districts

Pubs, Bars & Inns districts	Birmingham	Bristol	Leicester	Nottingham	Manchester	Oxford	Mean
Community - Educational	2	6	2	3	0	17	5
Community - Emergency Services	0	0	0	0	0	0	0
Community - Governmental	2	2	4	0	0	1	1
Community - Health	0	0	0	0	0	0	2
Community – Institutional and Communal Accommodation	3	2	7	1	0	1	2
Community - Religious	0	1	2	1	0	1	1

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General Commercial Mixed Use	0	0	1	0	2	3	1
General Commercial Mixed Use - Derelict	1	0	0	0	0	0	0
Industry - Manufacturing/Processing	3	0	0	0	0	0	1
Office Only	35	14	22	18	7	8	18
Office With Retail on Ground Floor	0	0	2	5	2	0	2
Recreation And Leisure	3	5	2	1	0	3	2
Residential Only	5	22	6	11	12	20	13
Residential With Retail on Ground Floor	0	0	0	4	2	0	1
Retail	44	47	49	51	72	43	51
Storage/Warehousing	0	0	0	1		0	0
Transport	1	1	0	3	1	0	1
Unclassified	1	0	1	0	0	3	1
Utilities	0	0	1	0	0	0	0

Land uses in Restaurants districts

Restaurants districts	Birmingham	Bristol	Leicester	Nottingham	Manchester	Oxford	Mean
Community - Educational	2	1	1	2	0	18	4
Community - Emergency Services	0	0	0	0	0	0	0
Community - Governmental	1	1	8	1	0	0	2
Community - Health	0	0	0	0	0	0	0

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Community - Institutional And Communal Accommodation	2	1	0	0	0	1	1
Community - Religious	1	1	3	1	2	1	1
General Commercial - Mixed Use	2	0	3	0	2	4	2
General Commercial – Mixed Use - Derelict	1	0	0	0	0	0	0
Industry - Manufacturing/ Processing	6	0	0	0	0	0	1
Office Only	27	17	11	15	19	12	17
Office With Retail on Ground Floor	0	0	0	5	8	0	2
Recreation And Leisure	5	4	1	1	2	2	2
Residential Only	16	29	1	8	1	12	11
Residential With Retail On Ground Floor	0	1	2	4	1	0	1
Retail	33	45	69	58	64	47	53
Storage/Warehousing	0	0	0	0	0	1	0
Transport	3	0	0	0	1	3	1
Unclassified	1	0	0	3	0	0	1

Land uses in the Fast Foods districts

Fast Foods districts	Birmingham	Bristol	Leicester	Nottingham	Manchester	Oxford	Mean
Community - Educational	1	1	0	0	2	29	5
Community - Emergency Services	0	0	0	0		0	0
Community - Governmental	1	0	0	0	0	0	0
Community - Health	0	0	0	0	0	2	0
Community - Institutional And Communal Accommodation	0	0	0	0	1	2	1
Community - Religious	1	0	0	0	1	0	0
General Commercial - Mixed Use	0	0	1	0	2	1	1
General Commercial - Mixed Use - Derelict	0	0	0	0	0	0	0
Industry -	0	0	0	0	0	0	0
Office Only	7	4	1	4	2	8	4
Office With Retail On Ground Floor	0	0	0	8	1	0	1
Recreation And Leisure	1	1	0	0	0	2	1
Residential Only	59	15	75	1	58	12	37
Residential With Retail On Ground Floor	2	0	0	2	1	0	1
Retail	28	78	23	76	33	43	47
Storage/Warehousing	0	0	0	0	0	0	0
Transport	0	1	0	0	0	0	0

Unclassified	1	0	0	7	0	1	1
Utilities	0	0	0	0	0	0	0

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