Research Article

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Social Impact Assessment in Urban Security Management Projects: A Case Study from Pakistan

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Abstract

Public safety and security management projects are devised to reduce crime, fear and calamities by prevailing law and order to reduce the harm in society. In a certain context, social impact assessment is a novel way to reveal the extent of effectiveness for these projects. This case study presents an Expert System based methodology regarding social impact assessment for two urban security management projects in Pakistan. An Expert System, DoctuS is employed as a tool to build a rule-based model tool using social impact attributes (as variables) from literature and expert knowledge (Author's own insight as being involved in projects). Case-based reasoning (CBR) method is employed for the measurement of the impact of urban security management KPIs (Key Performance Indicators) in the two case projects. The empirical findings in this case study approaches the impact assessment by quantitative analysis of crime rates in JMP statistical package and Qualitative Expert knowledge-based model in DoctuS. Thereby, the study evaluates the pre and post ante project situations in order to assess the project's effectiveness and impact on improved urban safety and security. In the first step, the projects are briefly described, followed by the crime rate analysis under the project jurisdictions and rules between attributes are defined. The second step defines the qualitative rule-based model along with the two cases described, and validated in DoctuS tool. Some attributes and rules have changed, and a new concise model is presented. The Expert System compares the project cases and evaluates the social impact assessment based on the defined KPIs. The Expert system validation presents a novel model for social impact assessment of subject urban security management projects. We propose this methodology and model as useful in investigating social impact assessment of projects specifically dealing with urban safety and security management. However, the generalizability of the findings of this case-study based articles need more sophisticated tests as recommendation for the extension to this study

Keywords: *Expert system, crime rates analysis, urban safety and security, case-based reasoning, social impact assessment in Pakistan*

1. Introduction

Social impact assessment is defined as "the process of identifying the future consequences of a current or proposed action which are related to individuals, organizations and social macro-systems" (Becker, 2001, p.311). "A policy can generally be thought of as a statement of intent made by a government body, often with the involvement of non-government individuals and organizations" (Evans & Cvitanovic, 2018, p. 3.), (Slootweg et al., 2015, p. 6). There is a lack of study in the literature on comprehensive understanding and identification of key factors, influencing social impact assessment in urban security management. It concludes by making a system of development and diffusion of innovative policies (such as new technology incorporation) in the ongoing project operations and processes (Edler et al., 2003, p. 3-20) leading to improved decision making.

Social Impact Assessment is a much needful and discussion-worthy genre in urban security management domain. Particular literature on social impact assessment relates well to public administrative and regional sciences. (Davis and Webster, 1981) mentioned Social Impact assessment as a decisive and feedback mechanism of improvement in implications to community and regional initiatives (projects). This paper presents an Expert System based methodology established on empirically evident statistical analysis, attributes, and Key Performance Indicators (KPIs) from literature and expert knowledge to carry out social impact assessment. Whereby, we observe how the social changes have been achieved to mitigate crime in the cities. Which variables across the project implementations are supported by theoretical background in literature and how does the statistical analysis of crime rates throughout the years support the claims that the project was successful? Moreover, the qualitative analysis of the literature-based variables using DoctuS system identifies the most vital factors for impact assessment of the projects. Therefore, the mixed method and undertaken research methodology in this article is recommended to be extended for urban security management projects of such scale.

This study addresses the problem of effective evaluation of the urban security management projects using pre and post ante situations assessment. This is important in the alignment of urban administrative systems, policy and strategic reforms using diverse data, indicators and subjective knowledge. In addition to crime rate analysis, an AI-based Expert system platform, DoctuS is used for case-based reasoning to summarise the attributes. Whereby, narrowing down of the diverse attributes from literature on wider context of urban safety and security alongwith expert knowledge is achieved by this method. The study approaches a systematic model and framework of Social Impact Assessment, indicating the most important attributes for public safety, security management projects and their evaluation of effectiveness for the public by analysing the crime rates, literature reverberated KPIs and specically the authors' expert knowledge on the project.

For this purpose, we have gathered a wide range of indicators, attributes and strategies to propose this methodology with discussed limitations in the literature. The two project cases discussed here are the safe city projects, implemented in Pakistan's national and provincial capital, Islamabad and Lahore, respectively. The rationale for choosing the projects as cases include author's own engagement in the projects, familiarity of the context and experience within urban safety and security management domain. Furthermore, the empirical data is gathered from the official statistical resources to present the descriptive statistical analyses of crime rates for both city cases elaborate on ex-ante and post-ante situations in the project cases to empirically support the claims. Additionally, the changing scenarios in communities and regions are discussed to evaluate the lessons learned in projects.

As (Lovejoy, 1983) stated, the social impact assessment is an ever-growing inclusiveness of attributes. As implication of which, this article considers some best practices from literature and theoretical background towards the better applicability of research way forward. Furthermore, the study incorporates the framework based on analyzed attributes as Key Performance Indicators. These attributes form literature and expert knowledge are categorized into three primary variables including policy measures, decision making measures and regional dynamics. So, to see how these

variables account towards the social impact assessment for the case projects. All the information gathered comprised of case-specific information, which are statistics including crime rates per unit population, policy initiatives, decision-making elements and regionally varying characteristics. The project, community, social, demographic, and regional characteristics generate a wide explanatory power and understanding of the project's impacts.

To compare the empirical findings with the expert system findings, we have reflected upon crime rates as a measure of effectiveness for subject smart urban security projects. As paper analysis discusses and reviews the utility of two such projects from Pakistan, which are Safe City Project Lahore and Safe City Project Islamabad in terms of crime control initiatives. Notes on integrating smart security in practice, police operations and social challenges along with the opportunities linked with these projects are discussed in a regional context. Descriptive crime statistics and trends translate into urban security effectiveness as a decline in crimes in due course of implementation of subjected urban safety and security projects. Policy practices employed with digital innovation for the achievement of safe and secure communities are emphasized. Moreover, we argue about the generalization of findings with the statement of limitations.

Detailed statements over empirical findings as quantitative analysis analytical framework and qualitative analysis are presented in the methodology section. The tools used in statistical, and Experts' systems case based inductive reasoning are JMP Pro v16 and DoctuS Knowledge Management System, respectively. To summarize, the paper clarifies integration of social impact assessment literature with empirical findings, specific to the cases in order evaluate the social impact of the projects in cities and communities. The cases are specified in detail with regional data on crime rates and population to understand the differences in the attribute values varying across the cases. However, we recommend the inclusivity of further attributes that might be specific to the project or the regional context in similar future studies.

2. Literature Review and Theoretical Background

In this section, the structured classification of the literature review is presented on theoretical background, cases, methods, and tools used in this study.

As criticized in Prison of Poverty, the book by Loic Wacquant (Wacquant, 2009), the authoritarian and forced security, public spaces and penalties approach of America translated into some of the European states of France and Germany. The same can be seen in the Indo-Pak region due to pre-independence British colonial thinking and in Asia overall, by China exporting authoritarianism. Urban security management projects are initiated around the world to restrain the proliferation of bad habits in the community to generate a broken window to urge more crime (Wilson and Kelling, 1982). Elaborating on the discrepancies between elected and authoritarian regimes, (Rudra and Haggard, 2005) stated that "authoritarian governments spend less and show a weaker record concerning several physical quality-of-life measures" (p 1041).

Currently, most of the urban safety and security management projects are rolling out new technological solutions to control the crime because of innovative policies. These surveillance solutions to control crime and aid police services have been criticized by the public literature over privacy concerns. Nonetheless, accepted as in policy and can be seen as not so bothering to the public due to their safety concerns in public areas. (Local social behaviours). As ((*For a detailed account of this movement and its impact, see Eric Cummins, The Rise, and Fall of California's Radical Prison Movement*, 1994), (*States of Siege: U.S. Prison Riots, 1971-1986 - Bert Useem, Peter Kimball - Google Books*, 1991)) research has shown, the spread of bad behaviors is ultimately causing it to root in the neighborhoods to form a chain of criminal activities, reflected by "the broken window theory".

Pakistan has also incorporated a zero-tolerance strategy to beat crime on the surface, but the underlying factors are still prevailing. Chalom et al. (2001) emphasizes that not only policing can curb crime, but the focus on other socio-economic factors (e.g., health, education, unemployment, and youth protection) is also required. For that, a broad social scenario change observation is needed (as

cited in Tulumello, 2018, p. 3). Well, it is a debate about long-term solutions to social problems. Lastly, in this way, we can make a broader sense of security understanding in regions as compared to the global thinking and trends in this area of research. The literature lacks a solitary agreed-upon definition of safety and security, but sources discuss it as several indicators and dimensions. As we can refer to (Kabát, Filip and Filipová, 2017) perceives security as a multi-level phenomenon as a national, as well as relating to every inhabitant individually. However, in a broader context, it becomes important to address the scope and dynamics of it, but complex (specifically in case of limitations in uniform and categorical crime data to interpret and translate regional safety trends) at the same time. It not only requires regional understandings but also cultural elucidations.

To answer a much curious question, we can state how these public security concerns are addressed on administrative levels and what impact does it make? We may refer to SIA, as (Becker, 2001) maintains that impact assessment and consequential studies present a good analysis of such social systems. Moreover, decision-makers need to follow the recommendations made by researchers to understand the strategic needs and devise the least problematic strategy to solve a problem (or implement an intervention). For instance, (Tulumello, 2018) presents a conceptual analysis of security policy for crime prevention, following a methodological approach to compare security policy in regional settings. He suggested the study outcomes as insightful for political actors, as well as research society involved in public safety and urban security domains. (Nam and Pardo, 2011) state that smart city experts and researchers are the key spectators in research when innovation is discussed in policy and governance (Ahmad *et al.*, 2022) terms.

Upon the measurement of the responsiveness of governments in turn to the community problem. The nature of problems may vary depending upon the factors bound with certain regional and country's legal and institutional systems. (Baumgartner, Jones and Wilkerson, 2011) asserts that policy change dynamics revolve around "preferences, institutions and information" (p. 947) in comparative political research which enables the government's problem-solving capabilities. Whereby, comparative frameworks are crucial in making shared policy visions among institutions, municipalities, and governments as we reach the complexity of contexts in practice. (Çağlar and Gürel, 2019) discusses the impact assessment based sectoral balancing in the public sector. Whereby, they proposed a model and solution, emphasizing the sectoral balance in financing by public money. Government funding agencies and their motives in generating a significant impact among public sector domains.

(West and Bernstein, 2017) have built an understanding of the implications of social impact assessment in a project setting. The referred study suggested urban dimensions of security and wide-ranging aspects of policy reforms and evaluates innovation by comparing the safe city initiatives in seventeen cities. Based on the valuation upon methodological measurement for indicators of Metro Vision, Digital Infrastructure, Public Safety Effectiveness, Public Safety Adoption, Use of Data Analytics ((Pérez-González *et al.*, 2019), and Community Engagement, (West and Bernstein, 2017) report the rating of subjected cities as the innovators in public safety. This helps us understand digital innovation being an integral part of the solution to the increased crime rate and reduced public safety. But references to factual observations in this regard are scarce and need to be conferred.

To elaborate on above mentioned gaps, we approach the problem of social impact assessment by quantitative as well as qualitative analyses. In quantitative part of data analysis, we observe the statistical data on crime rates for the cities of Pakistan where safe cities projects have been completed in the past five years, namely Islamabad and Lahore.

(Ruža *et al.*, 2016) cites an important and primitive study (MASLOW, 1943) on the discussed topic in this case study. According to this, followed by the fulfillment of the physiological needs, comes the individual's safety needs, and takes up as a leading factor in one's conduct build-up. In the case of regional, political, ethnic, community, domestic, and personal abusive distress, physical safety is not satisfied and results in an unpleasant perception of one's safety. Therefore, the spatial phycology and geography concepts lead to the importance of regional understanding of security,

along with the cultural and geographical dynamics in such case studies.

This research realm gets foundations from Maslows' hierarchy of needs, as well as being a fundamental need for the well-being of humans and societies. Referring to Maslow's proposed needs model, safety, and security needs assurance as the second most important need of mankind, following physiological needs. This fact has been proven by several research studies mentioning this area of research as important in the social sciences' body of knowledge. Subject projects related to Maslow's concept of safety and security are implemented to fulfill the primary needs of people to be safe and secure, removing any threats from the surroundings by any means. Such opportunities are well appreciated in public administration and police reforms areas making the urban localities safer ((*(1) Examining the Concept of Security in Abraham Maslow's Hierarchy of Needs Theory | LinkedIn*, 2022), (Wahba and Bridwell, 1976), (Rasskazova, Ivanova and Sheldon, 2016).

(Hynes and Purcell, 2012) emphasizes the readiness of cities, discussing the increased trend in urban population and leaving critical infrastructural security more vulnerable in complex meshed urban networks. (Nam and Pardo, 2011) proposed the framework of smart city innovation in the deployment of technology as crucial in public safety policy. This shall foster the scope of innovation regarding opportunity factors that are very closely tied to the smart security dimension of future smart cities, as the digital transformations are progressing in the subject cities. (Lopes and Farooq, 2018) presents sound readiness on Lahore city becoming a smart city. As (Kourtit, Nijkamp and Steenbruggen, 2017) mentioned the significance of digital data systems in transforming urban policy and the introduction of smart systems as part of the smart city initiatives across the world, of which "urban safety and security subject" lies as a subset in "safe city" initiatives. Through the subject cases, we get an understanding regarding the emergence of digital technology in urban administrative complexity framework and public databases in cities being crucial towards smart urban public policy. Furthermore, the electronic databases and digital innovation initiatives bring new technology into regional development planning whether it's police body cams, systems of facial integration or public data integration. All these databases and data sources are necessarily maintained for transparency and accountability in urban safety and security development.

Literature narrates urban security as a component in urban livability by identifying the underlying key assessment indicators i.e., social and transport security, emergency handling, disaster recovery, response capacity building (Stelmach and Moch, 2022) and natural calamities (Ma *et al.*, 2023). Also, several indicators are identified in measuring "urban security, such as crime rate ((Ibem and Aduwo, 2013); (Martínez, Short and Ortíz, 2015), traffic safety ((De Vos, Van Acker and Witlox, 2016,(Marans and Stimson, 2011), and emergency shelters (Yu and Wen, 2016)." ((Zhan *et al.*, 2018, p. 3). All these security measures are a part of practices in the subjected safe cities projects. This way, not only the regular police operations are supported, but integration is also facilitated under police command and centers. Hereby, considering the policy factor, (Devroe, 2013) has analyzed the policy variation in Belgian and Netherlands, The constitutional and legal setting of the Netherlands favors crime suppression policies. Also, an integral social policy is supported scientifically by government-funded crime research and indexing bodies. Volatile politics is also discussed as an extrinsic factor in deterring maximum output of better policy settings. This study also tries to discuss the security thinking in the region and how Pakistan is cooperating and influencing the overall thinking about security, crimes, along with the ways of dealing with urban security challenges.

Furthermore, this paper includes insights on crime rates and terrorism due to regional inequalities and dynamics, the current social scenarios make this need even harder to be met. The study also fulfills an impact assessment of safety and security interventions as cases discussed for the proposed methodology. This is a progressive integration to research on public safety and security management.

3. Background on the Cases

There is an eclectic inclusion of concepts in this paper, which are directly or indirectly justified as a security initiative for the urban communities as a part of subject projects. Also, the technological

advancement and upgradation of pre-existing public security structures are useful as associated with the safe cities' definitions. Furthermore, other essential dealings such as police command centers, police-public interaction, and industry support are also discussed as vital factors in these safe city projects. Statements of support from UN organizations and practice of agencies to these initiatives translated the urban security enhancements into the safe city goals. UN-Habitat (2009) is also mentioned for its enforcing measures towards international initiatives on sustainable cities as this safe city program is rooted in UN-Habitat for crime control. Based upon this inventiveness supporting measure, authorities took the initiative to set up safe city Programs in metropolitans around the world. In Pakistan, safe city Islamabad and Safe City Lahore are the first two projects in the smart and safe city domain.

(Tumalavičius *et al.*, 2010) discussed the importance of fighting crime to ensure public safety. In this regard, for policy-making purposes, developing countries unlike Europe and US lack unified crime statistics and analysis. Insightful deduction upon such crime databases is crucial at regional and provincial levels. PITB (Punjab Information Technology Board) in Pakistan and digitization measure in Punjab province has now started to focus on crime mapping and data. However, it is not available to work out publicly by researchers. Therefore, in two sub-headlines, we state the brief introduction of the subject projects.

3.1 Islamabad Safe City Project

Safe city, Islamabad project was proposed and initiated by the federal government under the ministry of interior. Progressed by the Chinese state-level cooperation and Huawei company took on the project. Both countries signed an MOU for this project in the presence of prime ministers from both countries at Wen Jiabao's last visit to Pakistan in 2010. The project was financed on a state-approved loan for the duration of 20 years with a minimal interest rate of 2 per cent. The initial Budget for the project is reported to be 124 million USD in different reports. Exim Bank of China was the initiator of this cooperative concessional loan for the project. The participating bodies on the ground were ICCI (Islamabad Chambers of Commerce and Industry, Huawei Technologies Co. Ltd, a Chinese company that signed the contract for the project infrastructure deployment with local governments for both projects) with several other state agencies involved. Interior Minister Said about the Project, unrealistically, but imposed the importance in intention about the project on behalf of the government. "Although a huge amount has been spent on the safe city project, I will only be satisfied when the crime rate is brought to zero."

The safe city databases have been generated to integrate the criminal records into a central access system in order to manipulate the facial recognition features of CCTV. These criminal records and databases help in true spirit as a real-time emergency response and rescue practice (such as enhanced criminal track and trace capability), also in vehicle identification by its number, for example. A media report in Pakistan Today highlighted the fact of the audit of imported technology and equipment to ensure the data integrity and safety of sensitive information of Pakistani citizens. NITB (National Information Technology Board), PTA (Pakistan Telecommunication Authority) and several other stakeholders attached to the project proceeding ensured that along with the international neutral consultants involved in project delivery from Chinese to those Pakistani authorities. We shall further discuss this data and public privacy concerns and considerations in the later sections of the study.

3.2 Lahore Safe City project

Lahore is a more populated city with intercity or domestic migration, historical value in tourism, and job opportunities. (Bajwa, Khan and Nadeem, 2018) extended about the deprivation of public upon resources of health and education, the middle and lower middle class are being scarce, below standard and have limited survival power to avail private and public facilities in Pakistan. As per the

Punjab Bureau of Statistics (2017), more precisely, there are only 47 government colleges and 54 government hospitals with a few emergency wards and ICU facilities for the 11 million population, hence making the situation of basic facilities for a common person very much clear. However, industrial growth has made it towards a good employment rate in Lahore.

The police coverage in the city is based on the Police stations. A total of 86 police stations are there in the city to provide the basic security and policing needs of the locality. The safe city project covers the surveillance zones based on the division of police stations, following the geographical boundaries of jurisdiction for each police station and their subsequent Headquarters (Punjab Bureau of Statistics). Furthermore, many acts of terrorism have urged the government to counteract suicidal and mob attacks that compromise the safety and overall image of the country internationally. For that purpose, the Punjab government passed Safe Authority Act 2016 to initiate the project for substantial surveillance and security implementation in overcrowded areas and publicly important routes. Under this project, 8000 surveillance cameras, integrated Command, Control, and Communication Centre, costing 12 billion PKR are established. It is planned to spread this project shortly and cover the other 6 major cities of Punjab by 2017 (Dawn, 2016a; Government of Punjab, 2016 as cited in (Bajwa, Khan and Nadeem, 2018 b)

Furthermore, Lahore Project has a far broader scope and integration efforts with other departments at municipal and national levels. That not only justifies the effort for improved safety, but also the overall well-being of citizens. Additionally, many court proceedings are aided by the electronic evidence from the CCTV camera network to proceed with cases on heinous crimes as mentioned in the concept paper(*Punjab Safe Cities Authority – Beginning of new police culture*, 2022) of the project accessible from the website.

4. Methodological Background: Expert Systems and Case Based Reasoning

Expert systems and knowledge are some very useful approaches for understanding narratives in the decision-making process. (Max-Neef, 2005) presents the Trans disciplinarity approach in identifying the effectiveness of social interventions in complex subjects as public safety and security. (Aeberhard and Rist, 2009) (Nicolescu, 2002). Therefore, for qualitative analysis of the literature based attributes, we use an Expert System DoctuS. (Baracskai *et al.*, 2017). This tool embeds (Simon, 1986) Simon's concept of bounded rationality and symbolic representation of expert knowledge. This tool works as a pre-built knowledge engineer's interface taking author (domain experts') problem-oriented knowledge. Hence to transform knowledge acquisition into certain decisions using an ID3 (Artificial intelligence (AI) learning model) algorithm (Wielinga, Sandberg and Schreiber, 1997) (Baracskai *et al.*, 2017) (Liao, 2005). Knowledge-based expert systems find many practical implications, transforming several businesses, industries and public sector operations and management (Wagner, 2017), (Liao, 2005), (Gavrilova and Leshcheva, 2015), (Wagner, 2006), (Wagner, Chung and Najdawi, 2003),(Wagner, Otto and Chung, 2002), (Cairó and Guardati, 2012).

Employing CBR (Case based reasoning) (Wang and Ma, 2022), (Chen *et al.*, 2022) helped us to integrate the expert knowledge and literature KPIs to compare the projects to reach on a conclusion about the effectiveness of cases and how the social changes are practically implemented using theoretical inferences in literature. (Ganji, Rassafi and Bandari, 2020) supports expert system's CBR approach as effective besides MDCA(Multi-Criteria Decision Making) ((Dehe and Bamford, 2015) and evidential analysis ((Okudan, Budayan, and Dikmen, 2021), and (Chen *et al.*, 2022).

5. Research Objectives

The study primarily focuses on the following aspects of the regional public safety and security understandings of the country and the provincial capital of Pakistan (Islamabad and Lahore respectively). Following are the summarized research objectives:

1. To demonstrate the importance and limitations of safety and security studies concerning

geographical, cultural, and regional settings.

2. To propose Expert system validated Social Impact Assessment model and framework for urban safety and security management projects.

The case study addresses the following key research questions focused on the objectives:

5.1 Research Question 1

What are the Key Performance Indicators and attributes for urban safety and security management projects? What are the key needs and limitations in actual realization of regional comparisons, change scenarios, combating crime and enhancing public safety?

5.2 Research Question 2

How to carry out Expert System validated Social Impact Assessment in urban safety and security management projects.

6. Materials and Methods

Data collection is comprised of two methods. Firstly, the statistical data collection and analysis presents the cases of both cities with comparison of populations and their growth compared to crime control trends using crime rates (Table 1-3). The descriptive statistics is employed in the statistical analysis using statistical package JMP Pro v16 for Spearman's correlation of the crime rates to measurement of change in crime trends across the years in both cases.

Table 1: Population Count and Growth Statistics for the Islamabad and Lahore 2015-20

Year/Population	Yearly Count Lahore	Yearly Count Islamabad	Yearly Growth Lahore	Yearly Growth Islamabad
2015	10369137	956599	420088	32600
2016	10807578	990397	438441	33798
2017	11263275	1025290	455697	34893
2018	11738186	1061412	474911	36122
2019	12188196	1095064	450010	33652
2020	12642423	1129198	454227	34134

Source: Pakistan Bureau of Statistics, Open Data Portal (https://opendata.com.pk/), ASOC Overseas Security Advisory Council US and local Police web portals

Table 2: Crime Count and Categorizations for the Islamabad 2012-17

Year / Major Crime Islamabad	Murder	Attempt to Murder	Kidnapping /Abduction	Dacoity	Robbery	Burglary	Cattle Theft	Other Theft	Other uncategorized	Total Major Recorded
2012	120	146	70	22	177	245	43	585	5699	7107
2013	131	203	112	52	288	345	39	667	6257	8094
2014	144	164	98	56	379	384	27	580	6564	8396
2015	116	131	97	26	209	330	21	512	6340	7782
2016	94	141	81	12	185	297	29	489	5689	7017
2017	84	163	99	16	195	253	22	506	5798	7136

Source: Pakistan Bureau of Statistics, Open Data Portal (https://opendata.com.pk/), ASOC Overseas Security Advisory Council US and local Police web portals

Table 3: Crime Count and Categorizations for the Lahore 2010-19

Year/ Major Crimes Lahore	Murder	Hurt	Rape	Kidnapping/ Abduction	Dacoity	Robbery	Burglary	Motor Vehicles Theft	Total Heinous
2010	627	1186	170	2176	156	3891	3021	6740	17967
2011	669	1192	122	2778	210	4637	4324	7563	21495
2012	669	1192	122	2778	210	4637	4324	7563	21495
2013	569	1065	104	2516	128	4140	4100	7044	19666
2014	584	1029	105	2366	108	5029	4601	6875	20697
2015	445	1112	144	2810	101	4445	4619	6320	19996
2016	423	1138	102	2781	79	3937	4024	7095	19414
2017	412	1152	81	2767	68	3518	3726	7482	19123
2018	400	1165	60	2753	57	3099	3429	7870	18833
2019	379	1220	59	2650	60	3115	3230	8000	18713

Source: Pakistan Bureau of Statistics, Open Data Portal (https://opendata.com.pk/), ASOC Overseas Security Advisory Council US and local Police web portals

Secondly, for the qualitative data analysis of the data gathered in Table 4, DoctuS expert systems (A business decision making and Knowledge management system: software package) is used. Attribute values from the literature are presented as the most important keywords and KPIs from literature on urban security management with an argument on social impact. We will assess these attributes based on expert knowledge for the subject projects to compare the impacts. This way we can conclude on comparative evaluation of the case projects based on the attributes as KPIs. Public safety and security research aims to solve one of the most requisite and complex societal problems, as we call it. Therefore, to conclude upon the diverse range of involved disciplines and variables in this research, a transdisciplinary research approach and methodological consideration have been adopted (Costanza, 1991; Horlick-Jones & Sime, 2004; Max-Neef, 2005; Pohl, 2008; Popa, Guillermin, & Dedeurwaerdere, 2015; Polk, 2015; del Cerro Santamaría, 2015; Guimarães, Pohl, Bina, & Varanda, 2019) as cited in (Varga and Baracskai, 2021) p. 41) (Table 4)

Table 4: Qualitative Data Collection Matrix for SIA in Urban Safety and Security

Sr.	Attribute/Keywords/KPIs	Empirical Resources/ References
1	Social Impact Assessment	Becker, H. A. (2001). Nicaise, I. (2008). Vanclay F. (2003).
2	Policy	Freudenburg, W. R. (1986). Esteves, A. M., Franks, D., & Vanclay, F. (2012). Dreyer, M., Renn, O., Cope, S., & Frewer, L. J. (2010).
3	Regional Dynamics	Umair, S., Björklund, A., & Petersen, E. E. (2015). S. I. (1995). Esteves, A. M., Franks, D., & Vanclay, F. (2012).
4	Decision Making	(Dehe and Bamford, 2015)(Bowen, 1994)(Jolán Velencei, 2017) (J Velencei, 2017)(Wu and Coman, 2023)
5	Crime Index	Anuar, A. N. A., Bookhari, S. N., & Aziz, N. A. (2012). Butot, V., Bayerl, P. S., Jacobs, G., & de Haan, F. (2020). Dent, D. W. (1976). Devroe, E. (2013). Evans, M. C., & Cvitanovic, C. (2018). Osorio, J., Schubiger, L. I., & Weintraub, M. (2021).Wacquant, L. J. (2009). Zhang, Y. C., & Yu, J. (2013).
6	Improved Service Delivery	(West and Bernstein, 2017)Expert Knowledge
7	Digital Vision	Expert Knowledge
8	Stakeholder Engagement	(Slootweg, Vanclay and Schooten, 2015)
9	Public Private Partnership	(West and Bernstein, 2017)
10	Risk/ SWOT (Strength Weakness Oppor tunities and Threat) Analysis	(Dongsheng Zhan et al., 2018) (Evans and Cvitanovic, 2018)
11	Acts and Laws	(Lovejoy, 1983) Expert Knowledge
12	Political Stability	(Lovejoy, 1983) Expert Knowledge
13	Regime Changes	Expert Knowledge
14	Regional Development and Marketing	Esteves, A. M., Franks, D., & Vanclay, F. (2012).

Sr.	Attribute/Keywords/KPIs	Empirical Resources/ References
15	Challenges and Learning	(Yu and Wen, 2016)b(Lopes and Farooq, 2018)
16	Resource and Limitations	(Bajwa, Khan and Nadeem, 2018a) (Bajwa, Khan and Nadeem, 2018a) ('Punjab Bureau of Statistics Data sets', 2020)
17	Crime Rates	Tumalavičius, V., Veikša, I., Načisčionis, J. (2010), Zahars, V., & Draskovic, V. (2017). West, D. M., & Bernstein, D. (2017). Zhang, Y. C., & Yu, J. (2013). Zhan, D., Kwan, M. P., Zhang, W., Fan, J., Yu, J., & Dang, Y. (2018). Gault, M., & Silver, E. (2008).
18	Perception	(Ruža et al., 2016)
19	Terrorism Management	(Little, 2004) (Stelmach and Moch, 2022)
20	Criminal Track and Trace Feasibility	Expert KnowledgeSubject Case Study
21	Public Data Integration	(Kourtit, Nijkamp and Steenbruggen, 2017)
22	Operations and Control	Expert KnowledgeSubject Case Study
23	Change Management	(Baumgartner, Jones and Wilkerson, 2011)(Njoh, 1998)(Marans and Stimson, 2011)
24	Emergency Response Time Mitigation	(Slootweg, Vanclay and Schooten, 2015)(Little, 2004)(Dongsheng Zhan et al., 2018)
25	Transparency and Privacy	(Punjab Government's Safe Cities Project: Safer City or Over Policing? | Privacy International, 2020)Expert Knowledge

Source: Literature Review

Using a comprehensive literature review, we could reach the impact assessment through multiple aspects related to urban safety and security management projects discussed in literature while narrowing down upon the subject cases ((Althoff, 2012), (Avdeenko and Makarova, 2017), (Baracskai *et al.*, 2017)). It is worth mentioning here in order to support the approach and methodology of this article. As ((Kuhn *et al.*, 1970), (Popper, 2004) emphasizes the need for a flexible scientific approach to see a bigger picture and contextualization of the problem solving combining tacit and explicit knowledge on a particular problem domain (Einstein's stance on knowledge exploration (Polanyi, 1966) as cited in (Baracskai *et al.*, 2017)).

7. Analysis, Findings and Results

7.1 Quantitative analysis

In the forthcoming arguments, an analysis of both cities is presented with the comparison of populations and their growth, compared with crime the control trends. Besides, some economic and political stability conditions are discussed. Case sections analyze both projects separately, opportunities and challenges in subjected safe city projects towards improved service delivery and effectiveness are interpreted as a control on crime rates from observed data. Following that scope, challenges, opportunities, women's safety concerns, and privacy considerations are elaborated. Finally, a discussion and conclusions are presented at the end.

The population in Islamabad, the capital of Pakistan was 1.015 million as per 2017 national census data. The data projections in scatterplot matrix for populations in 2020 shows only a slight increase in population over the years as shown in figure 1. Currently, the projected estimate for the population is 1129198('Population of the world countries and their projections', 2020), a tenth of a million in three years with a calculated average growth of 0.03 percent a year (figure 1). Meanwhile, cumbersome security measures can be witnessed in the city, one of the significant is the Islamabad safe city project. These are important because of the sensitive state-level administrative infrastructure and foreign establishments in the city. In population statistical representation, the projected data is used ahead of the year 2017 because the last official census for Pakistan was held in 2017. Figure 1 also presents the population of Lahore, the provincial capital of Punjab province. It is the second most populous city in the country and 26th largest city in the world with 11.13 million populations as per 2017 national census data. Currently, the projected estimate for the population is 12642423, approximately two million in three years with a calculated average growth of 0.04 percent a year.

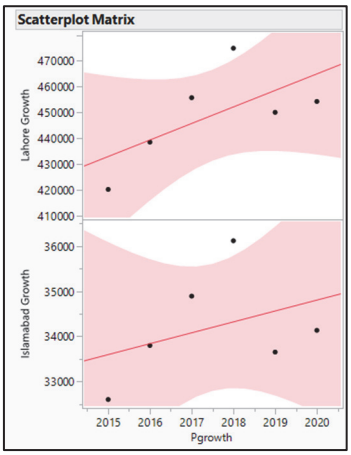

Figure 1. Population statistics Lahore & Islamabad 2015-2020.
Source: Pakistan Bureau of Statistics Census 2017 and World Population Review('Population of the world countries and their projections', 2020)

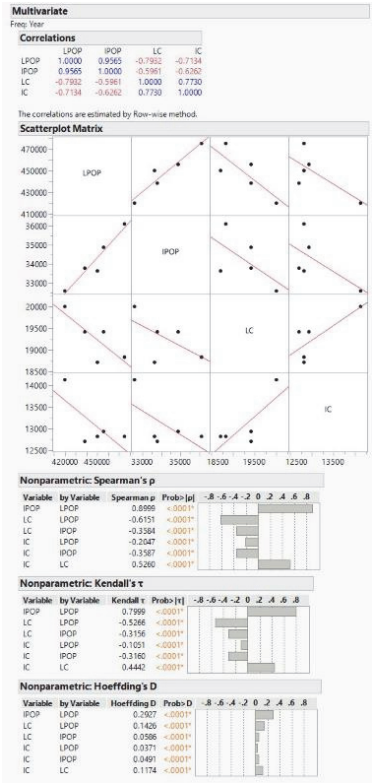

Figure 2. Population Growth and Crime Statistics Lahore and Islamabad Multivariate Correlation (Non-Parametric correlation) Analysis 2015-2019.
Source: Pakistan Bureau of Statistics Census 2017(Home | Pakistan Bureau of Statistics, 2017) and World Population Reviews.

Here we have computed non-parametric measures of association between the population and recorded crimes in the cities of Lahore and Islamabad. Spearman's Rho (r) is ranked Pearson's correlation with values range from -1 to +1, with larger absolute values indicating a stronger relationship. The calculated correlation coefficient for the population and recorded crime for Lahore and Islamabad cities are -0.7932 and -0.6262, respectively. This gives a negative correlation between the two, showing that the crime rate per unit population is declining although population growth is increasing (Figure 2). The p-values show the significance of relationship between population growth and recorded crimes, as significance of the correlation. A bar chart showing the correlation coefficients. These analyses suggest a good crime control over the period of analysis as shown in figure 1 and 2. JMP Pro v16, a University Licensed Software for statistical analysis is used for data analysis in this paper.

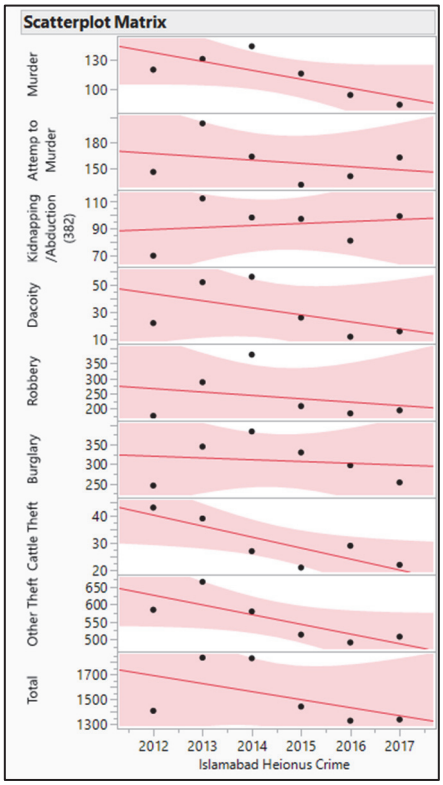

Figure 3. Total Recorded Crimes Islamabad 2012-2017.
Source: Pakistan Bureau of Statistics

The limitations and constraints of available crime data and statistics are already discussed in the methodology part. It is distributed and does not follow the standard categorization of crimes. For example, in figure 3, the total recorded crime by the Pakistan Bureau of Statistics was available on a provincial level. Islamabad being the capital city was also available till 2017. For the latest statistics on crime, we referred to other sources and compared the categories that were uniform across multiple sources. Consequently, this way we could not analyse the total recorded crimes for the recent three years (2018-2020). However, the analyses have been extended from 2012 to 2019 upon the heinous crimes as unanimously available over the tenure as illustrated in figures 3 and 4 along with the data sources.

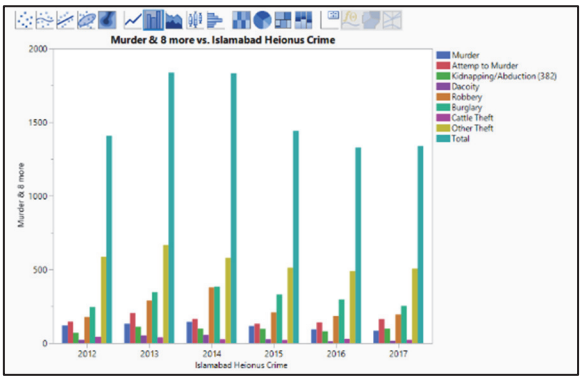

Figure 4. Recorded Crimes by Major and Heinous Categories Islamabad 2012-2017.
Source: Pakistan Bureau of Statistics and Islamabad Police Web portal (2018-19)

In figure 3-4, the crime statistics from 2012 to 2017 are presented from the official source of the Pakistan Bureau of Statistics. This shows the drop in crimes around 7-8 % between the years 2015-16. Later years, 2016-17 depicts a slight rise (about 2%) in overall recorded crimes in the city as we can observe from the data plots in figure 3. The data for 2019-2020 has been taken from the official police website of ICT, only for heinous crimes. The trend depicted a 19 % decrease in the heinous categories namely burglary, dacoity, fatal accident, theft, kidnapping, murder, robbery and theft leading to death and vehicle theft. As we can see in Figure 4, the total number of heinous crimes dropped from 18833 count in the year 2018 to count of 18713 in the year 2019 (*Islamabad Police*, 2020). Furthermore, if we see 2020, the same categories of crime, we can observe a decline of 8%. Also, cited in a project document as assessed by the authority's official website claims a 20 % reduction in public crimes, a 28-30 % reduction in vehicle crimes, 15-20% reduction in property crimes during the years 2018, and 2019. A similar trend can be observed in the scatterplot matrix for the Lahore city data as shown in figure 5. Consequently, this makes a demonstration of crime control on behalf of urban security measures, police reforms, and the safe city project deployed in 2016.

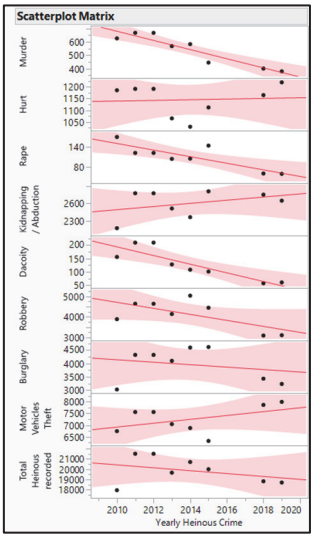

Figure 5. Recorded Crimes by Heinous Total & Categories Lahore 2010-2019 Box Plot.
Source: Open Data Portal (https://opendata.com.pk/), ASOC Overseas Security Advisory Council US, and local Police web portals

7.2 Knowledge Based Expert System

This study proposes an Expert system method to identify the best practices regarding social impact assessment for urban security management projects discussing the cases of Pakistan's safe cities projects with Expert Systems, covering the gap in literature using case-based reasoning (CBR) in order to measure the impact of urban security management projects. Case projects are key expectations in urban security improvement as a crucial socio-economic change in the subject context. Many Key Performance Indicators are identified from the case studies with the support of empirical evidence, statistical data, and expert knowledge. In this case-based reasoning approach, we have used Expert System's rule-based graphs to compare the project cases and evaluate the social impact assessment based on the identified KPIs. Furthermore, descriptive statistical analyses of crime rates for both city cases are elaborated on ex-ante and post-ante situations in the project cases to empirically support the claims. Davis and Webster, 1981 mentioned Social Impact assessment as a feedback mechanism of improvement in implications to community and regional initiatives. This paper presents an Expert System based methodology, based on empirically evident attributes and KPIs from the literature and Expert knowledge.

We have reflected upon crime rates as a measure of effectiveness for smart urban security projects. This paper analysis discusses and reviews the utility of two such projects in terms of crime control initiatives. Moreover, argumentation on regional dynamics identifies the possibilities, prospects, and challenges based on the research analyses of safe city projects in the two major cities of Pakistan, namely Islamabad and Lahore. Notes on integrating smart security in practice and police operations, along with social challenges and opportunities linked with these projects are discussed in a regional context. Descriptive crime statistics and trends translate into urban security effectiveness as a decline in crimes in due course of implementation of subjected urban safety and security projects. Policy practices employed with digital innovation for the achievement of safe and secure communities are emphasized. Overall, we talk about crime rates, social scenario changes, Policy reforms, and regional dimensions to measure social impact in subject projects over defined KPIs. Also, we argue about the generalization of findings, with the statement of limitations.

The detailed statements over empirical findings, analytical framework, and attributes as KPIs along with the justification and quantification are mentioned in the methodology section. Empirical applications of attributes are presented in order to elaborate the cases and illustrate the approach. In summary, this paper clarifies the integration of social impact assessment literature with those empirical findings on the key performance indicators of the research. The cases are specified with regional data on crime rates and population to understand the differences in the attribute values varying across the cases. However, an attempt has been made to recommend flexibility on the inclusivity of further attributes that might be specific to the project or the regional context in future studies of the same domain and variable scale.

The motivation behind the selection of these two cities is the implementation of safe city projects there, in the middle of last decade. Also, both cities have different administrative, demographic, geographic, and regional considerations. Taking advantage of that, we could discuss the regional dynamics here. This study attempts to discuss these factors in alignment with smart security projects (such as safe city projects). The data interpretations describe the contextual details of Lahore and Islamabad cities in order to answer the research questions. Based on these, factors and projects compare the competitiveness of smart security initiatives based on crime statistics, social scenario, regime changes, policy reforms, and dynamic regional dimensions.

Based on the empirical findings and the expert knowledge of the research subject, the author has been involved in the intervention of KPIs in the projects of the discussed scale and context. As we went through the literature, we identified the underpinnings of the expert knowledge in literature, as summarized below in Table 4 and Figure 6. In this way, we could accommodate a diverse range of attributes selection that could be put into the Doctus Knowledge Management System in order to get the rules for cases under study.

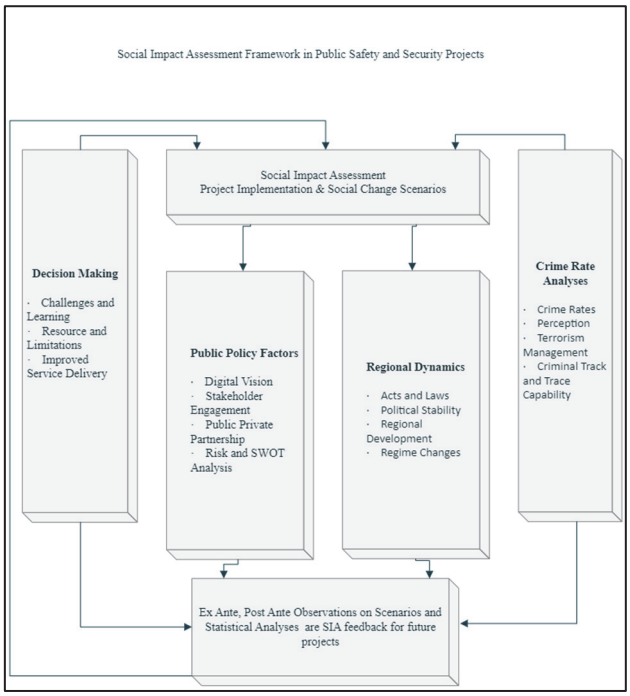

Figure 6. Social Impact Assessment framework in public safety and security management projects (Based on Literature and expert knowledge).
Source: Authors' Own Elaboration

The attributes and assigning of the weightage or values are based on the Author's understanding of cases as expert knowledge and empirical data as mentioned in Table 1 and Figure 6. Assignment of values to the attributes feeds the expert knowledge to DoctuS as we can see in Table5.

Table 5: Input Values of Attributes defined based on Expert Knowledge and Empirical Evidence.

Name	Value 1	Value 2	Value 3
Social Impact Assessment	Positive	Average	Negative
Policy	Comprehensively Addressed	Somewhat Addressed	Unaddressed
Regional Dynamics	Lower Degree	Average Degree	Higher Degree
Decision Making	Strongly Engaged	Somewhat Engaged	Unengaged
Crime Index	Positive	Average	Negative
Improved Service Delivery	Positive	Average	Negative
Digital Vision	Practiced	Somewhat Practiced	Unpractised
Stakeholder Engagement	Practiced	Slightly Practiced	Unpractised
Public Private Partnership	Involved	Slightly Involved	Not Involved at all
Risk/ SWOT Analysis	Managed	Slightly Managed	Unmanaged
Acts and Laws	Supporting Change and Policy	Slightly Supporting	Not Supporting at All
Political Stability	Stable	Dynamic	Unstable
Regime Changes	Stable	Dynamic	Unstable
Regional Development and Marketing	Emphasized	Somewhat Emphasized	Not Emphasized at all
Challenges and Learning	Addressed	Somewhat Addressed	Unaddressed
Resource and Limitations	Well Managed	Somewhat Managed	Unmanaged
Crime Rates	Low	Average	High
Perception	Positive	Average	Negative

Name	Value 1	Value 2	Value 3
Terrorism Management	Well	Average	Bad
Criminal Track and Trace Feasibility	Enhanced	Average	Low
Public Data Integration	Practiced	Somewhat Practiced	Not Practiced at All
OPS and Control	Organized	Somewhat Organized	Unorganized
Change Management	Clearly Solicited	Somewhat Solicited	Unsolicited
Emergency Response Time Mitigation	Successful	Somewhat successful	Unsuccessful
Transparency	Ensured	Somewhat Ensured	Not Ensured at All

Source: Authors' own elaboration in DoctuS KBS

The categorization of the attributes is presented in Table 1. The four Branching attributes (as KPIs) are Policy, Regional Dynamics, Decision Making and Crime Index, which evaluates the Social Impact Assessment in the case projects. The values that we can see in Tables 6 and 7 are based on the inferences drawn through inductive and reductive reasoning in order to identify the conditions that are not found valuable for the Social Impact Assessment of the project cases.

Table 6: Extracted Rule Values for Social Impact Assessment in the Subject Cases

	Islamabad	Lahore
Social Impact Assessment	Average	Positive
Policy	Somewhat Addressed	Comprehensively Addressed
Regional Dynamics	Average Degree	Average Degree
Decision Making	Somewhat Engaged	Strongly Engaged
Crime Index	Positive	Positive

Source: Authors' own elaboration in DoctuS KBS

We have found that Regional Dynamics is the least countable attribute and KPI for the measurement of social impact assessment of the Islamabad and Lahore safe city projects. However, other attributes count well in terms of KPIs for SIA, as shown in Table 4 below. Here * shows the conditions that can be referred to as "do not care". Further elaboration of these conditions is given in the DoctuS system extracted rules for the cases.

Table 7: Rules for Social Impact Assessment. Source: own elaboration in DoctuS KBS. Rule-Based Graph with Case-Based Reasoning

Policy	Regional Dynamics	Decision Making	Crime Index	Social Impact Assessment
Somewhat Addressed	*	Strongly Engaged	Average	Average
*	*	Strongly Engaged	Positive	Positive
Somewhat Addressed	*	Unengaged	*	Negative
Somewhat Addressed	*	Somewhat Engaged	Negative	Negative
Comprehensively Addressed	*	.. Somewhat Engaged	Negative	Average
Somewhat Addressed	*	Somewhat Engaged	.. Average	Average
Somewhat Addressed	*	Somewhat Engaged	Average	Average
Unaddressed	*	*	Negative	Negative
*	Higher Degree	Unengaged	Negative	Negative
Comprehensively Addressed	Average Degree	Unengaged	*	Average
Comprehensively Addressed	*	Unengaged	.. Average	Average
Comprehensively Addressed	*	Somewhat Engaged	.. Average	Positive

The aim is to assess the social impact of two case projects using expert knowledge, statistical data, and literature-reverberated attributes. The assignment of least and most ranks towards the attributes (as in Table 2) is made considering whether a particular attribute is practiced in the operationalization of project cases or not. Thereby, the DoctuS returned us with the most valued attributes using inductive reasoning employing its ID3 (Inductive Learning) Algorithm. This provides

us with the Rule-Based Graph (Tables 3 and 4), based on rules returned towards the most valuable attributes to be considered in the recommended framework. (Velencei *et al.*, 2019)

Then ID3 formula for attribute classification and characterization uses a specific statistical value for building a decision tree, that is called entropy in information. As we referred to the formula from the previous citation (equation 1).

$$Entropy\ (S) = -\left(\frac{|S_{minus}|}{|S|} log2 \frac{|S_{minus}|}{|S|} + \frac{|S_{minus}|}{|S|} log2 \frac{|S_{minus}|}{|S|}\right) \quad (1)$$

Where S is a set of examples, (S_{plus}) is for positive, while S_{minus} is for negative attribute and B is the binary representation of a descriptive attribute with an encoding range from 0 to 1 based on the least and most likely happening of an event (the practice of attribute in the project). As a condition logo should be 0 for each entropy.

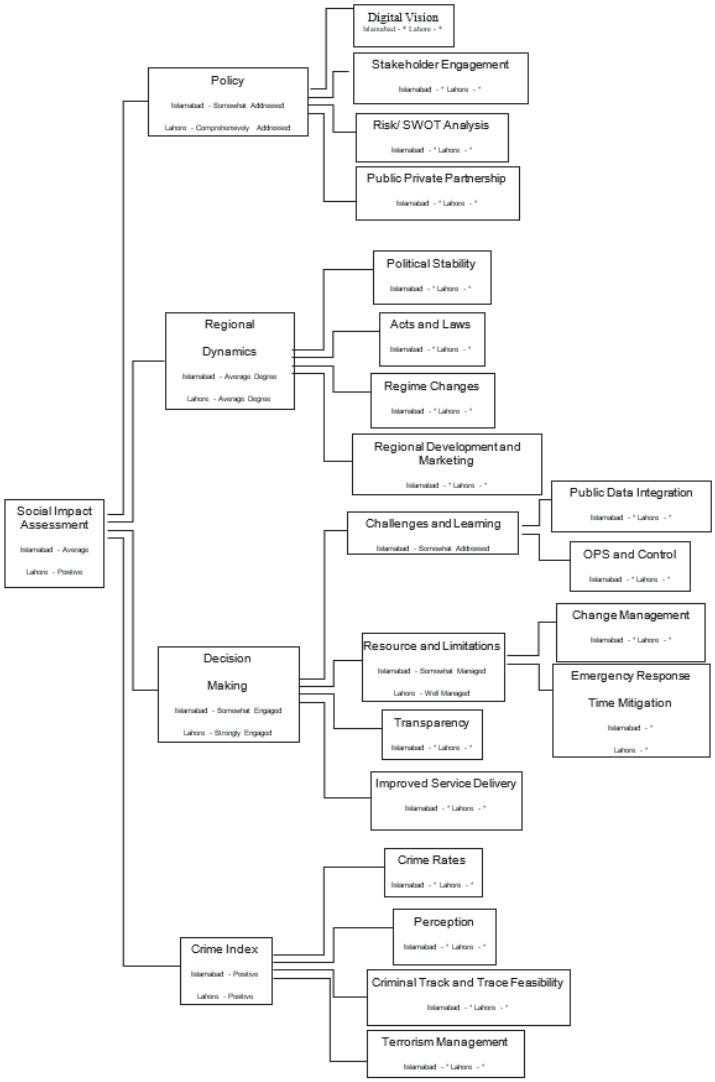

Figure 7. Social Impact Assessment Model for Urban Safety Security Projects Based on Two Project Illustrations

Public policy, decision making, regional dynamics and crime indexing are the main controlling aspects to observe social impact assessment and social scenario changes in urban safety and security projects (Figure 7 and figure 8).

1. **The Rules for Project Case 1: Lahore**

If
Policy is "Comprehensively addressed" or "Do not Care[1]*", and
Regional Dynamics are "Do not care *", and
Decision Making is "Strongly Engaged", or "Somewhat Engaged", and
Crime Index is "Average" or "Positive",
then
the Social Impact of Project is "Positive"

2. **Rules for Project Case 2: Islamabad**

If
Policy is "Comprehensively addressed" or "Somewhat Addressed", and
Regional Dynamics are "Average Degree" or "Do not care *", and
Decision Making is "Strongly Engaged", or "Somewhat Engaged" or "not at all Engaged", and
Crime Index is "Average" or "Negative",
then
the Social Impact of Project is "Average."
Else,
If
Policy is Unaddressed or Somewhat Addressed, and
Regional Dynamics are Higher Degree or Do not care *, and
Decision Making is Somewhat or not at all Engaged, and
Crime Index is Negative or Do not care*,
then
the Social Impact of Project is "Negative."

[1] *Do not Care is a condition where the system does not care whatever the value an attribute attains in that situation*

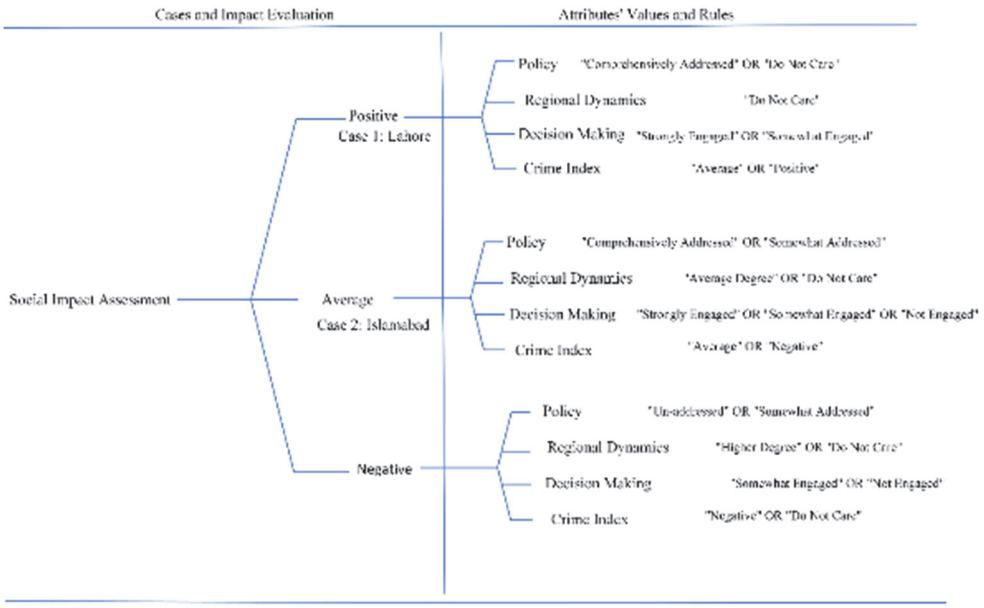

Figure 8. Social Impact Assessment Case Evaluations and Rules for attributes.

In essence, based on the case analyses, we propose the below SIA framework for Urban Safety and Security Management projects.

Social Impact Assessment in public safety and security projects lead to the identification of challenges, learning, and limitations in the projects. One identifies the important resources in this process, not only in the project execution but while recording the consequences of execution on the community. As a part of social changes scenario, we emphasize observation of certain crucial factors, including crime rate analyses, improved service delivery in public safety, police services and women empowerment (more stressed in eastern cultures, as part of social integration and women safety awareness). The assessment includes accountability and integrity of information, which is kept and retrieved by the agencies for investigative criminal procedures, and the privacy of the public in terms of police body cameras, facial recognition CCTVs, and fingerprints. Literature suggests that urban safety and security projects are a part of human development, in terms of improved business and social conditions. Dissemination and deliberating the ownership of all above mentioned social changes help in stakeholder identification and management in the process of social impact assessment. In figure 7, we emphasize the measurement and observation of crime rate analyses and social change scenarios in order to carry out decision-making about the involved crucial factors, the need for changes, and the assessment of the impacts.

8. Discussion

As we deduced from the results, regional dynamics is the most flexible variable, counting least towards the social impact assessment in urban security management projects. However, Policy, Decision Making and Crime Indexing are more crucial factors to discuss the effectiveness of such projects. Moreover, the findings indicate all the above factors to be considered while managing and controlling the operations of projects.

In the cases section, the literature background and observations from sources and specific data on population and crime rates is interpreted over a span of the last eight to ten years. Furthermore, to

compare Pakistan's Safe Cities projects in the context of crime rate competitiveness, an interpretation of the crime rates in the cities where these projects are implemented is presented and compared with regional dynamics and social change scenarios. This demonstrates the importance, need and limitations of safety and security studies, concerning geographical, cultural, regional mechanisms and lack a of unified reporting mechanisms at metropolitan levels.

Generally, the impacts of any security project are broader enough including social, cultural, well-being, personal safety, and human rights. Certainly, these all-influence factors are suggested to be taken into consideration, being crucial in policy-making on public security. Additionally, the crime rates with discussed limitations upon the reflection of effectiveness for both projects are presented and found control over the crime rates in both cities as compared to gradual increase populations.

The analyses resulted in a social impact assessment framework. The further extension presents a methodology based on this framework for evaluative decision making [(Bowen, 1994) using expert systems ((Wang *et al.*, 2020)]. This Social Impact Assessment model for public safety and security evaluations shall imply a novel approach in order to reduce the complexity of involved variables in the context of literature.

Furthermore, empirical support from the literature also seconds the findings as a positive outcome (*Pakistan Today*, 2020) of these projects, as many media reports credits lost and found cases as the success of these projects, besides the partial criticism (*Robberies in I-8 expose Islamabad Safe City farce - Home - News Pakistan TV*, 2020) over local crime spikes and personal privacy breaches. Mainly, the comeback of international cricket teams is one of these positive outcomes. This research is intended for researchers, policy institutes, security practitioners, regional matter experts, and decision-makers as it proposes the possibilities, prospects, and challenges based on the research analyses of subjected projects in two important metropolitans of Pakistan.

We do not generalize this research framework across other projects of different social scales and sectors. However, we suggest this as a novel indication of KPIs in urban security management Projects. Moreover, we suggest, the importance of integrated crime reporting is crucial for open academic research and policymaking on a higher level, rather than just being locally desegregated. Notes on integrating smart security in practice and police operations, along with the social challenges and opportunities linked with the safe city projects are also discussed in diverse regional settings. Subsequently, the study could evaluate the possibilities and opportunities for smart security management and challenges on behalf of the public and authorities as well.

9. Conclusion

This article demonstrates the importance and limitations of safety and security studies concerning geographical, cultural, and regional settings. Moreover, we propose an Expert system validated Social Impact Assessment methodological framework for urban safety and security management projects. For which purpose, Key Performance Indicators and attributes for urban safety and security management projects are gathered using comprehensive literature review in order to identify the practices, needs and limitations in actual realization of regional comparisons, policy initiatives, change scenarios evaluation to combat crime and enhancing public safety. Most importantly, filling the gap in literature on how to measure the effectiveness of urban safety and security management projects.

This paper presents the solution for ex-post social impact assessment in urban security management projects. We illustrate the proposed methodological framework using a case study approach on Pakistan's safe city initiatives. The novelty of the proposition can be argued in terms of gap identifications, proposed model, elaborating effective need of varied integrating smart urban security practices, and reflection upon crime rates and regional dynamics with discussed limitations.

Whereas, several indicators are identified in measuring "urban security, such as crime rate ((Ibem and Aduwo, 2013), (Martínez, Short and Ortíz, 2015)), traffic safety ((De Vos, Van Acker and

Witlox, 2016), (Marans and Stimson, 2011), and emergency shelters ((Yu and Wen, 2016)" ((Zhan *et al.*, 2018, p. 3). Based on the literature review, exploring aspects of policy, regional dynamics, development, and Social Impact Assessment. This study identifies note-worthy crucial factors in learning and knowledge, which is being shared across domains in urban security management projects. Future extensions and implications to this reserach can be wide-ranging and contingent on international comparative studies in urban security management project settings. Therefore, we suggest a more extensive future research in this regard, as literature also narrates urban security as a component in urban livability. Thus, identifying the underlying key assessment indicators i.e. social and transport security, emergency handling and disaster recovery and response capacity building.

As far as cases are concerned, the Lahore project can be designated as a one-stop shop, as it includes all the policing departments under one roof. In this regard, Lahore (Positive Social Impact Rank) leads the way ahead of Islamabad (Average Social Impact Rank). The study evaluates better ex-post social impact assessment in the case of Lahore city, considering evaluations based on crime rate trends, policy initiatives to improve urban safety and social change scenarios in both of the illustrated cases.

Additionally, the changing scenarios in communities and regions are discussed in order to evaluate the lessons which are learned in projects. We propose this method as useful as a future methodological tool to evaluate the social impact assessment in the public safety and security domain. However, in addition to KPIs such as crime rates, public policy, regional dynamics, and developments regarding the improvement in public safety and security, we recommend extensions to this study in the recommendation section. To sum it all up, we have gathered a wide range of indicators, KPIs, and strategies to propose this methodology with discussed limitations in the literature.

In conclusion, this paper contributes a significant social impact assessment methodological framework for practice in the public safety and security domain. Moreover, it defines and unites the segregated elements of importance regarding public safety and security improvements to reflect on the evaluation of past versus current, leading toward future decision-making. Limitations in this study include the lack of uniform data insights and official resources. Additionally, it varies from region to region how advanced measures are being taken, how the other urban factors are playing with community awareness, behaviors (as social scenario changes), and crime trends.

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