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ORIGINAL PAPER
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EXPERTS' PERSPECTIVE TOWARDS SMART MANAGEMENT IN THE POST-WAR RECONSTRUCTION OF THE CITY OF MOSUL

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ABSTRACT

Motives: Urban developers around the world have been using smart management systems in redeveloping cities. This strategy allows a sustainable long term approach, built on scientific findings. Accurate data and information are key in achieving smart management in the reconstruction of post-war areas. Having the right information at the right time helps government officials, service providers and residents themselves make better choices when it comes to the reconstruction of post-conflict areas.
Aims: This paper explores the role of resident experts' contribution and how they can aid officials make more educated choices when it comes to urban decision making. It also addresses the ambiguity of the impact of using the expertise of local urban planners and architects in urban decision making in the reconstruction process as one of the strategies to achieve a smart city. The Old City of Mosul was selected by the authors as a case study in the post-war regeneration process. Therefore, the paper attempts to reach a scientific decision in selecting the best approach towards the urban regeneration of the Old City of Mosul.
Results: The paper signifies the role of the local community experts in urban decision making as a bottom to top approach, and recommendations were made based on the research findings.

Keywords: local experts, smart cities, urban regeneration, post-war strategies

INTRODUCTION

Engaging the local community in urban decision making is one of the main strategies in achieving a smart city. The term "smart" here is not only associated with high technology but includes other dimensions especially the social dimension through engaging residents and local institutions during the selection of appropriate strategies and solutions and at different levels.

The implementation of smart cities must be a fundamental part of a long term strategy, which takes into consideration the social, environmental and economic aspects. Smart city strategies enable taking educated decisions in prioritizing development procedures. Therefore, these strategies must be implemented in government plans and policies. The concept of smart cities has not yet received the significant attention needed from government officials. Although it delivers many advantages in developing public affairs, development policies

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and communities. It has still yet to be implemented in planning and designing stages. The features of smart cities allow local communities to engage in, and react to development plans and proposals. Decision makers, designers and citizens can all exchange data through this platform which will help later on in improving the quality of life and empower local residents (Hussein & Mohammed Salih, 2018). This is one of the strategies that leads to good governance, and good governance increases the capacity of the urban system to deal with risks and improves resilience (Irani & Rahnamayiezekavat, 2021).

The city of Mosul is one of Iraq's biggest cities in the north of the country (Fig. 1). Mosul went through devastating circumstances both during the ISIS occupation who took control of the city in June 2014, and during the war that liberated the city ended in June 2017. A war which left both the city's infrastructure and community torn apart and ruined. For this reason, involving residents in the regeneration process becomes more and more significant. The findings of this paper were determined after carrying out a questionnaire of predetermined responses. A sample of individuals were selected to participate based on certain criteria which included their area of expertise and their knowledge regarding the city of Mosul. The questions involved certain strategies, mechanisms and indicators which can guide the regeneration of Mosul towards providing better quality of life and a more sustainable city.

Fig. 1. Mosul location
Source: adapted from Google maps (2022).

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LITERATURE REVIEW

Urban decision making: community participation in the smart city

Recent scholars have discussed the rapidly growing international tendency towards engaging residents in policy-making and public interest decisions (Blondiaux, 2008). Usually political decisions concerning public good come as top-down innovations. While this strategy can be necessary, at times it fails to meet certain needs and aspirations of the local community. Consequently, residents may reject these forced innovations leading to a gap in understanding between decision makers and the community.

Governments all over the world have started implementing this new approach of public participation in many aspects. These strategies allow residents to take part in the shaping, realization, monitoring and evaluation of public policies. After Arnstein's landmark study in 1969 entitled 'Ladder of citizen participation', which is one of the most cited studies on democratic public participation, researchers have classified different levels and stages of community engagement in political decision making according to the objective and the degree of involvement in the final degree (Rowe & Frewer, 2005).

Among scholars in this particular area, many strategies of "the crowd" participation have been used. A new concept of "citizen scientists" has emerged among researchers. Onyago et. al foresee that urban governance is going through a metamorphosis with a including citizenry in the process of decision making (Onyango et al., 2021). One of the disadvantages of this methodology is its reliance on volunteers whom may not grant the issues at hand the appropriate analysis and interpretation they need (Cohn, 2008). The volunteers here become more of a tool than research collaborators. Despite this new concept's popularity, there have been many disparagements regarding the efficiency and relevance of its findings. One of the main challenges of this approach is the indifference and negligence, not to mention low technology capabilities, of most residents and the under estimating of the potential that individuals may have in policy-making (Dagnino, 2007). Eventually, the samples used in collecting the appropriate information may not be representative of all community sections. For this reason, scholars started using a different means of data collection. This is where the importance of information, communication and technology (ICT) came forth. Scholars believe that ICTs can be used to obtain the accurate information needed in decision making, relying on efficient, accurate and complete data sets (Ishikawa, 2002). They are also cost effective by relying on smart phones as the main means of communication, which facilitate participation anytime, anywhere (Marres, 2012). ICTs also allow individuals to participate through different means of communication and expression which enhances their role in public affair decision making (Muhlberger et al., 2011).

For the mentioned reasons, Giffinger et al. (2007) defined a smart city as "a city which takes advantage of ICT in order to ensure its growth and attractiveness". In their studies they also determined six specific constituents of a smart city, which were: smart economy, smart mobility, smart governance, smart environment, smart living and smart people. In this article, the authors focus on the role of smart people in participatory decision making.

Decisions are made in smart cities depending on information gathered by high tech databases, which allow analysis of this information, planning in accordance, and performance reviewing. For example, ICTs provide data that can be used to inform a final decision or what may be called an "urban democracy decision" by engaging local communities. Therefore, smart cities rely on smart people allowing them to express their needs and aspirations. Of course their role can be enhanced by technical support and training and by advocating social awareness (Hussein & Mohammed Salih, 2018).

After reviewing the previous works of literature, the paper findings stress on the significance of utilizing the (down-top) approach and engaging the local community experts in reaching a more beneficial

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strategy for rebuilding the city. This strategy can help guide decision makers, designers, and residents in achieving their goals. And according to these findings, this research applies this theory in the post-war reconstruction of the Old City of Mosul.

The reconstruction of the Old City of Mosul

The case of the city of Mosul is very complex. Mosul was already suffering from terrorist attacks and insurgents before the reign of ISIS. This lead to a fractured community and an underdeveloped urban structure. After the liberation war against ISIS, and according to (Rudaw, 2017), the destruction on the right bank (the western side of the city) of Mosul as a result of the war on ISIS was 30 times higher than the eastern side of the city. And it is still being renovated by locals only, some home or business owners are rebuilding their properties with the aid of NGOs alone. There has still been no major intervention by governmental authorities regarding housing or infrastructure redevelopment. Painfully, the western side of Mosul is where the historical city of Mosul lies and approximately 40% of this historical urban fabric was completely demolished (Antonelli & Cossu, 2021). The satellite images in Figures 2 and 3 show the level of devastation post war.

Achieving urban sustainability in post-war cities can be a major challenge for decision makers in urban renewal and regeneration procedures. Many priorities arise to the surface, one of them being saving heritage which reflects the sense of belonging.

Fig. 2. The right bank of Mosul pre and post-war – a) November 2015, b) July 2017
Source: Lubitz & Griffiths (2017).

Fig. 3. The bridge leading to the historical city: a) in November 2015 (top), b) in July 2017
Source: Lubitz & Griffiths (2017).

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In post-war development of cities, losing the local identity or weakening the sense of it becomes an imminent fear due to the many interventions and changes to the original urban layout. Other challenges facing developers and policy makers are both social and economic circumstances, the destruction of the infrastructure which leads to the deactivation of certain areas of the city (Hussein et.al., 2019). Al-Samurai and Al-Qaraghuli found that a major importance lies within the social and environmental dimensions to achieve sustainability in the reconstruction of the city of Mosul (Al-Samurai & Al-Qaraghuli, 2021).

Therefore, it can be stated that the urban decision in the reconstruction of the Old City of Mosul cannot be a central decision. The research was based on engaging experts from the local community by responding to a questionnaire which addresses the main issues in reconstructing the city. The goal was to reach the best approach and put it in the hands of decision makers.

There have been many initiatives and attempts, among the people of Mosul, to raise their voices to be heard as part of the decision making procedure. One of these initiatives is a personal blog by Mosuli Historian Omar Mohammed named 'Eye on Mosul'. This anonymous blog, at the time, was one of the few ways the world could hear about everyday life events in Mosul during the ISIS occupation, and played a major role in transferring information towards the liberating troops during the liberation war. However, the historian has now shifted his efforts towards the advocacy of social initiatives of the people of Mosul (Mohammed, 2021). The success of this initiative impels the great role the Mosuli community can have in deciding their own destiny.

MATERIALS AND METHODS

The methodology of this paper, which attempts to reach a scientific decision in selecting the best approach to urban regeneration in the Old City of Mosul, is based on studying previous works of literature in urban decision making, and highlighting the role of modern technology and local community experts' participation as main "smart city" strategies. This was implemented by interviewing selected respondents (a focus group) with a predesigned wet of questions, as shown in Figure 4 and appendix (a). After collecting the participants' information, the interview questions focused on prioritizing the urban regeneration from 3 main aspects: strategy, choosing the most appropriate

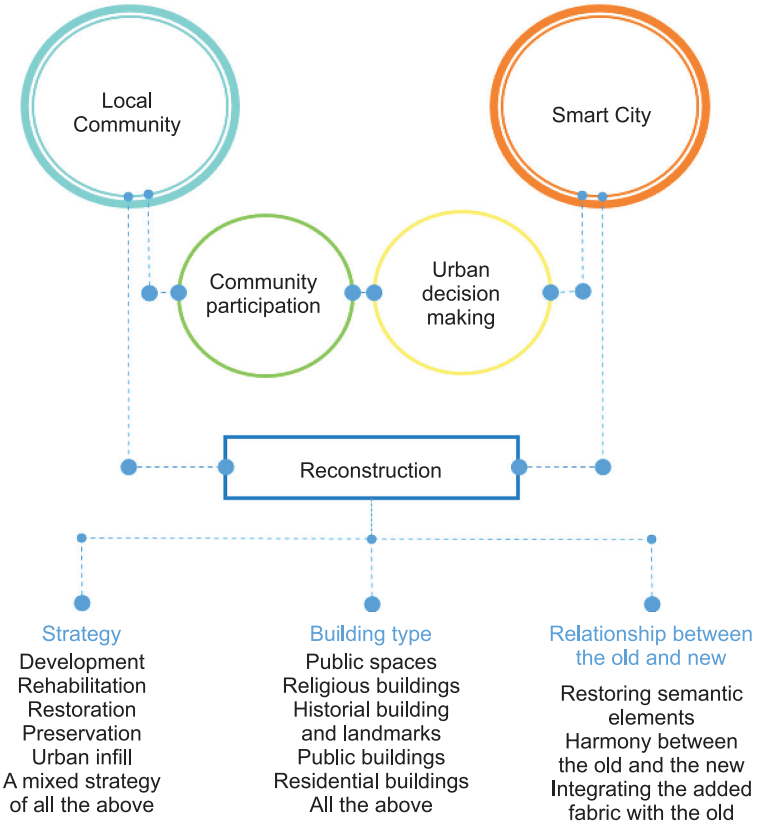

Fig. 4. Methodology illustration
Source: own preparation based on Author (2020).

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strategy for reconstruction; building type, prioritizing which building types to start with; and finding the applicable relationship between the old and the newly added fabric.

INTERVIEW QUESTIONS RESULTS' ANALYSIS

A set of questions about the reconstruction of Mosul was distributed among a focus group containing 21 architects and urban planners, who either live in the city of Mosul or have lived there in the past, therefore have sufficient knowledge regarding the nature of the city and its social and cultural characteristics, and due to their backgrounds, can make educated decisions regarding the reconstruction, fuelled with their local backgrounds and cultural pertinence.

Research Sample Information

The first few questions requested information about the interviewees, to help shed a light on the educational background and experience of the 21 participants. The participants were a small group of qualified individuals with certain experience especially in construction, urban planning and post-war redevelopment. In addition to the limitation of either having lived in or studied the urban attributes of the city of Mosul.

It was found that 38% of the participants held a Master's degree, another 38% held a Ph.D. and 24% of them held a BSc degree in either Architecture or urban planning. A little over half of the participants were men, where the rest were women. The major age group of the recipients were 30–40 years of age, 29% were 40–50 years and 15% were over 50 with a few participants under 30.

As for the academic and professional domains of the focus group, 90% were specialized in architecture and 10% were in the urban planning and design domain. Most of whom were academics with a few architects working in the local private sector.

As mentioned earlier, the focus group were individuals with certain experience in the urban history and fabric of Mosul. Therefore, 67% had lived there their whole lives, and over 14% had lived in Mosul for over 5 years and just over half of them had visited the Old City of Mosul after the war.

The reconstruction of Mosul

After collecting the appropriate information regarding the participants, certain questions were asked to understand the priorities of the appropriate people when it comes to post-war redevelopment of Mosul, especially the old part of the city. The authors proposed a number of reconstruction strategies: development, rehabilitation, restoration, preservation, urban infill or a mix of all strategies. The participants were asked which strategies they see appropriate according to the condition of the city at the time of the paper, and taking into consideration the nature of this ancient city and its history, culture and social qualities. Most participants preferred a mix of all proposed strategies, by studying the old city building by building and then deciding individually which approach would be more beneficial. Whereas over a quarter chose development as a main strategy, 19% mentioned rehabilitation and 10% preferred restoration of the devastated buildings. The term restoration refers to degraded areas and restoring the values and characteristics the space once had (Biegańska et. al, 2019). Urban infill and preservation were also among the proposed strategies to kick start the post-war reconstruction of the city, see figure (5).

The other issue tackled in the set of questions was redeveloping building type priority. The authors asked which building type should be prioritized in the first phases of the regeneration of the Old City of Mosul. Over half of the experts considered residential buildings the most important and critical when it comes to initiating the redevelopment strategy. Of course this is highly understandable due to the thousands of houses demolished during the war on ISIS. The second building type to be given priority,

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by about 20% of our participants, was vital public buildings. The rest of the answers were either historical buildings and landmarks or giving all building types the same level of attention after initiating emergency solutions for the displaced families, see figure (6).

The final question dealt with the relationship between the old and the new. Participants were asked to choose the strategy they preferred to be used while dealing with both old and new buildings. Almost half of the experts found that the integration of both

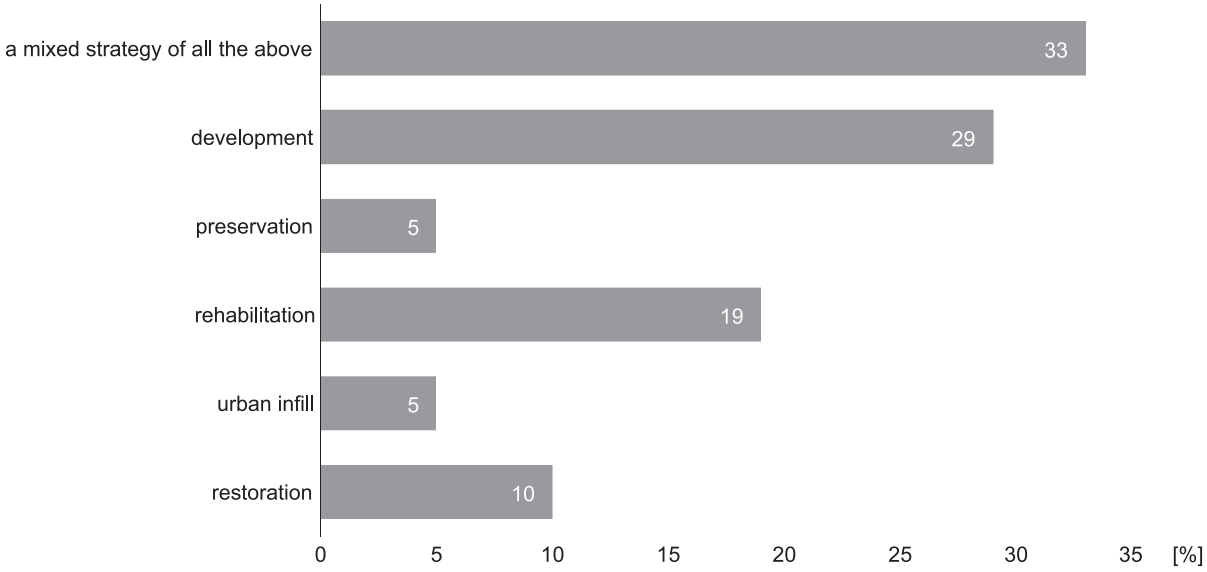

Fig. 5. Questionnaire results: Preferred strategy in the redevelopment of the city of Mosul
Source: own preparation.

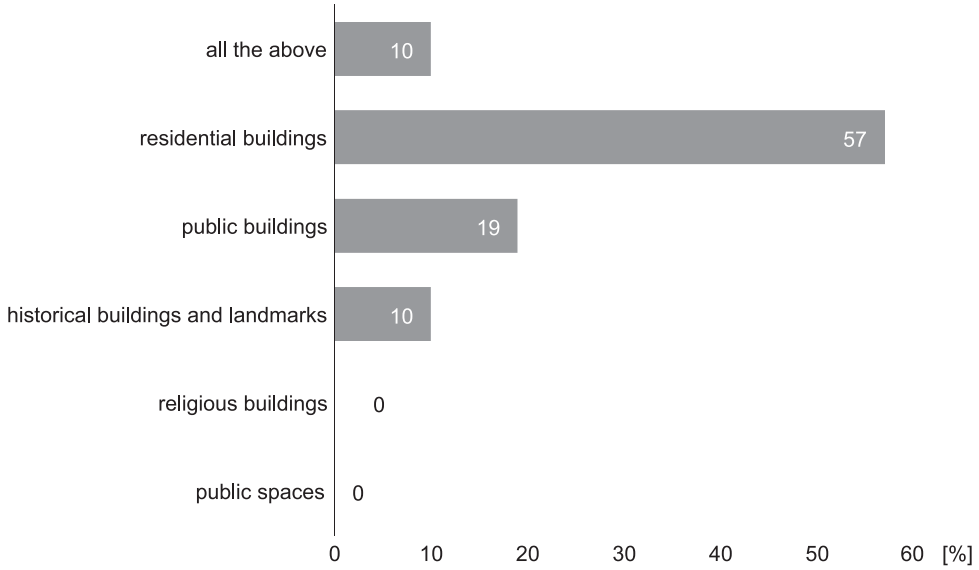

Fig. 6. Questionnaire results: The building type which should be treated with utmost urgency in the regeneration of the Old City of Mosul
Source: own preparation.

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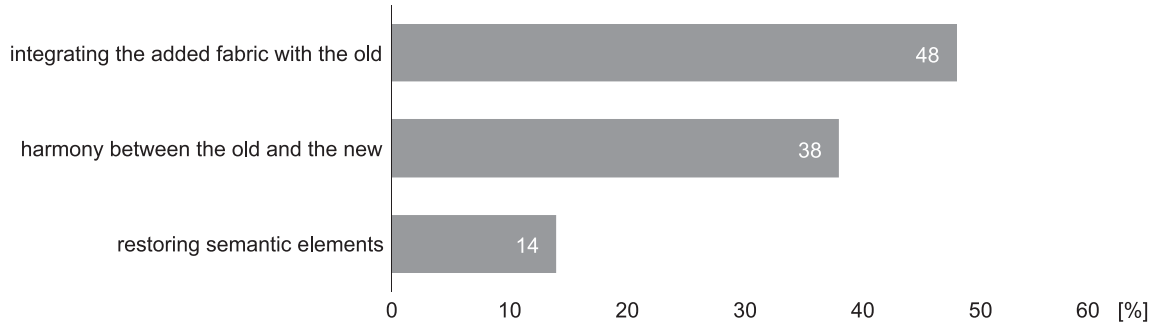

Fig. 7. Questionnaire results: Preferred relationship between the old and the new
Source: own preparation.

the old and new urban fabrics is the best approach. 38% recommended harmonizing the new with the old. And the rest preferred restoring the traditional semantic elements in the buildings, see figure (7).

CONCLUSIONS

The study attempts to implement the strategy of activating local community experts as 'smart people' in urban decision making in the reconstruction process as one of the strategies to achieve a smart city. Focus was on smart people and their potential role in bottom to top decision making, opposing central decisions which are normally distant from the public and their needs.

The authors started with interviewing a focus group of local experts in urban planning and architecture, with a previously designed set of questions regarding prioritizing reconstruction in the Old City of Mosul. The findings can be presented to stake holders and decision makers to help educate their decisions in the direction of the people adhering to them.

This research applies this method in the post-war reconstruction of the Old City of Mosul. According to the findings, this paper recommends:

1. A mixed strategy of development, rehabilitation, preservation, restoration and urban fill; in the post-war reconstruction of the Old City of Mosul, emphasizing on development as the main urban regeneration strategy.

2. Prioritizing residential buildings in the first place and public buildings in the second place, while reconstructing the city, this seems logical due to the high degree of displacement the residents of the Old City of Mosul suffered during this period.

3. As for the relationship between the old buildings and fabric and the newly built ones, the findings indicate that integrating the old within the new is the best strategy.

After addressing the final findings of this research, which are general indicators to commence the reconstruction process, it can be concluded that local community participation is key to achieving a smart and thriving future city environment.

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APPENDIX

Reconstruction of Mosul questionnaire:
You are kindly invited to respond to the following questionnaire as part of a scientific research regarding the post-war reconstruction of the Old City of Mosul. Responding should not take more than five minutes of your time.
Email address _____.

1. **Educational background**
   - o BSc
   - MSc
   - Ph.D.
2. **Gender**
   - Male
   - Female
3. **Age**
   - Under 30 years of age
   - Between 30–40 years of age
   - Between 41–49 years of age
   - 50 years and above
4. **Scientific field**
   - Architecture
   - Urban planning
   - Other
5. **Place of work**
   - Academic institution
   - Professional institution
   - Private business
   - Other
6. **Time spent as a Mosul resident**
   - Permanent residency
   - A few days visit
   - A few months residency
   - Less than 5 years residency
   - More than 5 years residency
7. **Have you visited the Old City of Mosul after the war?**
   - Yes
   - No
8. **Which is the best strategy to start with upon reconstructing the Old City of Mosul?**
   - Development
   - Rehabilitation
   - Restoration
   - Preservation
   - Urban infill
   - A mixed strategy of all the above
9. **Which of the following buildings should be prioritized in the reconstruction of the city?**
   - Public spaces
   - Religious buildings
   - Historical buildings and landmarks
   - Public buildings
   - Residential buildings
   - All the above
10. **Which is your preferred strategy towards the relationship between the old and the new?**
    - Restoring semantic elements
    - Harmony between the old and the new
    - Integrating the added fabric with the old

Please add any remarks or extra information below
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Thank you for your participation.

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