

Pessimistic Impact of Abandoned Housing Projects on the Environment and Society in Malaysia

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Abstract

Influx of people into cities have necessitated the need for the construction of more housing estates. Sadly, many of the housing projects were abandoned before completion. This paper presents findings on the effects generated by abandoned housing projects on the immediate surrounding environment and the inhabiting society of the neighbourhood. Sampling was made from thirty-six abandoned housing projects in Johor Bahru, Malaysia. Studied data on social menace and environmental decadence around the uncompleted buildings were sourced through personnel visits and the data was concisely analyzed. Consequently, a prototype structure was erected in an open laboratory and then abandoned for six (6) years. Periodic observations 'on' and 'around' the structures were recorded throughout. Findings show that there is a mounting upsurge of environmental hazards as well as socio-economic crisis associated with uncompleted housing projects. The most devastating of these problems are debility to the provision of 'shelter-for-all', promotion of man-made cities, monthly loan repayments to servicing banks by intended buyers, increase in social vices and subjection of human's and animal's health into jeopardy. This research could provide valuable guide to understanding the environmental hazards and socio-economic catastrophe normally caused by abandoned residential projects. The ability to improvise on the fly are fundamental, the capacity and willingness to adapt to changing conditions is key to project success.

Keywords: Abandon project; Environment; Housing; Society, Rethink.

Introduction

One of the most obvious changes to people's lives brought about by industrial revolution was that people moved from rural settlements into urban areas where factories are located. Except in Africa, there are more people in cities than in the rural areas (Phelix, 2021; Ferris, 2012; Zhu, 2007). Influx of people into cities triggered the need for adequate housing, and this motivated many nations to invest in residential projects. Although, policies surrounding the provision of residential buildings may vary among nations, developers usually undertake residential projects through contractual agreements involving stakeholders or buyers. Meanwhile, during the recent global economic recession, many nations have witnessed increasing number of abandoned residential projects (Mohammad *et al.*, 2016). Most firms still have that factory mindset oriented to economies of scale and not organized towards Value Management that is continuous improvement and innovation (Friedman & Lewis, 2021). Once there is an uncertain condition the project suffers delays or project overrun and worst abandonment. This is why they have difficulty having timely project completion or competing in an economy that demands creativity.

Generally, abandoned project is regarded as the consequence of unresolved contractual disputes. In fact, according to Yates (2011), no matter how thorough and well written

construction contracts are, contract disputes still occur during construction. In the event of any contractual dispute affecting residential structure under construction, the structure itself, the stockpiles of the construction materials on the ground, as well as the immediate environment are readily exposed to hazards. In fact, environmental conditions such as intensity of rainfall, humidity fluctuations and temperature variations were known to affect the conditions of uncompleted residential buildings (Goueygou *et al.*, 2001; Hime & Erlin, 2006; Jia & Zhou, 2006). Where the abandoned structure is at a relatively high level, partial or segmental collapse involving material's wastages or lost of lives could be the consequence (Umbugala & Bala, 2020). On the other hand, the immediate surrounding environment also suffer from many detriments including the creation of safe breeding enclave for reptiles and the provision of hiding grounds for hoodlums. The affected sites are improvised into slums creating negative impacts on the environment (Garba, 2020), which affects rental value and economy of a region. This age of disruptive technological change, the pursuits of sustainable building productions require proactive measures to ensure excellence and better dividends. Best practice firms' focus on identifying the ever-changing job competence required for timely and better project delivery. This includes monitoring critical parameters such as quality, time, resources and customer satisfaction to ensure continuous improvement and value addition (Umbugala, 2016).

In addition to the environmental decadence, several parties could be affected by the emergence of abandoned residential project. These include the intended buyers, the ever-growing population, the employed workforce especially the labourers and the neighboring society. The situation can be terrible and uncomfortable, if the project finance is from the bank (accrued interest). Indeed, the ugly sight of abandoned residential projects in the midst of habitable buildings often makes the scene purely incompatible (Mohammad *et al.*, 2010). To make the situation worst, where the abandoned residential projects are almost ready, homeless and low-income earners usually risk their lives by illegal tenancy even if the conditions of the buildings are unhealthy and unserviceable (Carrero *et al.*, 2009).

In previous research, on the life-span prediction of abandoned reinforced concrete residential building (Mohammad *et al.*, 2016), imminent dangers facing the main structures were studied and these are concisely reported. The objective of the present investigation is to evaluate effect of the abandoned [residential structure] on the immediate surrounding environment [main structure] and the society at Malaysia. Therefore, environmental hazards around uncompleted buildings were carefully monitored and thoroughly analyzed. Social menace on intended buyers, workforce and neighbors was also examined. The outcome of this investigation could provide relevant insights for proper understanding of the environmental hazards and socio-economic catastrophe normally caused by abandoned residential projects. This could agitate government agencies to restructure policies on housing projects, to avoid externalities that might arise from abandonment. This entails generating work culture and accomplishment that is integral (Maurya *et al.*, 2021), sustainable and optimal corporate philosophy to yield quality project delivery (Umbugala & Bala, 2020), Unless catastrophic repercussions of abandoned residential structures are fully investigated and well highlighted, the parties involved in contractual agreements may continue to indulge in avoidable disputes with consequent life-time sufferings to many in the general society. This indeed creates several environmental implications and multiplying effects which leads to social and economic effects that are usually monumental.

Materials and Methods

The Abandoned Housing Projects

This study was at Johor Bahru, Malaysia, records revealed that there are thirty-six (36) abandoned housing projects within the study area (Ministry of Housing and Local Government, 2005). Some of these buildings were abandoned for over a decade. Figure 1 presents study data in relation to the thirty-six abandoned residential buildings.


Johor Bahru, Malaysia (Map)	Item	Value
	Abandoned Projects (No)	36
	Apartments (No)	11,150
	Average Temperature (°C)	23 – 34
	Rainfall (mm/year)	2,400 – 2,600
	Relative Humidity (%)	79 - 85

Figure 1: Study area and natural environmental conditions

Environmental Hazards

The selected sites for the investigations on the real abandoned structures fell within high acidic rainfall zones with average acidity of less than five (5). Three categories of observations were conducted on the selected sites; environmental conditions within and around the buildings, activities of reptiles as well as human interferences. Figures 2 - 4 present typical scenes at some of the abandoned construction sites. Figure 2; (a) and (b) display environments with landscaped premises adjacent to abandoned construction sites. However, Figure 3; (a) and (b) portray environments with large premises adjacent to abandoned construction sites. While Figure 4 (a) presents environment containing a lot of dried undergrowth adjacent almost completed structure, Figure 4 (b) depicted premises of an abandoned structure occupied by stagnant water.



Figure 2: Environments with landscaped premises adjacent to abandoned structures



Figure 3: Environments with vast premises adjacent to abandoned structures



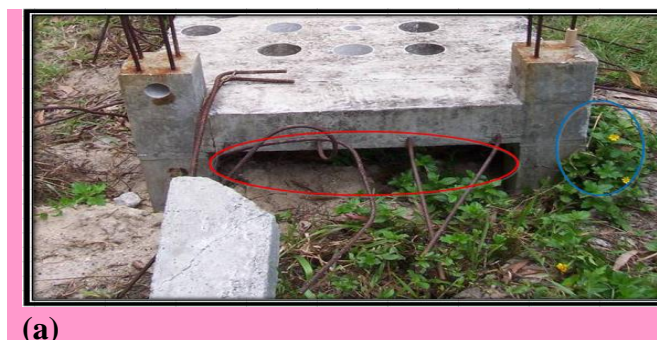
Figure 4: Environments with (a) Dried undergrowth and (b) Stagnant water

Socio-economic Crisis

Socio-economic crisis was mapped through consultations with some of the principal parties involved in the execution of the projects and members of the immediate neighborhoods. These include developers, interested buyers as well as settlers adjacent to the abandoned structures. The affected parties contacted contributed valuable information on the genesis of disputes, reconciliation efforts and most importantly the negative impacts which follow after halting the construction activities.

The Abandoned Prototype Structure

The abandoned prototype structure was designed, erected and abandoned in order to fully simulate the real situation where structures suffer from abrupt terminations of site activities. Thus, the model structure was constructed in an open space beside a structural laboratory. Figure 5 shows the model structure as well as the environmental scenes surrounding the prototype structure.



(a)

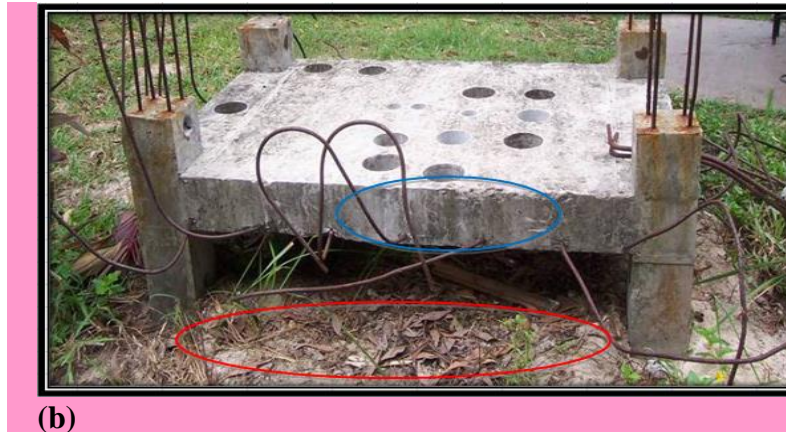


Figure 5: Environmental hazards on model structure;
(a) shrubs and reptiles hideout (b) cement leaching and decayed organic substances

The prototype structure was subjected to the effects of environmental factors such as rain, breeze, sunlight, etc. The structure was abandoned under these environmental factors with continuous fluctuations in temperature and humidity throughout the investigation period. Data was collected periodically over at least six (6) years. The data collected include structural dilapidations, environmental degradations and activities of reptiles.

Observations, Analysis and Discussion

Consequences of Abandoned Housing Projects on the Surrounding Environment

Creation of Hideouts

Even though, some of the abandoned construction sites adjacent to highways such as those shown in Figure 2 (a) and (b) are fenced, but sometimes unidentified people do find their way into these abandoned structures. In most cases, the patronizing people normally find their way into the abandoned premises; by cutting, climbing or jumping over the boundary demarcations or fence.

Indeed, according to some residents adjacent to abandoned housing buildings, the occasional encroachment by unknown faces and the activities which sometimes follow make them to choose between living in anguish through continuous complains to the parties involved in the construction project or vacating the area by selling their own apartments.

Development of Refuse Dumping Grounds

Another environmental hazard observed around abandoned projects is the appearance of refuse of all sorts usually dumped by passersby. In fact, some neighboring dwellers to the abandoned housing projects form habits of deliberate dumping of house generated garbage. Meanwhile, most of the environments of the abandoned sites already have construction debris such as decayed pieces of timber, fragments of reinforcements, metal scraps, nails, broken blocks and plastics. Thus, the already existing messy situations coupled with the dumped refuse make the environment completely inhabitable.

It is indeed quite disgusting to find heap of garbage containing various forms of injurious and hazardous substances adjacent to habitable buildings, especially where children move up and down on daily bases. To make the matter worst, those looking for potentially recycling materials often scatter the garbage constituents living the contents littering all over the places. In addition,

dogs and wandering animals while searching for food often contribute to the eventual messy and clumsy appearances of the affected environments.

The environments affected by refuse dumping not only became eyesore to the sight of the passersby but also annoy both the passersby and most critically the neighboring dwellers through emissions of different kinds of disgusting smells. The present investigation noted complaints by some residents adjacent to the abandoned housing projects to the authorities concerned, particularly the 'Departments of Environments'. Further investigations on the issue of environmental pollutions caused by dumping of refuse around abandoned housing projects revealed that the worst hit in terms of smell consumption through the usual human respirations are those living in the main streams of wind movements.

Breeding Ground for Reptiles

A major environmental problem observed around the premises of the abandoned residential projects is the presence of reptiles. Figures 3 (a), (b) and 4 (a) depict typical scenes of ideal breeding grounds for reptiles. Indeed, reptile activities among most of the sites especially those associated with large premises are quite disturbing. To make the situation worst, the existing reptiles within the premises of the abandoned buildings do frequently visit the neighboring houses, thereby raising serious health concerns.

Breeding and eventual overlap of snakes and rats into the gardens of the neighbors including occasional access into kitchens could lead to the spread of zoonotic diseases among humans. Typically, the society residing around an abandoned residential project could face severe health problems through stomach pains and 'Lassa fever'. In fact, dwellers around the abandoned housing projects could easily be affected by animal transmitted diseases through contact or inhaling of tiny particles in air contaminated with rodent excretions.

Additionally, loosed animals such as dogs were observed to visit these compounds for possible prey. In the event of searching for the prey, many of the dogs contribute to the rampant holes found around the buildings. In fact, where dogs or bigger creatures fed on the smaller ones, the areas become quite smelly with severe air pollutions. In many cases, the life of those associated with these environments became unbearable until they participated in clearing, burying or relocating the remains of the dead animals found in the affected premises to the community landfills.

Instigation of Fire Outbreak

Dried undergrowth covering vast premises is witnessed in Figure 4 (a). The shrub normally grows rapidly during wet seasons due to presence of literate soils around the uncompleted structures and these turned yellowish and quickly dry once the rainfall stopped. Meanwhile, a single non-thrashed cigarette butt could cause severe havoc in the vicinity by igniting fire, and generally wild fire on environments containing dried grasses could be difficult to control. The consequences of such fire outbreaks could be devastating especially when such fire escalates to neighboring premises.

Even though, the principal problem with fire outbreaks in the premises of abandoned housing projects is the destruction of construction materials, other problems may include that of weakening the main structure (Mohammad et al., 2011), destructions of wooden fences, as well as injuring or engulfing incapacitated animals found within the affected premises. In fact, findings revealed that sometimes the neighbors to abandoned housing projects must collectively put off fire emanating from the premises of the abandoned structures in fear of being affected

by the dark and smelly smoke swirling around their houses throughout the nights, or imminent fear of possible escalation of the fire to their residents.

Water stagnation

Most of the abandoned residential buildings were observed to be surrounded by unattended environments. The premises are generally devoid of external facilities such as drainage systems, culverts, pavements, walkways, etc. Therefore, the opportunities which these facilities normally offer are completely missing in these environments. For instance, the abandoned housing project shown in Figure 4 (b) presents scary situation where water stagnates around the uncompleted structure. In fact, such environments usually presents double challenges; the ease of unavoidable crossing is lost and additional hardships evolve mainly from inaccessibility of rain water as well as the eventual procreation of insects most especially ants and mosquitoes.

The tenants of houses close to abandoned housing projects usually face problems of ants of different kinds moving up and down throughout the day and night. While some of these ants look for food only from the stores of the occupants, others occasionally attack the tenants especially children by stinging or biting. Sometimes the consequences are really sympathetic particularly when these involve health problems such as skin rashes and fever. The mosquitoes on the other hand, often cause dengue or malaria fever to the neighboring dwellers. In essence, the neighboring tenants to abandoned housing projects usually spend a lot of money not only to deter ants and insects from their premises but also to medically address any form of illness which may occur.

The scary situation presented in Figure 4 (b) obviously demands high level attention. In this case, while both the main structure and its premises are under severe conditions, animals and most importantly children from the neighborhood houses could be at the greatest dangers of being drowned. Such a situation could easily escalate as it might threaten the safety of the adjacent houses thereby calling for immediate evacuations.

Environmental Hazards on the Model Structure

Investigations on the environmental hazards surrounding the model structure revealed quite interesting results. While lizards, rats and squirrels were occasionally observed around the prototype structure especially underneath the slab; circled red in Figure 5 (a), shrubs appeared to enjoy beautiful growth on areas not affected by concrete and mortar drops; circled blue in the same Figure. On the other hand, Figure 5 (b) mainly portrays traces of cement leaching and decayed organic substances; circled blue and red respectively.

Presence of reptiles and undergrowth around the abandoned model structure simulate the actual situations in the real abandoned housing projects. Degradations on the prototype structure caused by environmental factors such as rain, breeze, sunlight, etc., have been published (Mohammad, Chan and Bala, 2016; Mohammad, Bala and Mohammad, 2010). Meanwhile, appearance of marks caused by cement leaching especially in large scale work could pose serious concern since the leached cement may easily find access into the sources of drinking water. When wet, the decayed substances present messy and ugly scenes and when dry, these promote quick spread of fire whenever it occurs. Environmental and social benefits of sustainability best practices are usually plain to see, the Strategies can advance the economic, social and environmental wellbeing of a nation

Consequences of Abandoned Housing Projects on the Society

Material and Workforce Predicaments

Generally, materials relocation and lost of jobs to labour force are the most immediate predicaments associated with abandoned construction projects. Findings revealed that works are in most cases halted abruptly and the principal factors causing abrupt standstill of the site works include site accidents, disputes between contractors and clients due to inflation or recession, social unrest and natural disasters. Depending on the intensity of the crises, already mixed materials such as concrete and mortar could be lost, unless there are other similar works where the materials could be relocated. Obviously, other construction materials such as timber and bags of cement may also need attention within a short period of time before irreversible damages are incurred.

Creation of unemployment particularly to the unskilled labor is another social impasse associated with abandoned housing projects. The present investigations observed that unemployment is normally the case with daily/weekly wage workers whenever daily routine of site activities ceased. The rule of ‘no-work’ ‘no-pay’ mostly applies to this category of workers. Interestingly, workforce constitutes by far the highest number of workers in the constructions of housing projects. Thus, paralyzing site activities marks the beginning of not only a financial crisis, but also survival predicament to the laborers as well as their families.

Debility to the Provision of Shelter

The result of the abandoned housing projects shown in Figure 1 is quite alarming. Moreover, this is just the result of one state out of the twelve states in the Malaysian Peninsula. These abandoned projects were designed to provide over 11,150 units of apartments which could obviously cater for about 44,600 residents at an average of two parents and two children per apartment. Eventually, the society is deprived of this huge number of accommodations, thus making a pessimistic impact to the worldwide desire of providing ‘shelter for all’.

Once the ever-growing generation in a society is left without the shelter it deserves, rental charges for the existing apartments may increase mainly due to economic equilibrium between demand and supply, whereby ‘higher equilibrium price occur when the demand increases and the supply remains unchanged’. Obviously, this could contribute to the economic hardship as people will have to spend more without corresponding increase in their regular income. Recently, many communities have witnessed and some are still witnessing a lot of political as well as social unrest because of the lingering economic hardships among the general populace (Lahcen, 2011; Lisa & Marwan, 2011).

Other consequences of having far less than the shelter needed to cater for the prevailing populations include; human congestion in the few available accommodations with consequent health problems. Indeed, human congestions in a particular society could trigger many other problems such as waste of time or delay in the use of public utilities, inadequate services to the community, lack of proper access for firefighters and possible traffic hold-up to ambulances.

Increase in Social Vices

Observations from some of the selected abandoned construction sites revealed serious damages caused by persistent removal of installed facilities such as electrical conduits, electrical wires, plumbing accessories, window panels, glasses and many other construction materials like timber and roofing sheets. Indeed, sometimes where the facilities proved difficult to be removed, these are destroyed by the vandals.

Since crime in some countries has been reported to be on the increase mainly due to rise in unemployment, economic decline and social inequality (Raphael & Winte, 2001), therefore the abandoned housing projects have not only contributed to the increase in unemployment as previously explained, but these have also exposed the uncompleted buildings to the wandering unemployed members in the society. According to the report (Raphael & Winte, 2001), joblessness is a major motivator in theft, burglary and violent misconducts.

Monthly Loan Repayments to Servicing Banks

The biggest headache for buyers when a project is stalled is monetary losses. The victims have to settle monthly loan repayments and deal with much anguish as, more often than not, there's little chance of reviving these projects and getting the houses completed. Indeed, intended buyers for abandoned housing projects inevitably continue to repay bank loans for houses that they may never see.

It is quite sympathetic that intended buyers must pay 100% of the total amount, while having strong feelings that the outcome could be a total loss. Although, it may take several years before an average income earner can settle coast of a bungalow, victims of abandoned housing projects continue to pay banks out of their meager income though they are fully aware that their dream of owning a house may never come true.

Long-term Cumulative Losses

Cumulative overhead cost for services not necessarily rendered is inevitable when construction project is abandoned for a long period of time. As it is well known, biddings for contracts must include direct, indirect and fixed overhead charges generally aimed at covering expenses for temporary offices, equipment rental, administrative salaries, employment and payroll taxes, unemployment insurance, bid bonds, etc. Although, the firms normally provide leeway in the contracts to cover for these expenses but estimated time frame for the completion of the project is usually a factor. Therefore, in the event of prolonged period of paralyzed activities, additional charges are necessary in order to offset all outstanding dues.

Creation of Man-made Cities

A community deprived from the provision of residential buildings it deserves faces noticeable congestion of tenants within the existing residential buildings. This is usually followed by frantic efforts to build supplementary settlements. Indeed, failure to complete residential buildings to cater for the societal needs compels many of the general populace to choose between expensive living in the city and moving to the city outskirts for cheaper accommodations. Where the desired accommodations within the city are not available the latter becomes the main option.

The result is usually a formation of new settlements without full implementations of the normal ethics generally observed in the modern urban planning. These settlements otherwise known as self-made cities could be another important set back associated with the surrounding environment, and could be partly contributing factor on the increase in crime rate in some countries (). To this regard, the United Nations Economic Commission for Europe (UNECE, 2009), reported that rapid urbanization, poverty and lack of access to land and ownership, in addition to limited or no social housing, have led citizens to build their homes illegally under very poor environmental and social conditions. According to the report, more than 50 million people in 15 member States of the UNECE live in informal settlements.

Self-made cities usually lack adequate social amenities and their environs are often messy, congested and unhealthy. It is worth noting that provision of public services such as the need for an ambulance particularly on rescue or life-saving missions, and fire fighters especially during fire outbreaks could not be rendered at ease in most self-made cities. In fact, in-depth investigation revealed that security agencies normally face serious challenges in the identification, tracking and arresting suspects within self-made cities.

Illicit Tenancy

Where abandoned housing project is located around city hub areas, drug addicts and people associated with bad habits usually camp into the buildings. This is particularly the case where the abandoned buildings have reached the status of providing at least shelter against rain and sun as well as some levels of privacy. Sometimes very low-income earners, destitute and mentally affected members in the society also patronize these buildings including the available premises. It is very sad indeed to witness the condition of some members in the society residing in abandoned uncompleted housing projects. According to Carrero et al., (2009), homeless and low-income earners usually risk their lives by illegal tenancy even if the conditions of the buildings are unhealthy and unserviceable.

Conclusions

Based on the real abandoned housing projects as well as the small-scale model structure examined in this investigation, the following conclusions are drawn.

1. Abandoned housing projects could present a serious setback to achieving the goal 'shelter for all'. Consequences of having far less than the shelter needed to cater for the prevailing populations include; human congestion in the few available accommodations with consequent health problems. Other problems which arise in the case of emergencies include delay in the use of public utilities, lack of proper access for firefighters and ambulances.
2. The biggest headache for buyers when a residential project is stalled is monetary losses. The victims have to settle monthly loan repayments and deal with much anguish as, more often than not, there's little chance of reviving the project and getting the houses completed. Thus, victims of abandoned residential projects continue to pay banks while they are fully aware that their dream of owning a house may never come true.
3. Apart from an alarming decrease in structural integrity and durability functions in abandoned housing projects, there is cumulative overhead cost for services not rendered. Although, the firms normally provide leeway in the contracts to cover for these expenses but estimated time frame for the completion of the project is usually a factor. Thus, prolonged period of paralyzed activities attracts additional overhead charges.
4. Abandoned housing projects face illegal dumping of refuse. To make the matter worst, those looking for potentially recycling materials often scatter the garbage constituents living the contents littering all over. Eventually, the premises to abandoned housing projects not only became eyesore to the sight of the passersby, but also annoy both the passersby and most critically the neighboring dwellers through emissions of different kinds of disgusting smells.
5. Abandoned housing projects provide ideal breeding ground for reptiles. Indeed, reptiles' activities among most of the sites especially those associated with large premises are quite disturbing. To make the situation worst, the existing reptiles within the premises of the

abandoned buildings do frequently visit the neighboring houses, thereby raising serious health concerns especially the fear of possible spread of zoonotic diseases among humans.

6. Abandoned housing projects devoid of external works present double challenges; the ease of crossing the premises is lost and additional hardships evolve mainly from inaccessibility of rain water. Obviously, the eventual procreation of insects such as ants and mosquitoes which follows could be quite sympathetic particularly when these involve health problems such as skin rashes and fever to the neighboring residents.
7. Abandoned projects result to several environmental implications with the consequence multiplying and resulting to social and economy effects which are usually monumental.

Implication of the Findings and Recommendation

The pursuit of sustainable building productions required proactive measures to ensure excellence and better dividends. Best practice firms' focus on monitoring critical parameters such as quality, time, resources and customer satisfaction to ensure continuous improvement and successful project completion. Failure of government policies can be complimented with the application of value management (VM) which might save and guide a lot of projects to successful completion. The government should create a blueprint that paves way for project flexibility and sustainability to avoid negative impacts of abandonment, e.g. making compulsory the adoption of programs such as Building information Modeling(BIM) as requirement for developers. These research outcomes provide valuable guide for successfully project delivery and source of inspiration not only to the studied area but indeed contribution to the research world.

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