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Improving Shared Space to Reduce Traffic Risk: Analytic Study of Mawlawi Street in Sulaimani, Iraq

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ABSTRACT

In the traffic street design field, the shared space concept can help create appealing and attractive streets that solve people's problems, such as overcrowding, traffic jams, and congestion. This paper involves depicting the importance of the shared design based on the social model to reflect the people's movement in the street. The data were collected through monitoring and interviewing people who move down the city of Sulaimani. The approach involves tackling different circumstances in overcrowded areas and a free flow of pedestrians in the city. The information collected is essential in making planning recommendations to improve the experience and the social wellbeing of the street pedestrians. Then in the conclusion reviews the influences in this research and shows clearly the influences and recommendations for the shared spaces to draw more a flexibility street for pedestrians.

1. INTRODUCTION

Globally, there has been a trend increase of the shared traffic design among different countries specifically to solve openness, community issues, security, and blockage challenges. The originality of the ideas was from Holland; however, it has been tailored for case specifications in most parts of Western Europe. The concept application of the idea is most suitable for the extension between Rural and urban areas at different transport modes. Despite the manipulations of some of the features, the shared space concept tends to have some common features such as no boundaries, traffic signs, or conventions controls that allow less decision-making dependency and freedom for multi-modal personal in the built environment. When walking or driving, both pedestrians and drivers will now not rely on the traffic lights, signals, and designated crosswalks, but they will be aided by the environment and communication with order users of the roads. Clients easily understand this immediately when they enter the shared space environment and use hand caution and eye contact while crossing. Significantly the concept has enabled improved safety of the pedestrian as well as the limit vehicle's speed.
Furthermore, the indicated zone has revealed a decreased blockage and traveled time due to the shared space usage. However, there is little knowledge to support this claim. Also, the shared space designs have been revealed to be crucial in influencing an increase in the public intersections in corridors, crossing points, and district with the aid of the improved visual elements in the road. This depicts an area with a developed and strengthened financial market due to the increase of pedestrians and bicycle users on the roads [1].

2. LITERATURE REVIEW

Many journals, reports, and books have been used to gather the literature review. Numerous concepts and theories have been argued about in this part which turns around the life and work practices and relates to past studies.

2.1 shared space:

Shared design is typically an urban design with integration of urban engineering to minimize the segregation of the users of the roads such as vehicles, pedestrians, and street clients. It involves eradicating traditional street elements such as traffic lights, signs, street markings, curbs, and pedestrian barriers. Typically, it makes the streets 'naked' due to the elimination of street furniture. Understandably, shared space is not just about a design but also to relieve the streets from the fleets of cars that help improve the movement roles of cars with the social being. Streets sharing have been used as a *de facto* mode of transport worldwide for a long time and are still important today. Most engineers have thought of isolation of the vehicles and other street users for the public for a long time. With the progress of the security of the street,

Figure 1: Shared space for pedestrians, cars and bikes [3]

2.2 Historical Background:

As most designers consider their work, the shared space concept is not a new idea, but it has existed over time. Most cities have informally been utilizing the concept of shared lanes for a long time worldwide. For instance, in ancient times, the European towns had features of the shared space, wherein the roads pedestrians were given the established priority and the vehicles presented gradually. The typically crowded and narrow streets are used to prevent the high speeding of the vehicles and mobilize the free pedestrian movement. The developing nation’s cities also reveal the shared space features with moderate utilization of the merchandised vehicles, city lanes expansion, and distinctive security culture [4].
From the 1950s, the idea that different street clients must be isolated has been expansively acknowledged globally. Though this idea started being used as a standard over 50 years, its mobilization and use can be traced back to the recent time of motorization.

2.3 Flow of users across the street:

A crucial issue of the several shared design plans showered that there is high consideration of

the urgency of personal at the pedestrian check in the space to enable the users' flow. The plans require that the flow of the aid client can be maintained with a person standing that will prevent congestion and misunderstandings. For instance, in the Liverpool MPR plot, there was a significant improvement in the informal crossing of the pedestrians. Also, in some of the parts, the pedestrian movement was absent due to the used signals by the designers. This shows the improvements proof by the Mixed Priority Route Course plans, increasing the popularity of ye informal crossing movements, and the number of pedestrians in the signaled intersections either remain constant or increase. The Noteworthy Centre Zone shows a variation of the pedestrians crossing at a particular point as some were increased, others significantly decreased [5].

2.4 Street Furniture:

The shared space design involves the reasoning that ‘less furniture is more’ that reduces road markings, signs, barriers, and signals as the credentials for people and traffic's effective and secure movement [6]. The street elements such as signs moved the roads to be less secure contrary to the intended purpose. Understandably the many rules based on the signs significantly lead to the loss of the human capacity of being attentive, which is socially dependable conduct. As the use of drugs increases, the decline of personal responsibility becomes [7].The orderly evacuation of the civilization in town depends primarily on urban traffic planning [8]. Therefore, urban traffic planning aims to control human conduct and make people behave a sense of social conduct as they utilize the roads as it energizes their conduct and responsibility in the streets.

The earlier control of conduct by the engineers and authority tends to increase the misconduct of the individuals and foster dangerous and impolite behavior of the road users. In this case, mostly the pedestrians will look for the constricted focus where they will take advantage when the driver halts a street user. This resulted in the idea of avoiding pedestrians from crossing the road at each event. Therefore, the introduction for the shared space served to evacuate the activity lights, signs, guardrails, street markings, and keeps through which all have shown negative consequences behavior and the road security [9].

2.4.1 Signs:

The shared space idea considers removing signs to be one of its fundamental elements in designing the roads. It is argued that the presence of signs depicts that an engineer has not completed their construction work, and it is a disappointment [10]. Currently, the street has a lot of signs; however, 70% of them have been disregarded by the road users [7]. Too many signs in a road depict many stories to the users since it tasks the users to go ahead as fast as they can and not consider the importance of the surrounding environment. This is an unlawful message and may reduce the road's safety and thus many significant accidents [10]. The road signs have lost their original meaning, which is less significant as the specialist just erects them to avoid the obligation. However, the point of view is not radical, and a traffic engineer such as American traffic engineers have caution and highlight the dangers of having the roads signs [11].

Figure 2: The most advanced sign on street [12]

2.4.2 Traffic Lights:

Traffic rights removal is one of the fundamentals of the shared space requirement. Though some people argue that it is unreasonable to remove traffic lights, its removal is accompanied by some significant advantages. Typically, eliminating traffic lights is a crucial way to increase the safety of the street. The rationale might argue that traffic lights improve safety has been a misconception. The UK office of transport believes in eliminating the traffic lights to increase the safety of the road and street users [13]. Traffic lights promote unsafe behavior. For instance, green lights typically trigger sense privilege, and therefore, the pedestrians tend to cross the road confidently, and the drive may cause controversies that lead to fatal accidents and injuries. The controversy and the space conflicts between the pedestrian and the driver usually do not end well additionally, the traffic lights arrangement may affect the driver's eye concentration. In some cases, the driver may see the illusion showing the absence of the pedestrians and other cars; therefore, increasing the danger of the crossing points. Having traffic lights also creates significant blockages, pointless delays, and contaminations. No one uses green, but one must wait, which leads to time wastage and goes against the human senses. Some individuals may feel there is no good reason for stopping based on the light when the road is safe to cross; the driver will utilize their gadgets as they gradually enter the crossing point if the driver has lights blackouts. Engineers believe that introduction of the traffic lights requires extra personnel to assist the people in crossing the roads as Modder man argues that treating individuals like a moron will continue to carry on like that [11].

Figure 3: Traffic lights to make the street safer [14]

2.4.3 Pedestrian Barrier:

Pedestrian barriers are fundamental tools for traffic engineers, and they include walls, guardrails, and railings typically used in the roads for security reasons. But similarly to traffic lights, these barriers go against human cognition and indeed cause dangers to the street for some significant reasons.

Studies typically show the treatment of people like creatures, and the fencing of the road is like the confinement of the individuals into a restricted area like cattle. Therefore, using alternative means such as convoluted temporary paths may be smart choices for these security barriers that increase the unsafe ways [11]. Moreover, the barriers involve limitations of the users to use crossing focuses; this means that the message is concerned to the drivers that they will only focus on the individual are hence will start speeding up. Speeding up without considering the surrounding environment can lead to fatalities. Barriers are also normally unsafe for cyclists since they find themselves stuck between the vehicles and the barriers. The irrational barriers, pedestrians' non- comfortability, and the careless drivers are significant ways of encouraging accidents.

Figure 4: Pedestrian barriers [14]

2.4.4 Road Marking:

Road marking is another traffic zone feature that needs to be eliminated in the usage in the street since its uses trigger unsafe ways. For instance, Wiltshire Province Board, UK, has considered eliminating the road's centerline [15]. The removal significantly decreased speeds by 5%, and the collision declined by 35% in the province from 17 to 11 [16]. The absence of the marked roads aids 40% of the drivers when they are confronting the incoming vehicles than those drivers using the lines as they cannot moderate the incoming vehicles [17]. Also, the markings in the road increase the collisions rate due to the constant misunderstandings between the users.

Figure 5: Road Marking to aware the pedestrian [18]

2.4.5 Kerbs:

To construct a shared space on the roads, it is important to consider removing the kerbs. Kerbs are typically the raised parts in the roads, and it has been in use in the roads for a long time allow pedestrian to be less demanding use of the carriageway's mud and soil [6]. Sometimes, it shows the division between the different street clients. Using guardrails as kerbs, for instance, to disconnect individuals make an individual own the space they occupy, and they will argue that they own it, which allows the drivers to gain the freedom to speed off. The use of barriers sends an illusion message to the drivers that they can disregard the attention on details in the road and mostly the individual they are transporting. By gaining such behaviors, the drivers will risk using the roads. Shared space solves such challenges by ensuring individuals behave humanly, rather than utilizing caution signs, prohibition, and confinements to control the people on the road [11].

Importantly, the use of traffic calming signs and devices should be avoided. However, it is important to consider socially supporting ways that enable people to behave with enhanced humanity. However, better ways that are non-versatile should be adopted. Removal of such components helps enhance the streets users in socialism and build relationships, which is the critical success of the shared spaces [19].

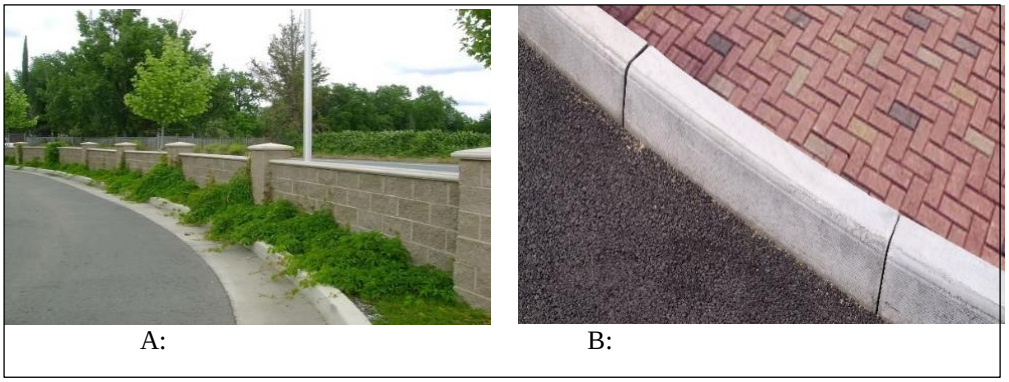

Figure 6: Street kerbs for making different level [18]

2.5 Proportion of pedestrians moving freely:

The primary aim of most shared spaces is to mobilize and empower pedestrian development. Most routine formats use the kerbs and the pedestrian barriers in controlling the movement of pedestrians; such control of movement normally displays physical and mental abstractions of the street users. Therefore, reducing such a barrier is believed to have brought pedestrian liberation into life, as demonstrated in some of the few case studies. Within the sampling area of Station Street in Tidworth, some pedestrians are utilizing the desired lines to cross. The qualitative research depicts that the development opportunity was popular among pedestrians, including old people with mobility challenges enjoying removed kerbs.

The following shows how pedestrians are flexible in development as they are affected by traffic speed and flow. Some considerations were made for the research that includes actual speed and flow of traffic and the pedestrian wit preference to use the road crossing than the designated passengers' ways; the study excluded the transport vehicles:

- Traffic with less than 30mph was over 50 vehicles in an hour.
- Traffic with speeds less than 25mph, were over 100 vehicles per hour
- Traffic flow with less than 20mph was more than 200 vehicles per hour

In a place where the requirement was met, it is evident that the pedestrian ends to move in unexpected ways. The York data revelation does not counterattack the shared space methods and cannot show the accruing benefits when all the conditions for the free space are accomplished [5].

2.6 Space available to pedestrians:

There is no guarantee that the pedestrian will utilize all the access roads. The road's readiness to be involved and the vehicular traffic impacts determine the use by the pedestrians. In Other Words, the pedestrian will only use the available space. The case studies surveys show differences and increments in the physical space accessible by a pedestrian. Though kerbs normally create space for pedestrians to use, there is a challenge in keeping up the width of the carriageway. Case studies show that pedestrians like the idea of adding more spaces. This can be achieved through extensions of the footway width despite the challenge of vehicle moving contemplations. Additionally, the level surface planning facilitates the overcoming of the challenges of the movement and makes the street width aggregated, hence avoiding carriageway designation for the vehicle. The effective changes will be in line with traffic speed and flow.

Figure 7: Space for pedestrians [20]

2.7 The benefits of shared spaces:

There are three type shared spaces benefits that are:

2.7.1Safe and Security:

People face variety of dangers within the urban environment crimes, road brutality, acts of terrorism, quick moving vehicles, common disasters/phenomena, and inconspicuous issues such as airs prolusion and water defilement. In a few parts of the world, the dangers of normal disasters-earthquakes, surges, volcanic ejections- are ordinary concerns to be tended to within the plan of buildings and settlements. To a few degree building procedures and innovation permit such issues to be overseen and the resultant dangers diminished. Other threats – genuine or envisioned- apparently proceed to extend. This area bargains mainly with crime, safety and security and essentially their relationship to the public realm. Road/Pedestrian security.

Security relates to the protection of oneself once family and companions and individual and communal property. Need of security, discernments of lack of security and fear of victimization are dangers both to the user of the open domain and to the creation of superior places. Making a sense of security and safety is, in this way, a fundamental requirement of effective urban design [21].

2.7.2 Fear and Victimization:

The event that individuals select not to use a specific place or environment since, at best they feel awkward there and at most exceedingly bad they are afraid and feel risky, the open domain is ruined. Such evasion could be a result of fear of certain situations as well as fears as specific occurrences. Many people, for example, are uncertain approximately or dreadful of certain parts of shared spaces, such as pedestrian's subways, dull rear ways and ranges that are left or swarmed with the off-base kind of individuals.

Fear of victimization (instead of real levels of crime) is regularly the driver of moves to

private's portion of the public realm, isolating communities within the process [22]. This privatization ordinarily deciphers in to specific control of certain psychological militants or spaces through the use of diverse implies of isolation and segregation, such as physical remove, dividers, doors and fence or other, less visible obstructions to shut out and prohibit the exterior world and its seen dangers and challenges additionally by implies of dynamic policing methodologies and surveillance cameras.

2.7.3 Crime:

Contemplations of security are related to concerns almost crime. Crime is around guilty parties and offenses security approximately casualties and fear of victimization. In open space it is frequently disorderly instead of necessarily criminal behavior that's complicated. Consequently, it is critical to recognize between criminal and messy behavior. Common issues in open space are jumbled conduct and incivilities:

- Disorderly conduct: characterizes clutter as a (condition coming about performance which consisting on area, while nearby conventions hostile in infringement of anticipation on behalf of regularity with peacetime in a public) Thus, clutter by and large alludes moreover to disorderly conduct [23].
- Incivilities: inciting uneasiness and dread, characterize incivilities as (Low level breaches of community measures that flag a disintegration of customarily acknowledged standards and values) [21].
- Research Aim: The most point of this study is arrangement in inventive traffic extend with another process of open space wherever traffic now not ruled the surroundings or maybe, adjusted the situation out by extra capacities. Also examine the pedestrian and shop owners of Mawlawi Road and diagram the challenges and issues for improving planning of open space for which pedestrian and his environment were taken as the basis.

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3. CASE STUDY AND RSEARCH METHODS

3.1 Case Study (Mawlawi Street):

The raped financial development of Iraq after the war in 2003 made the citizens more dependent on private cars coming about in challenges and risky environment for walking. Mawlawi street is full of activity and popular commercial area found in the city center of Sulaimani in Iraq. It can be considered as the most considered that interfaces the city center and historical area to the public park and Salm Street. The width of Mawlawi Street is 15m and it is nearly 1 km long. Moreover, it is the entry of the city center and chronicled locale in Sulaimani. There are distinctive sorts of activities on both sides of the road, including hotels, green groceries, retail shops, food courts, book shops as well as informal activities such as sellers and vendors.

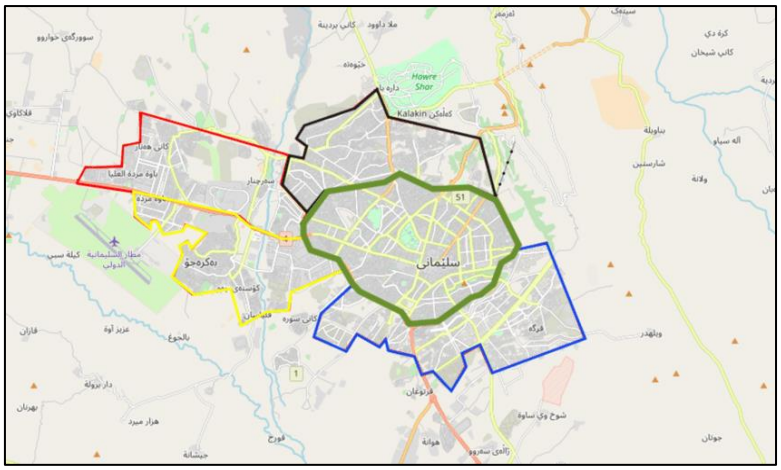


Figure 8: Mapping of Sulaimani with different quatter [24]

The lack of proficient public transportation has made individuals more dependent on private cars. Moreover, after 2003 most of the private houses around Mawlawi street were bought by traders who have presently demolished the houses and changed over them to commercial buildings. In this way, lack of residential function around the road decreased security, particularly at night time. More imperatively, the unpleasant quality of the built environment in such historical street has made the road inactive at all times of day including the evening. In spite of being the most and busiest commercial way, the road is presently awkward for strolling affecting pedestrians and guests not utilize the road for walking, fun and pleasure during their free time. Subsequently, the main essential point is to progress the safety level of this commercial street by concentering primarily on the design and arrangement of streetscape components [25]. [27]

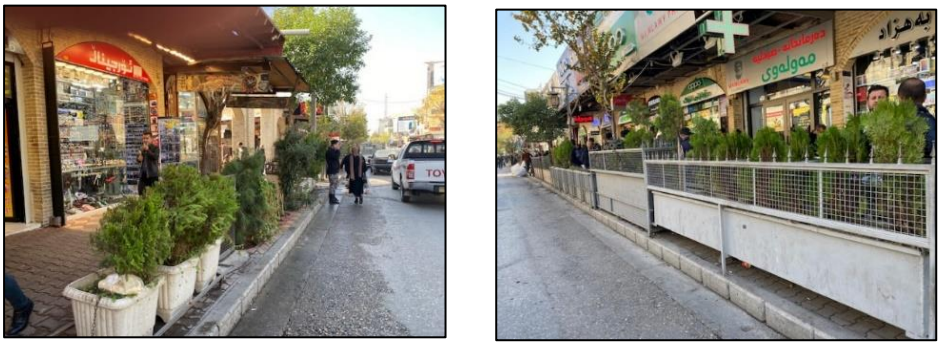
Figure 9: Mawlawi street [26]

Figure 10: Main gate of Mawlawi Street

Figure 11: Traditional shops on Mawlawi Street

A **B**

Figure 12: Traditional sweet shop of the Sulaimani city in Mawlawi Street



A **B**

Figure 13: Some green pots on the Mawlawi street's pathway (A & B)

The lack of greenery on this place enhances the government to put some greenery pots for revivals the street. Which is helpful for cleaning the area from the air pollution because of having many cars.

A **B**

Figure 14: pedestrian crossing areas (A & B)

The lack of the signs and unobvious street paint of the area made the pedestrian confuse where to cross the street; in the same time, it is difficult for drivers where to stop for pedestrian to cross the street.

A **B** **C**

Figure 15: The materials of the street became old which is unsafe for cars

Figure 16: The lack of benches made the pedestrian to sit on the greenery pot's edge for relaxing

3.2 Research Method:

In order to advance shared spaces, it is critical to decide those basic physical factors that impact the pedestrian. This study employed the mixed-method approach counting quantitative and qualitative information. Qualitative survey considered of direct perception and interview, though quantitative information's were collected through questionnaire. The interview result was arranged within 30 shop owners who are working in the right place (Mawlawi street). They were inquired issues approximately the quality, chance, security with risk of the area, Street Qualities plus going through Surroundings area. These principles are vital since situation overseen within a fewer unmistakable. However, vital highlights by street that got occupied beneath thought while checking with the pedestrian situation. In the interim, photos were taken all through the perception to supply a visual portrayal and to contextualize the watched streetscape features.

4. RESULT AND DISCUTION

4.1 Questioner:

This research involves qualitative collections using questionnaires. Mawlawi Street was selected based on the interest of an individual. All ages were considered for the study, and the recording of the data was in each category of the age that were developed that include (15-25) years, (25-45) years and (45-65) years individuals the majority. The 4 answered questions to reflect and appear below;

For the individuals of (15-25) years, around 57% of them believed that they feel pleasant and typically walk on the pathway safely depicted in pie chart in **Figure 17**. Nevertheless, the other ages depict diverse results. They specifically argue that they are not happy and specify that the condition is worse at night due to the absence of light.

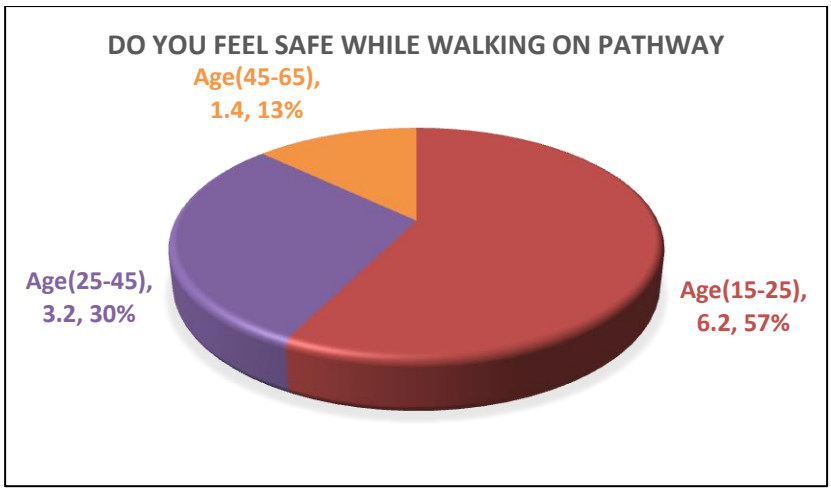


Figure 17: feeling safe while walking on Pathway

The pie chart in **Figure 18** shows that %64 of the people ages between (25-45) years are felling safe while crossing the street, while the two groups of ages (15-25) years and (45-65) years feeling less safe while crossing the street about %22 and %14 respectively. In addition, lack of parking and traffic lights made the street un safe while pedestrian crossing because the private cars park their car anywhere, they want.

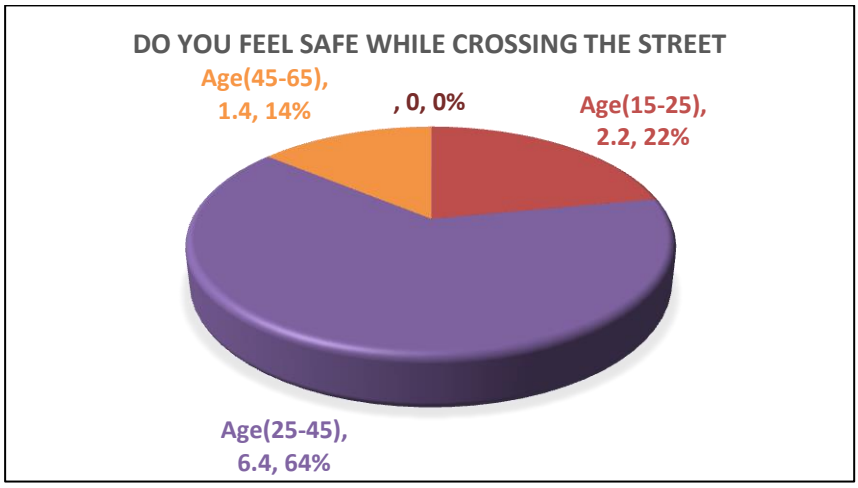


Figure 18: Feeling Safe While Crossing the Street

Nearly %52 of different ages of citizens focused on obstacle and barrier, the main reason for the pedestrian to walk on the pathways and crossing the street pie chart in **Figure 19**, and this answer should be considered while trying to make the shared space for pedestrians.

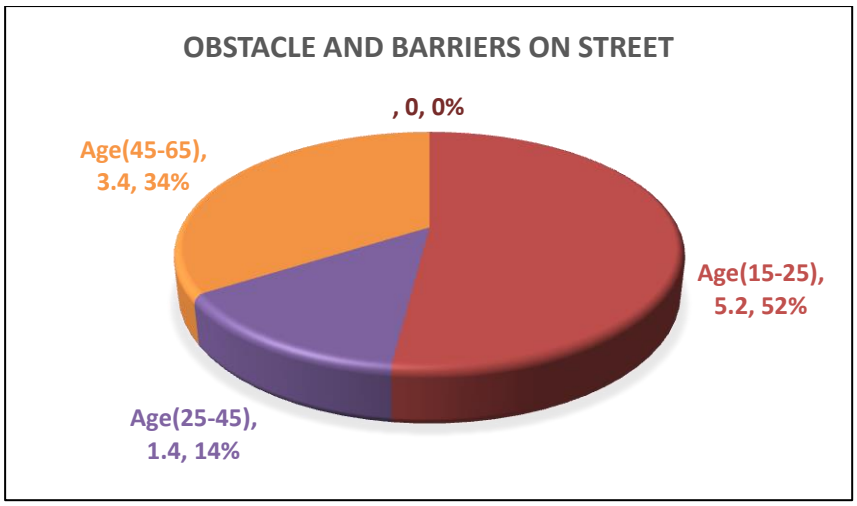


Figure 19: Obstacle and barriers on the street

The pie chart in **Figure 20** explains the situation of Mawlawi Street within the citizen's replay showed that the materials are not useful for those who aged between (45-65) years old and disables.

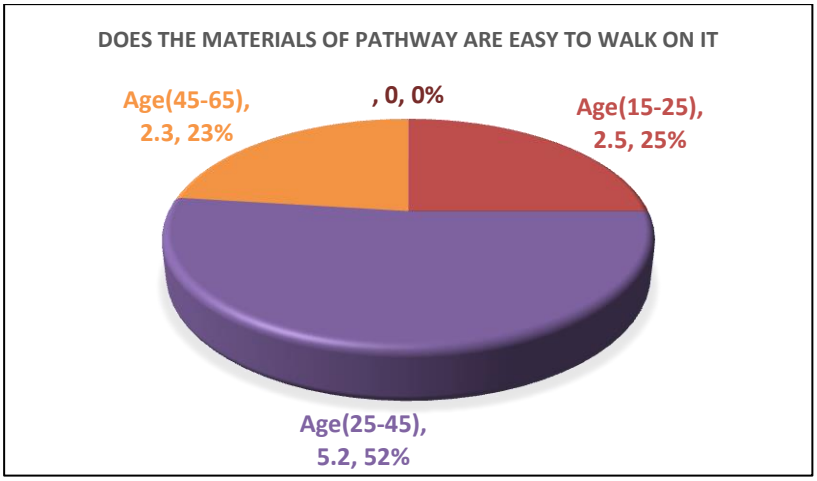


Figure 20: the Materials of pathway

4.2 Swot Analysis:

There are some points illustrate the strength, weakness and threat of Mawlawi street;

Strengths:

By shops owners and pedestrian named as a best place for increasing economies of the city, it is a good place which attracts tourists for seeing traditional shops and antics as an old town of Sulaimani city. Moreover, in some Occasions like the month of Ramadan feast each single night the street will close for cars and used only for pedestrian for gathering, shopping and some entertainments.

Weakness:

Lack of the parking is the most problem of the street, also the bus as a general transport will not go on this street for serving citizens the taxies can be used for the people but it is expensive comparing to the buses. In addition, lighting is one of the reasons for stopping the crime and makes the street safer all the street depends on the shops light at night to make the place brighter.

Although, lack of greenery and benches which is very important for this street because most of the pedestrian are in need of an open area for relaxing, also the greenery one of the reason for cleaning the air pollution which was caused by the cars.

Threat:

Air pollution has risk on pedestrian's health because of majority of cars on the street, also unsafe crossing the place in need for labels and signs on the path way also crossing zebra line on the street to be much clear for the citizens.

5. CONCLUSION

The point of this paper is the safety of traffic development from the public realm and the move towards shared space has imperative suggestions for the preparing and proficient advancement of all the different disciplines included. Integration of engineering with urban design implies a broadening of mindfulness and information among experts and professionals who, until recently, have shared only a sketchy understanding of each other's roles. Shared space raises the potential for a fundamentally different vision for the streets of towns and cities for the future. With adequate proficient support and political assurance, it seems hold the key to turning around the long-lamented decay within the quality of roads, both in Britain and over the rest of the world, where cars and traffic are likely to remain an inescapable component of our social and financial structures.

If the finding from the expanding number of shared space plans proceeds to illustrate the positive results from treating drivers as intelligent citizens, administered by the same social conventions that support civility in other public places, there's a hope that the segregated world of post-war urban planning will not got to scourge the coherence and quality of the built environment. This considers appeared that there was a strong relationship between the physical components of street and pedestrian concept.

Based on the shared space concept, various practical settings and arrangements can be utilized to enhance the pedestrian social being and the cities interior. Mawlawi Street is an example of a town that can be improved through connecting such arrangements to empower the safety of the pedestrians by offering them space that can move freely. It should involve the provision of attractive spaces such as open spaces, green zone, and building elevation designs such that it attracts the users of the roads is a crucial solution to the selected street. Additionally, making the spaces easily get by the pedestrians with diverse special needs is one of the important considerations that some urban designers have considered so that they will improve the wellbeing of these individuals. Also, the spaces can be modified by adding trees, and different kinds of green plants can improve the experience in the streets.

The result illustrates that the level of pedestrian in Mawlawi Street was in low level due to the poor qualities of the walkway foundation, poor quality of the street furniture's conveniences and poor quality of the road framework. Therefore, the arrangement and plan of the physical components have a significant role to make improve pedestrian movement and reduce the crime in the street. At last, Mawlawi Street can be more walkable through designing physical components, in done probably. This paper concentered on the connection of the physical components of the street and pedestrian, whereas land use as the other aspect can play a major part to advance development in a shared space.

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