Sustainability Innovation

How To Design A Plan To Turn The Local Community Into A Sustainable Ecological Community Of The Future?

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Summary

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With the deterioration of natural environment, one big step we can take is to renovate our current community in order to mitigate the environmental disaster. Facing the problem of renovating sustainability and eco-friendly community, we will work as a group with the government, the real estate management and the tenants to create a sustainable and eco-friendly community.

When we analyze different solutions to mitigate environmental damage, one huge aspect is people way of living, their housing environment. House always plays a huge role in people's life, and by renovating these communities into communities that are innocuous to the environment.

However, we do face multiple challenges. Our community currently lack greenery, have many exhausts from cars, poor real estate management, low sustainability, poor construction and structural planning, and lack of restrictions on transportation.

Carefully examining the problem, we see three major root causes for the problem: the inevitability of economic development, tense relationship relating to human nature, along with cultural and customs.

With these challenges and root causes in mind, we come up with eight general solutions. Some encourage to create a new policy, some would need new platform build, and some require renovation on the community.

To ensure our solution is the most effective on pinpointing and solving the problems, we use the criteria of safety, economy, effectiveness, feasibility and complexity. As our problem actively impact people's style of living, criteria of safety, complexity, and economy are very important. Furthermore, effectiveness and feasibility also have importance as we need solution that actively mitigate environmental problems. By adding and subtracting points, our final solution is creating an online recording system for estate management.

The solution is simply building an online Community Estate Manage Universal Information Platform that records the government policies, community projects and residents' suggestions. The platform should be developed and maintained by a third-party professional company, and supervised by government commissioners

and representatives of community residents who join the platform. There will be supervisors chosen from the government to constantly check and grade the performance to improve the trust between residents and estate manages as well. This solution is very simple as it doesn't involve many stakeholders and is considerably safe. This reassure the tenants when applying the solution as it's not going to be dangerous. Moreover, it is relatively cheap as we only need to invest money into creating the platform and will effectively dealt with the root cause of poor estate management. We also create interface for residents' feedback to make the marking more accurate and reliable. Government could offer renovation and schedules could be seen on the platform which minimize the inconvenience. Residents could also see historical performance curve which avoid bad decision. All these designs decrease the complexity of the solution and increase its effectiveness.The sustainable renovation of old communities faces many challenges such as residents' enthusiasm, property management efficiency, government policy support, etc. The online system provides effective information exchange channels, which can help the government coordinate the promotion of sustainable renovation and help the property mobilize the enthusiasm of residents. Help residents monitor the progress of the project. And through residents' suggestions-community project-government-supported path provides a sustainable transformation of the community basis.

As surveys examining shows: the online platform design is acceptable, with high willingness and Function recognition for people to use.

It needs to improve ease of use and increase compulsory application based on the feedbacks. And, as a way to build an eco-community, how to promote the sustainable transformation of communities through the online community information management system is also a question worth exploing.

In short, to design and build an online Community Estate Manage Universal Information Platform. It can promote communication among residents, property departments, and the government, improve the quality of community life of residents, and provide a foundation for sustainable transformation of old communities. The plan received high positive feedback, and residents' willingness to use it was relatively strong.

Identify the Challenges

1.Lack of greenery

Lack of greenery is a major problem for communities around famous schools. Increasing the coverage area of plants is a major problem if an eco-friendly community wants to be reached; however, there are some considerable problems. These communities are usually old (at least 30 years), their planning is usually impaired. Sometimes, only a tiny amount of plants could be noticed in these communities.

2. Exhaust

Another problem for the communities around schools is the exhaust of cars. Exhaust from vehicles contains various harmful substances, including carbon dioxide, sulfur dioxide, nitrogen monoxide, and so on. These gases can cause global warming and acid rain if they are released into the air. These substances also cause severe health problems. For the communities around schools, the bad planning and lack of greenery cause tail gases to be breath in easily by residents. To build a sustainable ecological community, the amount of exhaust from vehicles has to be controlled.

3.Realty management

To ensure the school district housing complex functions sustainably, effective realty management is essential. It consists of maintaining greenery, cleaning public spaces, fixing public facilities and managing parking problems. However, the criticism on realty management has been a long-term mainstream in China, as the average satisfaction rate in Shanghai is around 35-40 percent in 2019. A lack of effectiveness is shown in the percentage. 30-70 percent of real estate owners in ten chosen Shanghainese housing complexes did not pay the seasonal realty management fee at least half of the times, this cuts down the funds by about 50% of the estimated amount. Realty management of many communities faces economic challenges. As funds decrease, there is not enough money to repair and maintain facilities, the quality of service goes down, resulting in disbelief in realty management. This is a cycle that triggers challenge to a sustainable housing complex, as greenery and functions (responsibility of realty management) are what makes it sustainable. In addition, to sue a realty management committee, the plaintiff has to go through tedious procedures of acquiring signs from more than half fellow real estate owners. Secondly, realty management is often in the form of district government or real estate owner appointed committees. Because it is not commercialized and lack competition in market, being ineffective does not have a high cost.

4. Cultural Environment

One of the challenges of this area is the cultural environment. The cultural environment itself does not pose a significant problem, but because of the high density, the surrounding neighbor's actions primely influences the relations of dwellers. Due to the different ages, education, and other aspects of people living in the area, the actions and the obedience to the rule can widely differ from unit to unit. These differences in actions often lead to an increasing number of problems, such as not following the rules for garbage classification or creating excessive noise at midnight. The difference in obedience can lead to great difficulty when managing such phenomenon, as it is hard to control these minor disobediences. The second problem is that due to the high density, conflicts between people were more frequent. The frequent interaction between different people was sometimes too excessive and posed a significant problem.

5.Sustainability

All across the world, many resources go wasted without the correct facility to utilize them. Such natural, renewable resources such as sunshine and rainwater, where the too almost always exist in abundance across some areas. Catching rainwater is a common personal action in China to prevent water accumulation and collect toilet water. However, these behaviors are usually carried out on the family basis, rather than planned and constructed by the community. Most of the rainwater is still unattained, in events of heavy rainfall and typhoons, many neighborhoods gets flooded without adequate rainwater retention area and water collection pipe. Same for attaching solar panels to families' roofs: an action that is somewhat common but not popular, and most apartment residents simply do not meet the requirements for installation. Without renewable resources exploited to their full extent, more un-renewable fossil fuels are burnt for energy, wasting resources as well as accelerating pollution. Communities are using unneeded supplies of fuel while disregarding nature's free gift. Thus, residents cannot live sustainably as they don't learn the concept of sustainable living, and communities fail to maintain their waste emissions at a reasonable level for the environment.

6. Structural problem of building

As construction company might minimize the cost in order the maximize the profit, the inadequate structure design is troubling to residents. First, the majority of housing available in Shanghai has a narrow space. The confined area does decrease house prices but also creates dissatisfaction with residents. The minimum space would create discomfort and decrease the sustainability of the community as the need for suitable housing is not satisfied. Second, the structural problem would also create noise pollution. Companies would use low-cost materials that cannot insulate noise, and thus will create discontent. The poor material between neighbors will increase the possibility of noise pollution. The poor material used will allow noises such as instruments' sound, footsteps pass through and disturb the normal routine of the residents and decrease the comfort of the house. This challenge has a significant impact, especially in China, as people usually live in apartments.

7. Transportation

A robust hourly variation in passenger flow exists for school-district housing (SDH). The tidal passenger volume signifies that at peak hours ("rush hours"), over-capacity is nearly inevitable. The public transportation facility around SDHs is often the maximum load section (MLS). Furthermore, different from peripheral or suburban sections, which may have unidirectional high volume, these sections usually contain a tremendous volume of flow in all directions. Consequently, the crash of flows heading for diverse directions frequently takes place.

There's also limitation existing in SDH's road design, they often rely on a trunk and branch network of roads. Such kind of intra-community network usually leaves only 1-2 automobile-passable gate for connection to the municipal road network. The lack of gate induces a traffic flow shockwave effect, originating from the gate and extending into the community's capillary roads. This effect will diminish the time-efficiency, volume and capacity of traffic flow. Moreover, the accessibility of public transportation is degraded due to the lack of gate. Despite the oftentimes short straight-line distance, the lack of gates decreases the accessibility. As a combined effect, commuters and residents are less enthusiastic in taking public transportation and turn to use private cars or taxis instead. Carbon emissions will grow in the macroscopic view. To this end, difficulties rose when one tries to improve the socio-environmental sustainability.

Uni-functional community, such as dormitory towns or commuter towns, often holds a uni-purpose and therefore mono-destination traffic flow. However, SDHs usually contain not only the school-targeted flow, but it also embraces the city's native population. This implicates that traffic with a mixture of age and purpose exists. Plus, as a result of the shortage of gates, destination classified shunting of traffic flow is almost impossible. Hence, school-destined flow and work-destined flow are forced to merge in one crowded stream. Due to the difference in characteristics, the two flow has a distinctive pace (as grandparents are often the ones who is bringing children to school). Consequently, temporal-efficiency for work-destined flow is reduced, as well as the increased danger of commuting personnel's crashing into children or elderly, causing injuries. Ultimately, maintenance of sustainability on the social perspective becomes challenging.

Identify a Root Cause

The inevitability of economical development
China had experienced rapid GDP growth in the last 40 years. The highest annual growth rate is 14 in 1992 and 2007, one of the fastest for developing countries. The result is a country-wide real-estate development, especially in major cities like Shanghai, with multiplying housing prices. After 2007, the annual GDP growth rate falls to 9, then gradually falls to 6 in 2019 and potentially below 0 in 2020 because of nCov-19. At the mean time, the price of housing is still rising. In high-tier housing compounds, school district is the reason why price rises and people buy, so sustainability becomes a sub-sided problem. In all districts, the residents' salary (roughly measured as GDP) increases more slowly. As a result, they have low economically availability to pay realty-management fees for environmentally friendly alterations like greenery or rooftop sun power plants. In conclusion, The increase in real estate price outgrew the increase in salary, results in the lack of money on making communities more sustainable.

2.Tense relationship relating to human nature.
Of all the problems mentioned, many of these problems, primarily social problems, are caused by the tense and complicated relationship between neighbors and families within a district. This is because, in recent days, especially in China, many of these old apartments are still governed individually, and there is little trust between complexes and houses. Maximizing the benefits and making sure there is nothing to lose from the newly enacted and enforced regulations is the only point most residents consider. When a problem deals with multiple families or people, making sure everyone agrees and is happy has become a challenging task. For a moderate or complex project to be implemented, just the fund and location of instruction would need multiple rounds of discussion between different families, and vast amounts of time would be taken in debating, discussing, and negotiating a plan everybody likes. Many times, not everyone's interest is met, which would compromise on the location or how the solution would be implemented. There is also a tense relationship between agencies that build apartments and manage them with the residents. This tense relationship also comes from maximizing interest, which sometimes for the real estate developers would mean cutting corners when building a new apartment or managing the apartment, causing terrible quality houses. All of the problems mentioned loaded to a single social problem, which is distrust. Between residents, no one believes that one's action is for the benefit of the whole complex, meaning everyone wants to supervise the project and creating a mess. Between real estate companies, the tense relationship caused by cutting corners has led to distrust in residents of the companies making good use of

money handed in by residents. Thus, distrust is the fundamental nature of individuals and had caused many of the issues and challenges.

3.Culture and customs

In most cultures, there are defined ways of living that many residents look forward to. Such ways of living may include who they want to live with, type of housing they choose, location of the housing and many details. In China, many elders long for a big family of four generations. With this hope in mind and the love for their children, many elders live with their children to help with the grandchildren. Often times there will be at least three generations living in the same household, as many families have both parents working full time and their children will be unattended to. Such tradition terminates the option of moving elderly family members to separate retirement communities.

Another cultural aspect is the presence of the school district housing policy. In China, enrolling in a public school requires the ownership of a housing in that school district. This policy allows children to go a desired school as long as they own an apartment in that area. However with this policy, apartments in a popular district are usually tiny and extremely expensive. But universally, parents usually place their children in a prominent position, and would make heavy expenses for the sake of their children. This means that most families in a good school district would be crammed into small spaces that are usually completely functional.

Generate Solutions

Minimize tax for ecofriendly and effective materials

As the structural problem is a severe concern that troubles tenants, a way to introduce sustainable and effective materials to wide variety of tenants must exists. Materials that insulate sound and ecofriendly are expensive, and this means there will be a lower range of customers. As more people are discourage by the high pricing, the structural problem will always exist as long as the prices are continuing to stay high. Thus, by decreasing the overall price of the material, it would promote customers to buy and use them. Government will provide a tax deduction for housing materials that are effective and ecofriendly. This will increase the cost-performance ratio and thus increases the range of customers. As the price are more acceptable, more people will apply the materials which solve the structural problem in the house. Moreover, as more people are using ecofriendly materials, a more sustainable and environmentally friendly community will appear.

2: Create an online recording system for estate management.

For structural problems, it's usually the real estate who wants to maximize profits and they will use cheap materials to build the house. By create an online recording system by the government, we will be able to record the behaviors of these estate managers. The estate managers are required to upload the status of community infrastructure and maintenance, the use of community property fees, sustainable transformation of the community, etc. The tenants in the community can also upload their dissatisfactions online. This information is open to the public and multiple raters from the government will rate each manager's performance. Those community fails the rating will be required to change their estate manager for a better condition in the community. Notorious real estates will eventually lose their customers and be replaces by renowned real estates, and finally resolve the structural problems. The system will prevent real estate dissatisfying the tenants and increase the comfortability of the tenants in the community. House with structural problems will be reported to the system and will be given a renovation. By preventing problems created by real estate managers, it will make the community more satisfying and more ecofriendly.

3 Upgrade the community to a sponge community

Sponge cities are massive urban drainage systems that mainly serve three purposes: reduce the danger of flooding, mitigate the effects of droughts, and improve the community's sustainability. Sponge cities consists of permeable roads and sidewalks, green roofs, wetlands and natural vegetation, and methods of storing rainwater underground. With maximum planning, around 80% of a city's urban area should reuse at least 70% of rainwater. Transitioning a concrete city into a

sponge city would replace the current neighborhood with large, permeable sidewalks, central rain gardens, underground storage tanks and an increased area of greenery.

Better greenery growth environments is a key solution to do the job. Any housing complex in Shanghai has children, since mixed communities are mainstream. Children have tendency to rip off greenery, so they waste money on replanting and fixing plants. In this case, trees can stand more damage than flowers and water plants. In addition, we can implement fines on breaking greenery, so our solution becomes more economical.

Green roofs are also an important part of the sponge community. These buildings are old and not effectively using reusable resources, such as solar power; also, the fundamental facilities are aging and out of time. Reconstructing the roof could also solve the problem of ineffective usage of natural resources and aging facilities since solar panels and fundamental facilities, such as water storage, are all placed on the roof. Reconstructing the roof can repair and update these facilities at the same time. In addition to those advantages, reconstructing the roof is also economically beneficial and comparatively not time-consuming. To rebuild the whole building, it takes a much longer time than only reconstructing the roof, and it is also much more expensive.

4 Traffic Restriction

Traffic restriction is a type of solution specifically designed for exhaustion. If we want to alleviate the problem of exhaustion, the best way is to restrict certain types of cars entering the community. By restricting certain types of cars entering the community (cars that are old or greatly pollute the environment), less exhaust will be released to pollute the environment. Indeed, it is still really hard to completely solve the problem. One way of eliminating the problem is to restrict any vehicles into the community (except for the ones which use reusable energy or do not harm the environment). By doing so, the source of the problem is avoided, hence the community won't have the problem; however, considering the fact that residents rely on cars to travel, a complete restriction is not suitable for the situation.

5 Add on to roof construction

When it is impossible to rebuild the whole community, modifying the roofs with green plants and unified management of solar cells is also a good way to solve the problems of greening, water and energy storage in the community. Modern rooftops of apartments usually immediately direct rainfall into the government drainage system, providing no help during heavy rainfall. An alternative to the current slanted rooftop design is a flat, grassy water garden. Such design can be easily implemented on already flat roofs with the add on of water-diverting devices. These permeable surfaces would be able to collect up to 70% of rainfall, draining the collected water to external containers a store for future use. As water seeps through layers of dirt and possibly other mechanisms of purification, impurities are separated and can be used by households and the public for non-drinking purposes.

A rooftop garden can act as a cushion for the solid roof during rainfall as plants absorb water, minimizing the risk of leakage. Greenery can also absorb some of the sun's radiation, lowering the temperature of the building, extending its lifespan. And in cases where the entire roof is buried with blanket of vegetation, the dirt below acts as an insulation shield, cutting resident's costs for insulating their rooftops. A greenery insulation blanket also doesn't need much attention or repair, there by decreased the human efforts needed for rooftop maintenance. Not only does the natural insulation lengthens lifespan, it's also more sustainable by maintaining a somewhat stable temperature all across the seasons. During the summer seasons, buildings' interiors with rooftop gardens can be up to 4 degrees Celsius cooler than buildings without. On the exterior of buildings, rooftop gardens can lower the temperature by 15 degrees Celsius. These vegetation acts as the natural AC, decreasing the need for heavy air conditioning, allowing the residents to live more sustainably.

6 Reconstruction of communities' public spaces

When the increase in demand and resident density, there is an urgent need to reconstruct public space in this specific area. The excessive walls that separate resident blocks would be removed, allowing for more space to construct new structures. All old infrastructure would be taken down, allowing space for constructing a better, new, more space-efficient public space. Specific objects to remove would be old parking spots and old parks with unusable public amenities. New architecture replacing old ones would include better-designed walls separating resident blocks reasonably and conveniently, reducing the amount of time needed to travel in and out of the residential building to public roads. New public parking spaces could be designed to fit the twenty-first-century car's size and designed in a way much more efficient on land use, easy to park, and much more convenient. Garden rebuilt would be more compact, saving space for the narrow roads with cars parked on the side, improving the traffic but not compromising on the quality of the garden.

Regular maintenance of the public gardens would be needed to keep the garden attractive and making sure everything works well, truly benefiting the residents. Regulation on making sure cars park at the correct spots would be needed, to make sure that the roads are not clotted by the randomly parked cars. Posts would also be posted everywhere to inform residents of the change, ensuring everyone knows how to travel in the resident block with the new walls and blockades.

7 Restriction on car ownership on a family basis

With the development of the society and improvements in technology, the automobile industry had also become very efficient and developed, providing normal citizens with affordable, useful cars. However, with limited road capacity and the huge numbers of cars owned by families in China, road congestion and environmental pollution had become a very serious problem. Many regulations and solutions had been proposed, but the control in the number of cars owned by each family might be a viable and effective policy. With this policy enforced and taken

into real world, the number of cars a family can won would become limited. This would not be affixed number for every family: for larger families, the number would go much higher because of the high demand; for smaller families, it would go much lower because the demand for transportation would be much lower. In this way, it would be much more economically effective because it limits the number of cars through policies rather than economic strategies.

8 Use recently rising realty management companies instead of appointed committees

Due to the fact that Chinese citizens in all cities do not have a voting culture, less than half of residents vote in realty management decisions, so democracy in housing compounds is unfeasible. Changing the culture of a particular place is out of reach, so adapting is a better solution. Commercialized management has a better quality than non-commercialized ones, because the employees' income is dependent on their work. If clients are not content with their work, another company is in competition. Competition leads to better quality of goods and services. As for lawfulness, currently there are no restrictions other than usual business restrictions on realty management companies.

Identify the Criteria

1 Effectiveness

Effectiveness in the passage's sense is comprised of two parts, its improvement to the environment and how well it solves the current problem with the policy. The improvement to the environment is measured by the changes before and after this policy was enforced and came up which can be how did it contribute to minimizing the impact of the problem to the specified area. The "how well it solves the problem part" is measured by how the policy helped to mitigate the problem, which can be buy a significant margin or only slightly. This is important because the more effective the policy, the more the local citizens would agree to the policy and support it and the government's support, because they are usually the source of fund.

2 Safety

Safety is very important regarding to renovating the community. Inappropriate materials and unauthorized methods could all lead to deadly injuries. Thus, when we are considering certain solutions, one element we need to consider is the safety of tenants, how are the safety of our tenants going to be affected by certain changes in the community. As the thing we are changing is a place where our stakeholders are going to stay and live for a long time. Even a little uncertain factor is missed, it could affect the tenants for life. Thus, we have to be certain and clear on our decisions. For example, if we are applying new technology and materials, we need to ensure they are safe to use. If we are considering renovating the whole community, we need to be sure tenants are safe and comfortable about leaving the house.

3 Feasibility

Any solution requires feasibility. In the case of editing an existing housing complex into an environmentally friendly sustainable one, it is related to lawfulness and cultural adjustability. If a solution is against national or regional building requirements, we can't get the license to implement that. If it is overly exotic to the point where we ignore Shanghainese mainstream housing cultures, such as build separate communities for schooling, retiring and working, time is needed for people to adapt. If it is overly idealistic, such as a conceptual beehive community that maximize the use of space and minimize greenery, parking and sustainability problems, inconvenience is the major problem, since man can't fly or be there to open their doors to let the neighbors pass. The lack of cultural adjustability and convenience leads to the lack of popularity and acceptance, results in the lack of investment, clients, and further, degrade the economical criterion. In summary, lawfulness, convenience cultural acceptance is vital to feasibility.

4 Economy:

The economy (price) of a solution greatly influences the value of a solution. The money that is spent needs to be as low as possible to reach the same effect, especially for public associations (such as the government), or consumers (the residents). If the solution requires an excessive amount of money, then the solution would be considered a less effective solution. This solution will gain less profit (what people gain minus what people pay) and will be ranked lower among others. A solution with a higher cost would also be harder to be approved by government officials since no one wants to pay a superfluous amount of money to work on something that is not crucial. Another thing is that whether people have to consistently spend money on a particular solution. Some solutions have to pay money several times to keep its effectiveness, and this type of solution will also be ranked lower (since a lot of people hate to constantly pay money). In short, a solution has to be economically efficient to be a better solution.

5 Complexity

Any solution that has a low complexity is better; that is to say, the solution needs to be as simple as possible. Complexity regards to two aspects. The first one is the number of agents affected, including the government, owners, and property management company. An agent is affected by a solution when the solution requires the agent to participate in some kind of decision making, such as participate in a meeting. A solution will be more complex if it requires meetings between the parts of government or, even worse, it requires several owner congresses. If these meetings are required, the solution will be considerably more laborious. Another aspect of complexity is the difficulty of implementing the solution among communities. Some solutions are harder to carry out since the residents may think these solutions are dehumanized and will not endorse these solutions. In this case, the complexity of these solutions will greatly increase. Whenever the complexity of a solution increases, the solution will receive a lower score and be considered as only an alternative one.

Evaluate the Solutions

Criteria: Effectiveness, Safety, Feasibility, Economy, and Complexity.
Each criterion contains 8 scores and 40 scores in total.
1. Minimize tax for eco-friendly and effective materials, 3+7+6+6+5=27
Solution 1 still depends on people's awareness. If people still have a bias on ecofriendly materials and choose conventional materials, the problem won't be solved.
2. Create an online recording system for estate management, 3+8+6+7+6=30
Only by documenting the behavior of estate management won't encourage the manager to do better. They could still do the minimum work required to pass the test.
3. Upgrade the community to a sponge community, 2+1+1+1+1=6.
Sponge community requires huge renovation which increases its cost, complexity and decreases the safety of residents and feasibility due to the huge cost and long duration. Besides, the sponge community doesn't have huge sample cases to support its effectiveness.
4. Traffic restriction, 8+6+4+6+4=28.
As setting restriction would involve multiple stakeholders and could potentially evoke dissatisfaction, it would increase the difficulty when implementing the restriction. For the potential disagreement from the resident, the restriction might not be implemented at all, or be violated at a certain point. This decreases the feasibility.
5. Add on to roof construction, 6+3+5+3+5=22.
The renovation requires might reduce safety for residents and chances for falling objects. Materials cost and labor cost also be high.
6. Reconstruct the communities' public spaces, 4+2+3+2+4=15.
As renovation is needed, high cost and the potential risk to residents would happen. As public spaces have a huge amount of visitors, the renovation might be rejected and the complexity of the solution would increase as well.
7. Restricting on car ownership on a family basis, 5+5+4+5+6=25.
Dissatisfaction might be created by the residents. There might be risks of people not following the policy.
8. Changing a reality managements companies, 6+6+6+6+4=28.
Changing companies require people to look for other companies, lawyers to cancel the contract, employees who lost their jobs, there are many stakeholders for this solution and increase the complexity of the solution.

Make an Action Plan

Introduction

1.1 Action plan aim

Our action plan aims to connect residents and estate managers by creating an online platform. This solution gets the highest score of 30 in last chapter, wins especially in economy and feasibility.

The platform's ultimate goal is to provide the best possible service for residents and build the trust between residents, property management and the government, which is established to facilitate the subsequent sustainable transformation of the community in the next step.

1.2 The advantage of this action plan

For most neighborhoods, residents pay a fee for estate mangers monthly. Most of the residents' day to day services are provided by the estate managers. Such services may include parking, home repair, regulating this platform will exist in two forms: a interactional website for browsers and an application for mobile users. The interactional website will mostly be aimed towards estate managers, as it's easier to upload attachments and share long lengthy descriptions. The application is mostly aimed towards residents as the phone is more accessible to navigate. Residents can also share thoughts as soon as they discover a problem, minimizing delay.

When residents discover a problem in their infrastructure, such as a leakage, wall paper molding, or bigger issues like crumbly walls or failing electricity, they can report this problem through the app. This report will get pushed to the estate managers who can then evaluate the situation and provide feedback. If the estate managers deem the situation impacts more than one family, they may contact each family through the app and notice them of the issue. Residents will then be able to vote and discuss ideas within the app, never having to leave their households. This policy both provides the residents with more freedom, and acts as a deterrent for future managers to provide better service. These days, society's requirements for community sustainability are rapidly increasing, while the old communities around schools are the key part to the remodel. Due to its overcrowding, large flow of people, and complex community structure, before each step of the transformation, a long-term investigation and publicity of residents' wishes were carried out, and the property management of the community played little role due to the failure to establish good trust with the residents.

Every six months, residents will vote for or against the estate managing company to decide if they want to keep the original estate managers or change for a new one through this platform, which can give the residents the feeling on benefits of

community management,and make them more positively to respond to the district renovation.

Aiming at the ecological community design, our plan takes into account the harmonious relationship between people and between people and the community, and through residents' suggestions-community project-government-supported path provides a sustainable transformation of the community basis.

Construction process

1 Design and Development

In order to ensure the practicability and fairness of the system, it is planned to take the form of outsourcing, allowing third-party professional information technology companies to design and develop the system.

2 Promotion

The government will become the main driving force for the promotion of the information platform. Through policy support, the application of the information system will be promoted in pilot communities, residents will join the system voluntarily, and property management will compulsorily submit the progress and overview of community projects.

3 Supervision and maintenance

To realize the functions of the information management platform, government departments and residents' representatives need to supervise together and provide timely feedback on the operation status of the system and whether the functions are realized.

Maintenance work should still be handed over to a professional information technology company, and troubleshooting and back-end information collation should be carried out every three months.

Implementation Plan

For the online platform to really work, there would need to be a lot of interactions and activities happening in the platform, turning it to a software or website that government, resident and estate managers really use and monitor the feedback.

First, proposing the platform to the government and making sure that the government is in control is a very important aspect, because only the government can restrict and enforce the regulations, for example making sure that if a manager is rated low for few months, that person would be replaced and a new manager would be found. So, while creating the platform, by listening the government agencies' needs, the government would be willing to use the platform. Then, the platform would serve its use to the general public in real world.

Sharing and promoting this platform to the estate managers would be a very important aspect. Only if they accept this platform, it would become something really useful. So, when the platform is creating, the interests and benefits of the estate managers would have to be covered, and also by ensuring that a review are carefully inspected to make sure they are as close to the real world as possible. This prevents a concern made by managers which would be that residents using this platform as leverage and asking for unreasonable requests. By giving awards and

benefits to estate managers that did well would also be a good action. Also, with the help of the government proposing this project, it would make the route of promotion much easier.

The most important part of the platform is the users, because only if the users really give accurate feedback, the platform would really work well. There are several areas to attract and promote the platform which can be in the areas of guaranteeing true and reliable results, giving benefits, and also letting people to know about this platform well. To the first part, a very strict regulation mechanism that checks every feedback would let users using it to know that the opinion that they see is real and trustworthy. Secondly, benefits such as little gifts, coupons are a great and cheap strategy to attract new users to know and start the practice of using this platform. Lastly, posters and other promotion methods can be posted around the site, letting everyone know this platform.

Response to challenges and root cause

1.Creating an online recording system for estate management can solve most of the challenges identified in the previous pages.

As stated before, estate managers often want to maximize their profit, so they will choose to leave some of the problems as they were, including lack of greenery, sustainability, and structural problem of the building. These problems (challenges) are all problems with infrastructure, which means it could be easily solved by spending money to update and improve the quality of the infrastructure. The reason that this problem still exists is that these realty managers are unwilling to spend more money since it diminishes their profit. However, by creating an online recording system, these managers are required to upload the status of the communities' infrastructure and maintenance, and everyone, including the residents and government officials, can see their progress. While governments can check if their work has reached the required amount, residents can also record and propose their dissatisfaction with their work. Since the lack of greenery and structural problem are obvious and vital problems, government officials and residents will pay attention to these aspects. In this way, realty managers will be forced to increase the area of plant coverage and increase the quality of the community's infrastructure.

2.Exhaust and transportation problems can also be solved.

If there is dissatisfaction in transportation, residents will ask the managers to fix the problem. Managers, on the other hand, will try various ways to solve the problem to the greatest extent, rather than ignoring the problem that everyone is concerning (what is happening right now).

3.Builds a way to let realty managers and residents communicate.

While residents may have some dissatisfaction, estate managers also have some problems with their budget, since almost half of the residents choose not to pay for the seasonal realty management fee; however, these people also want a better environment. Without the recording system, it will be hard to let residents and

managers communicate with each other, so the dissatisfaction may continue to grow. The recording system allows the estate managers to plan their work with the residents, thus solving the realty management problem.

4.Promot cultural diversity.

It could also be a place where people from different places collaborate to make the community a better place. By designing a collaborative space, all people from different parts of China or different parts of the world can communicate with each other. The cultural problem cannot be solved, but we can turn the conflicts between cultures into a place full of diversity. Although small conflicts may still exist, people will accept others from a different place around China, so the disadvantages will be changed into cultural diversity.

5.Minimize the effect of the root causes.

As stated before, economic development is inevitable. The problem caused by economic development will still exist, but the effect could be minimized. Estate managers can now find a balance between estate management fees and residents expects. By increasing the number of ways that these people can communicate, they can reach an agreement about what should be done. In this way, vital problems, such as a structural problem of buildings, could be solved in the first place.

By building the recording system, neighbors can also communicate with each other online. In this way, it can not only solve the problem of tense relationships, but it can also make people from different cultures and areas understand each other. In this way, problems regarding these two root causes can also be solved.

6. Provide a foundation for the sustainable renovation of school district housing

Due to the high population density of residents, complex intergenerational relations, and poor community management, the school district's housing has led to uneven residents' awareness of sustainability, high resistance to property promotion projects, weak connections between communities, and ineffective implementation of government policies. Sustainable transformation There is considerable difficulty. The online community information exchange platform provides a communication channel between government-residents-property, allowing residents to understand government policies in the first time, understand the progress of sustainable projects, and subconsciously improve residents' environmental awareness, for sustainable transformation Provide the basis.

Prototype and Test

| Prototype Design

The Community Estate Manage Universal Information Platform

The platform is designed for three different audiences, so it has a different program interface, and the corresponding functions are also different.

Estate Manager: The main menu of the interface is mainly divided into five parts: Notifications, Project Manager, Past Projects, IM and Ratings. The notice in the Notifications is classified into from residents and from government, each of the notice can be answered directly in the system, the estate managers can build new projects based on the notice as well. Project progress can be checked in Project Manager, and project plans, action plans and results can be submitted in this part; plans and scores of completed projects can be inquired in Past Projects. The platform also provides a P2P (person to person) communication platform for the residents, managers and third-party companies, they can ask questions and give advice in the system, and get reply in time.For the estate managers, the Rating part is important. They can intuitively see the residents' ratings of their current jobs and the historical score curve, and you can make timely rectification of the work based on the suggestions made by the residents. The interface for government is almost the same to this one.

Residents: The main menu also contains five parts, New Suggestions, Progress, Past Projects, IM and Ratings. Users can white down the suggestions on the projects in the first part of the system, and query the problem solving situation in Progress. The Ratings part in the platform is the main channel for residents to exercise their supervisory power.

Specific Process: There are two specifics ways for the platform to play its function. Fiestly,the residents propose urgent problems in the communities, then the estate manager give a reply or build a new project for it. If they need help from other community or government, they can ask in IM part. Secondly, the government need to carry out community renovation, all the work can be done schedule in the project, and the advice from the residents can be seen in the project interface. The interfaces and the usage process are specifically described and showcased in the attachment.

Feedbacks learnt from users

We elaborated our prototype design into a concrete online survey paper, and handed it out. Our survey-takers are of different genders,ages, jobs, and education level. Our main survey target is school district housing residents. School district housing is a special kind of housing in China. 31.6% of the survey-takers are men, 68.4% are women, more than 60% of them are between 25 and 45, and about 30% are over 45 years old. , More than half of our survey-takers have a bachelor degree or above.

Most school district housing is expensive and the living environment is poor. Residents basically have children. The background information of the respondents shown in the questionnaire results is authentic. And they come from different communities, and enjoy different types of property services. This improves the fairness and credibility of the questionnaire results.

1. The result of residents' demand for online platforms

Survey-takers living in different communities with different estate management styles have different intentions to establish online platforms. Only when the residents live in a community with external professional property company, a bit of them are unwilling to have an online platform. Enjoying all kinds of estate management, around 40% survey-takers don't care about the platform, other 40% will change thire mind depending on how the platform designed. On total, 43.42% survey-takers chose to see how the platform designed.

And people care if the online platform is convenient much more than if it is beautiful or useful. (The overall ratings is each 2.38, 1.33 and 1.18.)

We also counted the functional requirements of residents on online platforms. About 85% of residents are very concerned about community project follow-up and property information upload. 46.05% of participants are concerned about whether different regions can cooperate through online platforms. 42.11% of the participants are concerned about the government's access to the platform, and 40.79% of the participants are interested in being able to support/oppose the current estate manager.

The above data shows that residents have a general demand for online community information platforms and have high requirements for the functions and

convenience of the platform. This proves that in the process of ecological community construction, information symmetry and communication among the government, property, and residents are issues of concern to everyone.

2. Survey-takers' evaluation of our platform design

The survey-takers give us 3.7 (total score is 5) for the design.

Survey takers gave an average score of 3.68 for the overall interface design of our online platform, and an average score of 3.62 and 3.49 for its functionality and convenience.

Based on the result, the comprehensive scores of the participants on the five different sections are: New Suggestions -3.67, Progress -3.78, Past Projects -3.72, IM -3.58, Ratings -3.75.

After seeing the platform prototype, 82.89% survey-takers are willing to use the online platform, and 90.79% think this platform will be useful for community renovation.

Improvement for next iteration

Based on the survey-takers' feedback, we come up with two thoughts of improvement for the next iteration.

Feedback 1: Ease of use is the indicator that residents care about most. The most concerning function is the availability of timely community project progress.T Improvement: he main menu of the platform is integrated, and the resident's side more reflects the project progress, construction location, construction time, and estimated completion time, so that residents can better deal with the problems of dust and noise in the community reconstruction.

Feedback 2: The ease of use of the New Suggestions section is low (3.49). Improvement: Add options for common words and used words to save residents' time to fill in; develop a question section and design common question options; develop a repair channel directly connected with the maintenance department to speed up the process.

The subject of this survey is residents, and a follow-up survey on the user intention and requirements of the property and government departments should be added.

Team Credits

吕帐予Cathy Lyu is responsible for writing realty management in challenges, feasibility in criteria, realty management companies in solutions, inevitability economic development in root cause, and.

江之越Zhiyue Jiang is responsible for writing sustainability in challenges, sponge communities in solutions, culture and customs in root cause, and action plan.

李思远Cyrus Li is responsible for writing lack of greenery and exhaust in challenges, economy and complexity in criteria, roof reconstruction and traffic restriction in solutions, evaluate solutions, and action plan.

李依娜Yina Li is responsible for writing structure in challenges, safety in criteria, minimize tax on eco-friendly materials and online recording system for estate management in solutions, and writing summary.

周子皓Steven Zhou is responsible for writing transportation in challenges, prototype design, drawing graphs and design.

朱哲立Charlie Zhu is responsible for writing cultural environment in challenges, effectiveness in criteria, restriction on family car ownership and reconstruction of public space in solutions, human nature in root cause, and action plan.

Judge Comments

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" Review Comments:

Congrats to the team for tackling a unique problem and approaching the solutions from a very social angle – using information to obtain better outcomes in housing management and maintenance. The team also did an excellent analysis of traffic flow patterns and the challenges in planning an optimal public transportation solution in SDHs (and other urban areas). The team did a good job identifying the various challenges – it was surprising to see the energy usage did not get a mention (buildings contribute one of the highest percentages to global greenhouse gas emissions).

The team did not really clarify what a sustainable community entails – The discussion meandered between environmental issues, social challenges and poor management/oversight issues. Because of inadequate clarity in identifying a core problem they wanted to solve, the solutions generated were somewhat disconnected. I suggest that the team be able to answer this question with one line – "We are trying to fix …." . Every solution you generate should be an answer to that question.

A good way to approach problem design is to spend time thinking about what constitutes an ecofriendly community. It would be helpful to break up your thinking into the structural elements (type of construction material, insulation, design); resource considerations (water, waste, electricity)) ; the social elements within the building (management, interaction between tenants, social contracts – how are problems identified and solved, how are updates done to common areas, how is crime and other common problems addressed); and the larger community level issues like income growth, transportation options, government oversight etc. It is likely that the complex challenges in these areas require drastically different solutions and approaches.

While the online platform is a good approach to raise awareness around issues and to enhance communication across tenants in the same building, it is unlikely to be the main factor that drives solutions in some of the complex challenges you discuss. I encourage the team to continue thinking about ways to make their community more liveable!

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