

## IT Problem Solving Formalisms for Urban Ageing

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### Abstract

The phenomenon of urban ageing refers to an elderly population that resides in urban settings. The patterns of urbanization and population ageing are both positive and negative outcomes of successful human development. While it may be a subject of debate whether urban living is better for ageing and longer life in comparison to rural areas, this study focuses on examining the issues related to urban ageing for the community in one of the local sections in Shah Alam, Selangor, Malaysia due to its diverse population. The study aims to adapt the Soft System Methodology (SSM) for Community IT-Based project. The study addresses several challenges faced by the community such as; (i) a lack of awareness about the neighborhood, (ii) inadequate welfare support, and (iii) a shortage of platforms to ask for assistance from the community. A solution is proposed to address these issues and engage the community to support one another.

**Keywords:** Urban Ageing, Soft System Methodology

### Introduction

The increased life expectancy of the population is a great achievement, but the interplay between urbanization and population ageing creates problems for various communities in different aspects of urban life (Van Hoof et al., 2018). Ensuring a high quality of life for the elderly population requires ongoing improvement of public spaces to meet their health and well-being needs (Liu et al., 2020). Urban residents were found to be more likely to utilize a greater number of devices compared to those living in rural areas (Calvert et al., 2009). The patterns of urbanization and population ageing are both positive and negative outcomes of successful human development. While it may be a subject of debate whether urban living is better for ageing and longer life in comparison to rural areas, this study focuses on examining the issues related to urban ageing for the community in one of the local sections in Shah Alam, Selangor, Malaysia due to its diverse population.

## Methods

The study aims to adapt the Soft System Methodology (SSM) (Adapted from Checkland & Scholes, 1990) for Community IT-Based projects, as seen in recent studies in Malaysia (Isa et al., 2020; Mohd Isa et al., 2020). The research approach used was action research, and postgraduate IT students from a Malaysian public university applied SSM in their group project. The project aimed to investigate the support issues faced by the elderly community, who are aged 60 and above, in one of the sections of Shah Alam, Selangor, Malaysia due to excessive urban growth. Data was collected through on-site observations and interviews with the elderly residents, and it was found that they faced challenges such as a lack of awareness about potential dangers in their surroundings, limited access to emergency support, and inadequate community welfare.

## Results and Discussion on the Application of Soft System Methodology (Adapted from Checkland & Scholes, 1990)

The seven steps Soft System Methodology (SSM) (Adapted from Checkland & Scholes, 1990) was employed in the study as follows.

### ***Step 1) Problem Situation Unstructured***

For this research project, a specific elderly community in one of the local sections in Shah Alam, Selangor, Malaysia was selected and a review of relevant literature and previous studies was carried out to identify the challenges posed by urbanization and suggest an IT-based solution. The aim is to uncover the difficulties faced by this community, which are often vague and unorganized. Hence, based on the research findings, five questions were formulated to help understand and analyze the complicated situation systematically. These questions are:

1. Find out about the problem situation?
2. Who are the key players?
3. What is their perception of the situation?
4. What current process is going on and how?
5. What does the organization look like?

The summary of the findings is shown in Fig. 1.

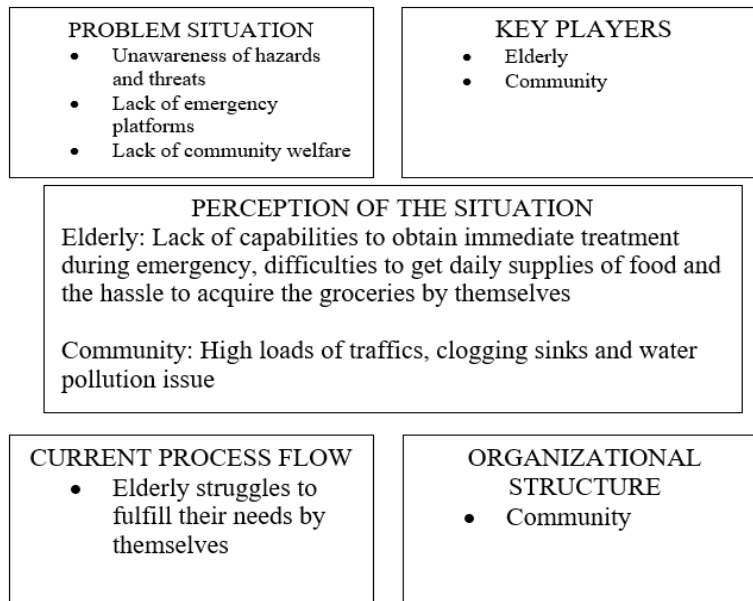


Fig. 1. Appreciation Problem Situation elderly community

**Step 2) Express the Problem Situation**

By compiling all of the material that has been gathered as a result of the desk research that has been carried out, the concept of a rich picture is portrayed in Fig. 2.



Fig. 2. Rich picture of the problem situation

**Step 3) Formulate Root Definitions**

In essence, a root definition refers to a procedure that transforms an entity by modifying it and producing a revised version of it. The most pressing concern is that elderly individuals who live alone are struggling to receive timely medical attention during crises and obtain their daily food needs.

**Root Definition (RD)**

The following is a written basis of Root Definitions:

**Root Definitions (RD)**

A system to do P by (means of Q) to do R

P: What the system does?

- Provide a platform that can solve the issue of the elderly having difficulties in obtaining immediate treatment during emergencies and their struggles with getting daily food supply.

Q: How it does?

- A mobile application will be developed to connect the elderly with their immediate community.

R: Why it's being done?

- To provide a solution to the issue of the elderly having difficulties in obtaining immediate treatment during emergencies and their struggles with getting daily food supply.

**CATWOE Analysis**

<b>C Customers</b>	<ul style="list-style-type: none"> <li>• The elderly community that having difficulties in obtaining immediate treatment during emergencies and struggles with getting daily food supplies.</li> </ul>
<b>A Actors</b>	<ul style="list-style-type: none"> <li>• Local Authorities</li> <li>• Department of Social Welfare</li> </ul>
<b>T Transformation</b>	<ul style="list-style-type: none"> <li>• By using the mobile application that will be developed, the elderly community will be able to connect with the local authorities to seek help</li> </ul>
<b>W World View</b>	<ul style="list-style-type: none"> <li>• The elderly community can receive immediate treatment during emergencies and will get enough supply of daily food</li> </ul>
<b>O Owner</b>	<ul style="list-style-type: none"> <li>• Authorities in the country</li> </ul>
<b>E Environmental Constraints</b>	<ul style="list-style-type: none"> <li>• Difficulties in getting all the elderly in the community to use the application due to no access to smartphones and non-tech savvy.</li> </ul>

**Step 4) Build a Flowchart of the Proposed Solution:** Through this step, a Flowchart is created (Fig. 3) which represents the system's activities. It is generated following the root definition stage and the CATWOE checklist.

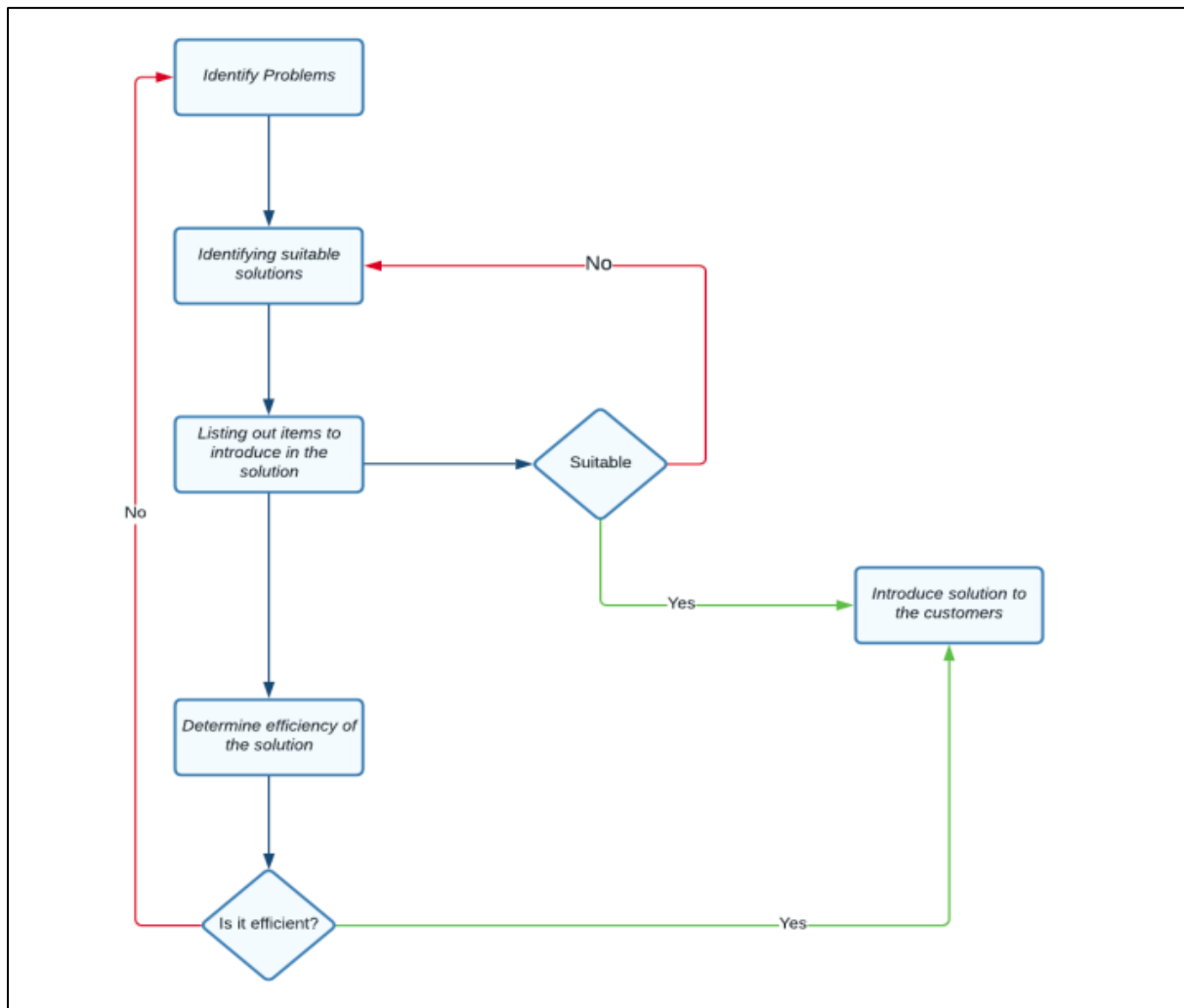


Fig. 3. Flowchart for the project

The figure above shows a general flowchart of the solution implementation process, which begins by identifying the problem to be solved. The next step is to identify the offerings for customers (users), followed by an assessment of their suitability. At the same time, the effectiveness of the solution is evaluated to make improvements for the benefit of customers (users).

**Step 5) Compare Flowchart Elements with the Real World:**

Table 1 Comparison of the elements of the flowchart of the proposed information technology solution with the Real-World Situation

FLOWCHART ELEMENTS	DESCRIPTION	REAL WORLD	OUTPUT
Identify problems	Finding the actual problem faced by the actors	Reading articles, studying past papers related to community	Difficulties in getting immediate treatment during emergencies among live-alone elderly
Identifying suitable solutions	Proposing an IT-related solution i.e., the mobile application	Development of the application	A useful mobile application is developed to solve the issues faced by the elderly in the community
Verifying the efficiency of the solution	The solution is fully capable of helping the elderly in getting immediate treatment during emergencies and obtaining enough supply of daily food	Solution implementation may be hard due to the cost of application development and the capability of the elderly in using smartphones	Not all elderly are tech-savvy, hence more effort is required to educate them to ensure that everyone is capable to use the mobile application

**Step 6) Define Possible Changes**

This stage integrates all previous stages and involves evaluating and considering potential modifications. It is here that action plans for practical improvements, changes, and modifications are developed. These ideas may align with research interests and problem-solving objectives, or be feasible and culturally acceptable recommendations.

Given that mobile devices are becoming increasingly accessible, the recommendation of a mobile application as a solution could be a viable option in the future. To make the application user-friendly for the elderly, several strategies have been devised. Firstly, the interface will be kept simple and uncluttered, with minimal functionalities on each page. Additionally, the proposed application should be compatible with both Android and Apple platforms to attract a wider user base. The application will also include two-way communication features that allow users to interact with one another. Importantly, the solution focuses on connecting the elderly with their community and employs various design techniques and mobile app development methodologies.

**Step 7) Take Action to Improve the Problem Situation: A Proposed Prototype System**

The I-Care application is an application with the main purpose, which is to support the community to create a brighter future. It represents the harmonious lifestyle of a caring community. The description according to different pages as follows:-

- **Welcome Page**

The welcome page is a starter page for the I-Care application. On this page, users have the option to register their accounts by clicking the Sign-Up button or logging in using an existing account.

- **Sign Up and Login Page**

Sign Up and login pages are where users can register a new account or log in using their existing account. This application only requires for username and password to log in. Clicking the signing up button will make the username and password stored in the database and make it possible for the user to login into the login page.

- **Welcome User Page**

The welcome user page is a page that will greet users right after login I-Care application. A brief explanation of the purpose of designing this application has been stated on this page. It is best to let users know first what the application is all about.

- **Introduction User Information Page**

On this page, users will be informed that the application will collect user information before entering the home page of this application. Users will know that their information is important for the application to give them an amazing experience. For example, the user's location is important for the application to know which is the most suitable community for the user.

- **User Profile Form**

Users must fill up two consecutive pages of user profile forms with personal data including name, age, phone number, and address. The application will read user data and save it in a database. Some personal data, like name and phone number, would be displayed for others to see and get to know one another better.

- **Map Page**

This page will be displayed when the user clicks the 'Track My Location' button. This leads the user straight to the map page. User can detect their live location. This will increase the accuracy of the user's location. Also, users can zoom in and zoom out on the map. Other than that users can also search their location manually on the map.

- **Process User Information**

This page shows that the application is analyzing users' data. Based on the data, the application will choose the best community group for users. Generally, users will be included in the nearest place in the community. The closest the community is the easier for users to support each other. As for this example, the community of the local section in Shah Alam is the best community for the user. The user still has the option to choose another community.

- **Community Home Page**

The Community Home Page is a page where users will be able to view all posts from community members. On this page, users would be able to view any latest news about the community such as warnings on the occurrence of wild dogs on the street, a horrible clogged drain around the neighborhood, and many more. This will raise the awareness of the surrounding community. Other than that, on this page, there is also a button for post-editing and emergency calls.

- **Emergency Alert Page**

When the user presses the "Emergency Alert" button in the tab bar, the emergency alert page will be shown. This page is vital for viewing other people's emergency applications. Top priority should be given to the most urgent emergency application. An accident, disease, or natural calamity that requires immediate action is considered a critical emergency. Applications that are colored red and yellow respectively display different levels of emergency. Users can click the "help" button to offer assistance and take action, as well as the "location" button to determine the location of the incident.

- **Ask Help Page**

When the user presses the "Ask Help" button in the tab bar, the ask help application page will be shown. Users can fill out this form when they need help. Users can give the range of the emergency and also specify the type of emergency. Any details on the emergency incident will give a clearer explanation to the community's members. Once the form filling is done, the user can submit the application which will notify all the communities about the related emergency.

- **Processing Page**

This page shows that the application form has been processed and notified to the community. Help will arrive in less than 10 minutes. If there is no help within 20 minutes, then the application form will go straight to the helpline channel. The okay button will bring the user to the home page.

- **Emergency Call Page**

This I-Care application provides a platform to contact directly with a helpline channel for any critical situation. Also, there is a button that will direct users to the Ask Help page. User can make their own decision based on the level of the emergency.

- **User Profile**

User Profile is a page where the user will be able to see all of their personal information being displayed. User is free to view or update their profile on this page.

## **Conclusion and Future Studies**

Urban ageing refers to the growing population of older adults residing in cities. This group often faces numerous challenges and concerns daily, making them a vulnerable population in the urban ageing community. The ageing process can be both positive and challenging, as older adults may lose financial stability, suffer from declining health, and receive little support for dealing with everyday issues. To address these concerns, efforts are being made to improve the quality of life for the elderly population. Based on findings from research, the



elderly face three main issues related to community support: (i) a lack of awareness of potential threats, (ii) insufficient platforms for seeking help in emergencies, and (iii) inadequate community welfare.

To tackle these challenges, a proposed solution is the I-Care mobile application. This prototype application enables communities to report and share information about their environment, such as flood warnings. It also provides immediate help in emergencies, allowing users to activate an emergency button for assistance. Additionally, the application offers support for daily needs, such as transportation and access to groceries. By implementing this solution, older adults can receive support for their daily challenges and the community can be made more aware of the needs of the elderly population, encouraging further efforts to help this vulnerable group.

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### **References**

- Calvert Jr, J. F., Kaye, J., Leahy, M., Hexem, K., & Carlson, N. (2009). Technology use by rural and urban oldest old. *Technol Health Care*, 17(1), 1-11.
- Checkland, P., & Scholes, J. (1990). *Soft systems methodology in action*. Wiley.
- Liu, B., Chen, Y., & Xiao, M. (2020). The social utility and health benefits for older adults of amenity buildings in china's urban parks: A Nanjing case study. *International Journal of Environmental Research and Public Health*, 17(20), 7497. <https://doi.org/10.3390/ijerph17207497>
- Van Hoof, J., Kazak, J. K., Perek-Białas, J. M., & Peek, S. T. M. (2018). The challenges of urban ageing: making cities age-friendly in europe. *International Journal of Environmental Research and Public Health*, 15(11), 1–17. <https://doi.org/10.3390/ijerph15112473>
- Mohd, I. W. W. A. R., Noordin, N., Suhaimi, A. I. H., Ismail, I. N., Mahat, S. R., Abdul Aziz, N. S., Tumin, M., & Yaakob, M. N. H. (2020). Framing soft system methodology in community it-based project: case of asnaf. *International Journal of Advanced Science and Technology*, 29(6 Special Issue), 1580-1587.
- Isa, W. M. W. A. R., Suhaimi, A. I. H., Noordin, N., Safiq, M. S., Wan Azmi, W. N. N., Norham, N. A., & Hammami, S. (2020). Applying soft system methodology in community it-based project: case of poverty tramps. *International Journal of Advanced Science and Technology*, 9(1.4), 131-137. <https://doi.org/10.30534/ijatcse/2020/2091.42020>