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Full Length Research Paper

A small house now or a big one later? Choice of housing units in phased upgrading of informal settlements in South Africa

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The South African housing policy puts emphasis on broadening access to formal dwelling units for households living below a given monthly income as determined and approved by the government at any given time. The emphasis on a serviced dwelling unit within the housing policy assumes that the preference for a serviced dwelling unit is invariable and rigid among the intended beneficiaries of the upgrading exercise. This study investigated how the time to delivery affects the type of housing unit chosen by subsidy beneficiaries. Using choice data from experiments conducted with residents of sweet homes (an informal settlement in Cape Town), it was found that preference for a bigger housing unit type decreased with an increase in the time to delivery. It is recommended that the housing policies in the developing and underdeveloped regions of the world match beneficiary preferences with available resources in the provision of appropriate housing units to poor households.

Key words: Housing subsidies, South Africa, delivery time, beneficiary preferences.

INTRODUCTION

Since 1994, a once-off capital subsidy has been the main tool used by the South African Government in providing housing and other services to the poor. This subsidy is given to financially disadvantaged persons (earning less than R3500 per month) for the purchase of land and a serviced basic dwelling unit (Abbot, 2002; Abbot and Douglas, 2001; Napier and Mieklejohn, 1997). The subsidy assists low income people to possess a residential property for the first time. The subsidy may be used to purchase an existing house including the land. This financial support is not in form of cash to the beneficiaries but is paid to the developer be it a private company, local authority or a community organisation. The government driven subsidy therefore guarantees the security of tenure of the beneficiary and greatly improves the affordability of owning a serviced housing unit for the low income households residing in informal settlements.

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However, the number of households without formal housing in South African cities continues to grow. This situation greatly derails goal number one of the Millennium Development Goals which is to reduce extreme poverty (including housing deficiency) by the year 2015. And further compromises the UN declaration of human rights which states that *'Everyone has the right to a standard of living adequate for the health and well-being of himself and his family, including good, clothing, housing.'*

In the face of a growing backlog of providing improved and serviced housing units to its poor population, the government of South Africa is faced with a puzzle of whether to provide more funds to meet its goals in the shortest time possible, or adopt incremental upgrading of informal settlements by extending time to delivery hence dispersing available funding to an increased number of beneficiaries.

The challenge with the first option is that apart from housing, there are other equally pressing issues of national importance such as education, food security, and health which need to have an increased budgetary

support. The latter option on the other hand, may guarantee quantity (many beneficiaries) but compromise the quality of the finished product.

Further, the uncertainty of availability of funds increases with time to completion especially where budgetary provisions are constrained. In the face of shortage of funds and a growing backlog in the provision of engineering services, authorities have no choice but to change its goals in terms of time to delivery so as to match available funding. In this way, the available resources can be used to provide some services to more people at each phase of upgrading unlike the once-off approach which provides for all services to a few people at a time. Hence instead of waiting for, say, 15 years for a serviced dwelling unit beneficiaries would have a combination of lower levels of engineering services which would be improved incrementally over a defined period depending on the practicality of having such combinations and the availability of funds. The emphasis on a serviced dwelling, as is in South Africa, presupposes that the preference for a serviced dwelling unit is invariable and rigid among the intended beneficiaries of the housing subsidy (Gigerenzer and Selten, 2001; Sayadi et al., 2005).

Incremental upgrading may be referred to as a planned phased or a step-by-step improvement of a settlement's levels of engineering services to achieve a preferred level of quality of life. The engineering services include housing, electricity supply, water supply, solid waste management and roads. Incremental upgrading as a strategy for improving quality of life has been mentioned in a number of cases studies (Skinner et al., 1987; UNCHS, 1987; Grange, 1995; Abbot, 2002). However in most situations, these case studies do not explicitly explain the associated procedures of incremental upgrading.

Infrastructure may be progressively improved if the upgrading packages can be disaggregated (Abbot and Douglas, 2001), if the phased financing for infrastructure is possible (Caleb consulting, 2000), if the process can be managed on a long-term basis (PGWC, 2002), and finally, if the infrastructure installed is upgradeable in the long term (Cotton and Franceys, 1988; the Less Formal Township Establishment Act, Act 113 (1991) in O'Regan, 1992; Choguill et al., 1994; Choguill, 1999).

In addition, literature exists which proposes a phased upgrading model called progressive improvement (Cotton and Franceys, 1988; Choguill et al., 1993, 1994; Choguill, 1996, 1999). Choguill et al. (1993) identify three main stages through which progressive improvement transforms an originally un-serviced environment not suitable for human habitation to one with full services:

1. Primary level that aims to address the basic health needs of a community,
2. Intermediate level which is concerned with socially and culturally accepted levels of service and,
3. Ultimate level ultimate level services that are installed for convenience purposes and usually mark a point where technical support in the upgrading exercise may be withdrawn from the community.

The progressive improvement model puts most of the responsibility for infrastructure improvement on the residents as noted by Graham (2003) who however suggests that the model can be applied by both the residents and the Local Authority. This would depend on circumstances affecting a particular environment at particular times e.g. the politics involved, financial base and the technological requirements of the improvement programme (Gilbert and Doyle, 2011).

It may be argued that up until now, incremental upgrading is a theory that has not been put into practice in a planned manner and that most of the projects that progress in an incremental manner are done on an ad hoc but haphazard basis depending on the availability of resources at a particular instant. However, if the policy on incremental upgrading is to be relevant, it has to be informed by the preferences of the beneficiaries and must be in line with the amount of resources available for the delivery of housing and services.

This paper presents findings from a study that investigated the effect of time to delivery on the choice of a housing size by beneficiaries. Housing is considered the principle service while other services such as electricity, water supply, sanitation, are in this context, referred to as associated engineering services. Results from this research can inform policy on the best modes of delivery of housing subsidies for poor households in developing and underdeveloped countries.

Most proponents for incremental upgrading champion individual self-help and community mutual aid for the realisation of housing solutions in low-income neighbourhoods as is with the "Freedom to Build" theory in Turner and Fitcher (1972). However, this study was designed on the premise of a government funded incremental upgrading process.

DESCRIPTION OF THE STUDY AREA

Sweet Homes, some 24 ha, is an informal settlement in Cape Town, South Africa and have a population of over 2,000 people. The settlement is bounded by Duinefontein Road in the west, Vanguard Drive to the South, a railway line that divides Philippi and Nyanga is to the east and a formal residential area called Vukuzenzele to the north. The settlement was created by retrenched farm workers from Philippi farming area and some families who came to the area to recycle building material from the dumping site (Caleb Consulting, 2000). It has existed on the site for more than 17 years now.

Apart from the retrenched workers, some occupants migrated to Sweet Home from Crossroads, while others

came from Nyanga bush and the surrounding area. Before the influx of more informal settlers was controlled, a substantial number of people migrated from the Eastern Cape in search for employment. The land used to be privately owned until 1998 when the City Council of Cape Town purchased the land (F. Ndathane, Community Leader of Sweet Homes 2006, personal communication).

The settlement was chosen in view of a pending Local Authority upgrading project and the promise of security of tenure to the inhabitants of the settlement. In fact, parts adjacent to the settlement (but not informal settlements) had already started benefiting from informal settlement roads upgrading projects initiated by the City of Cape Town.

The settlement lacked roads, electricity, and solid waste management but had communal stand pipes of an average 200 m reach per household and a communal bucket system for sanitation at the time of the study. All dwelling units were temporary shacks constructed mainly of tin, cardboards, plastic paper, and used iron sheets.

METHODOLOGY

The design of the whole experiment was driven by the hypothesis that the choice of municipal engineering services by individuals is affected by time. Thus if time has an effect on individual choice making, then given the same amount of money, the probability of people choosing to complete particular levels of engineering service must be different for different time horizons. This paper draws in on the effect of time on individual choice making of levels of services for a housing unit in a phased settlement upgrade. Thus for the isolated housing unit levels of service, it was hypothesised that the individuals choice for a given housing unit size is affected by anticipated time to completion. Thus, the probability of an individual choosing to complete and own a particular housing size must be different for the same amount of money but disbursed over different time horizons.

The study considered six municipal engineering services which are; housing, sanitation, electricity supply, water supply, solid waste management and roads. In all cases, levels within the upgrading exercise were considered in line with primary, intermediate and ultimate stages as suggested by Choguill et al. (1993, 1994) as being phases through which an originally un-serviced environment not suitable for human habitation is transformed to that with full services.

Above the envisioned status quo of the study area, all services were hypothesised to have three levels of service except for solid waste which had one level. For housing, a one-, two- and three-roomed housing unit represented level 1, 2 and 3 corresponding to a minimum one room structure 12 m^2 in size, a 24 m^2 two room unit and a 36 m^2 three room structure, respectively. And, it was assumed that the size of a housing unit is directly proportional to the number of rooms contained within the house.

Estimated costs were attributed to all services using a cost of municipal services model prepared for the Provincial Government of the Western Cape by Romano Del Mistro in 2006. Then a shopping matrix was constructed. This was used in assisting respondents to make purchasing decisions.

Three time horizons, 5, 10 and 20-year, were selected to let the respondents go through different delivery time horizons. The time horizons were theoretically proposed to suit reasonable periods within which an upgrading would be undertaken. The experiments were designed in a way that decisions to purchase particular levels of service would be made within each year of the three time horizons depending on the amount of money made available at a particular instant. Furthermore, three funding patterns (that is, increasing, decreasing and uniform) were designed so that the effect of time on choice making should be evaluated on an average basis. Each respondent had to go through three different experiments making decisions at particular instants, in a particular time frame and depending on the available funds. These decisions were recorded on data collection sheets at each instant. This data was used to establish whether choice is a function of time.

Seventy two community members from Sweet Homes were involved in this study. All the respondents had to be permanent members of the study area and heads of households without restricting interviewing both parents.

In this study, heads of households referred to parent(s) or anyone who makes critical decisions and is responsible for maintaining a household. Single person households were also considered as candidates within this study. Further, the respondents had to be within the 20 to 59 year age range the assumption being that it is in this range that one attains responsibility over households. Further, it was assumed that someone above 60 would seldom make an informed decision within the 20 year timeframe considering the anticipated age at the end of the hypothesized upgrading period. A 50 to 50% sex split was observed during the experiment.

During the experiment, respondents were asked to make purchase decisions at every instant depending on the time frame being considered and the amount of resources made available to them. The choices made were also constrained in cases where particular levels of engineering service required other services as prerequisites. For example, having an in-house water connection without a housing unit is technically impossible.

Unspent funds at a point in time would be carried over to the next instant as funds remaining from a preceding purchasing point, or because a purchase was deferred, or in both cases were one chooses to use some funds and carry over the rest irrespective of such a remaining amount being enough to purchase some level of service.

Data from the constrained experiment were analysed to determine the differences in trends of cumulative percentages of people choosing a particular level of service among the three considered time frames. Two complementary methods were used, namely; an average approach and a more descriptive analysis of mode by mode of funds utilisation.

For each time frame, percentages of respondents attaining a particular level of service were determined. For each level of service, a cumulative percentage of respondents selecting that level of service at each instant were determined and then cumulative instalments of funds were calculated for each instant and time frame.

Matrices of cumulative resource available at every instant by the cumulative percentage of respondents attaining a level of service were constructed. Following this, the cumulative percentages were read into relevant decision points against an array of all possible decision points. In order to establish a continuous trend between points where decision points were not considered within the levels of service due to differences in funding patterns and time frames, it was assumed that purchasing decisions would have a linear relationship to available funds between points where decisions were made.

However, the average approach which aimed at establishing differences between the three time horizons by looking at the average percentages of respondents attaining at least a level of service for the three funding patterns for each time frame proved to have some limitations due to differences in the funding modes for the different time frames. For instance, the initial decision points for some time frames occurred well into the experiment's decision points array such that most of the initial decision points were to be

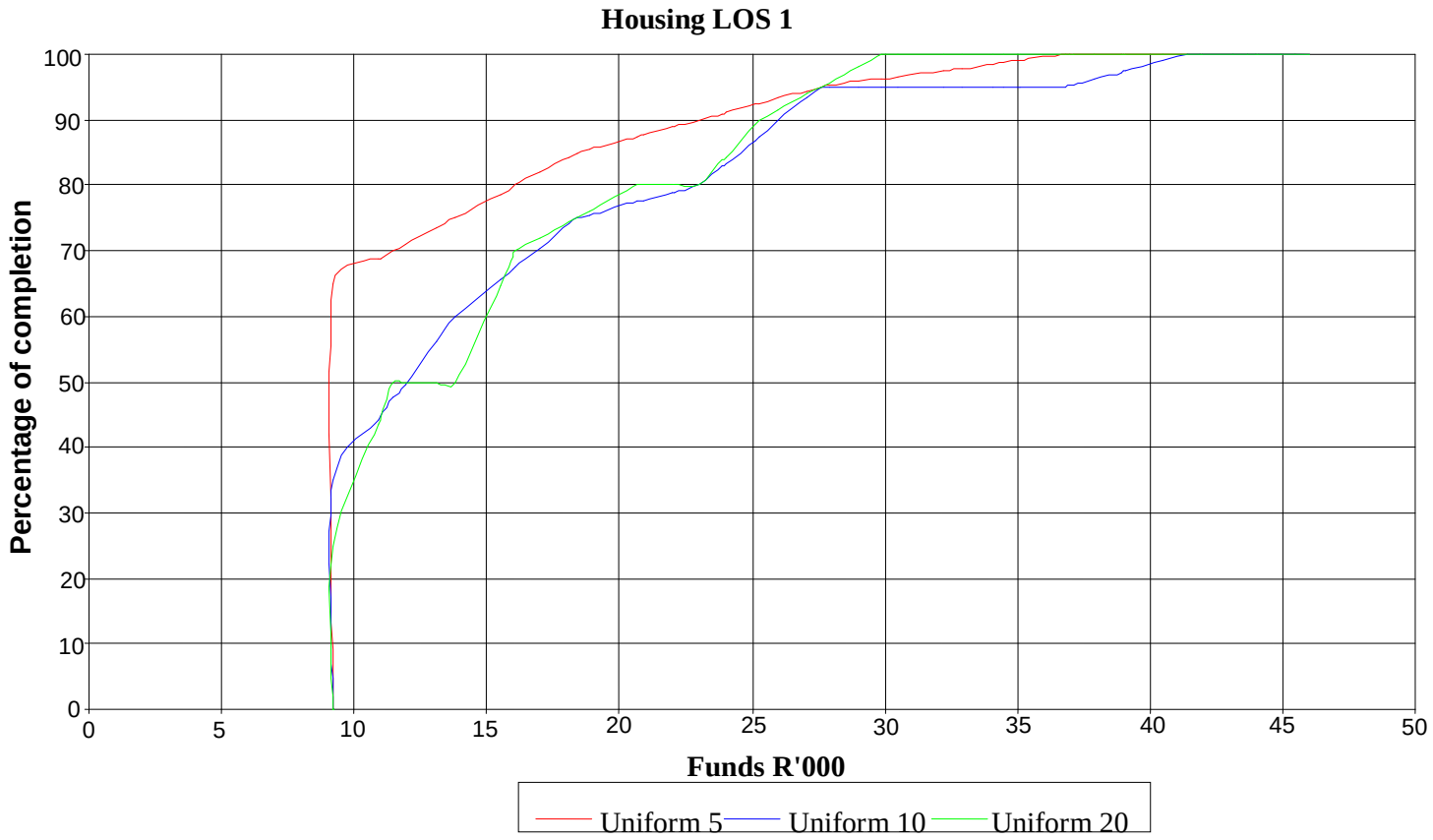

Figure 1. Percentage complete for uniform cumulative funds for housing LOS 1.

eliminated from the analysis. Therefore a more descriptive mode by mode analysis with a bias towards the uniform funding pattern was adopted.

This paper discusses the results from the 5, 10 and 20 years uniform funding pattern analysis which had funding patterns of thresholds and increments of R9200, R4600 and R2300, respectively.

Purchasing decisions for levels 1, 2 and 3 of housing were possible if and only if available funds at that particular decision point were equal to or in excess of R9200, R18400 and R28000, respectively. The aforementioned were cost estimates for levels 1, 2 and 3 of the theorised complete housing unit.

RESULTS

Figures 1, 2 and 3 show the results for the uniform funding pattern for levels 1 and 2 of housing.
The following were observed from Figure 1:

1. At R9 200 (1US$ = 8ZAR), the first decision point, 65% of the respondents attained at least level 1 of housing in the 5-year time horizon while 35% attained this level in the 10-year time horizon at the same level of funding. The absolute difference in percentage complete for the two horizons decreased almost evenly up to cumulative funds of R25 000 where there was about 6% difference between the trends.
2. At R9 200, 65% of the respondents chose level 1 of housing in the 5-year time horizon as compared to 25% that preferred this level in the 20-year time horizon. The absolute difference in percentage complete for the two time horizons decreased almost evenly up to cumulative funds of R25 000 where there was about 4% difference between the trends.
3. At R9 200, 35% of the respondents chose level 1 of housing in the 10-year time horizon as compared to 25% that preferred this level in the 20-year time horizon. Thereafter the trends progressed relatively the same over the experiment's funding range.

The following were observed in Figure 2:

1. At R18 400, 15% of the respondents attained at least level 2 of housing in the 5-year time horizon while 10% attained this level in the 10-year time horizon at the same point. The absolute difference in percentage complete for the two horizons was substantially different for the rest of the funding range with an average absolute difference of about 18% between R18 400 and R42 000. The maximum absolute difference of 35% was observed at R27 600.

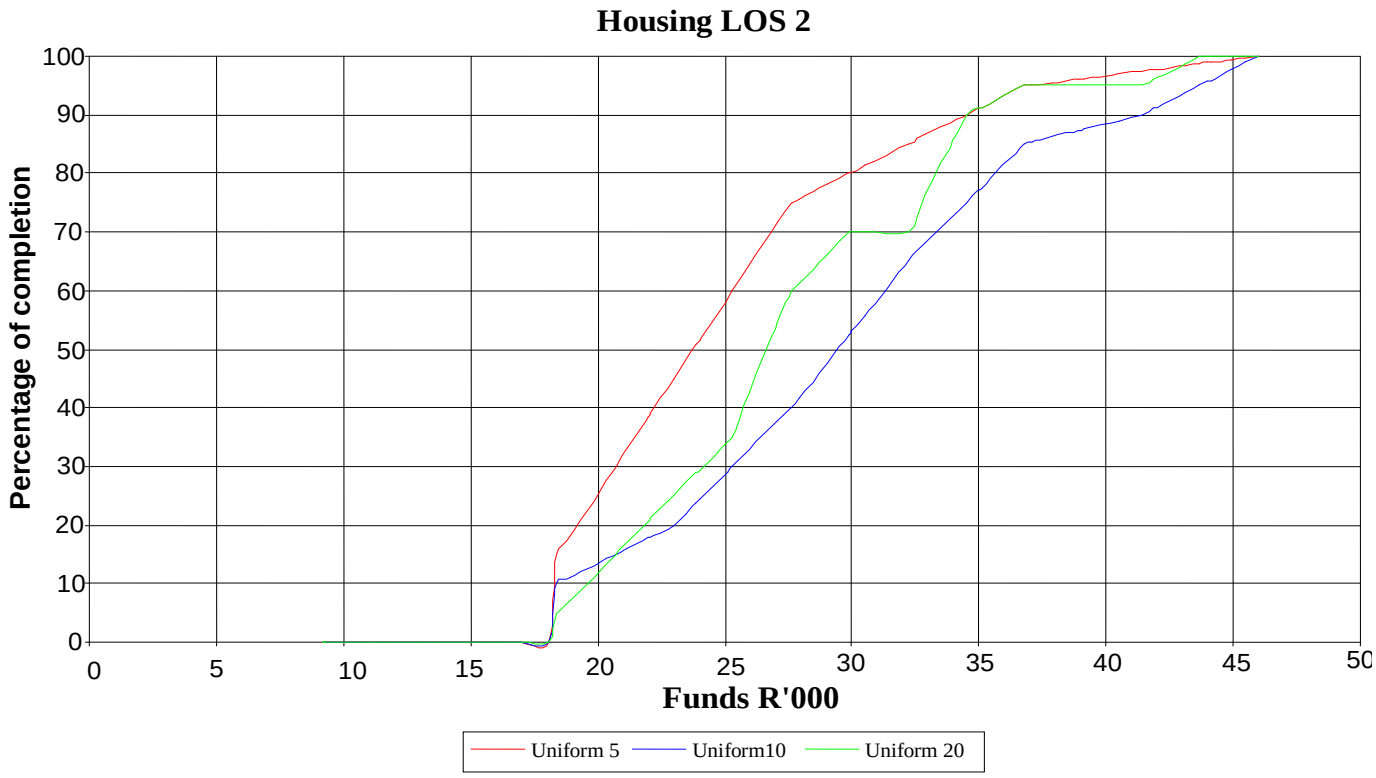

Figure 2. Percentage complete for uniform cumulative funds for housing LOS 2.

2. At R18 400, 5% of the respondents attained at least level 2 of housing in the 20-year time horizon while 15% attained this level in the 5-year time horizon at the same point. The maximum absolute difference of 25% was observed at R25 300.
3. At R18 400, 10% of the respondents attained at least level 2 of housing in the 10-year time horizon while 5% attained this level in the 20-year time horizon at the same point. The trends were remarkably different between R20 700 and R37 000 with an absolute average difference of about 14%.

In Figure 3 there was a difference between the 5-year trend and the other trends in the increasing funding pattern between R28 000 and R37 000. This was because of the funding mode in the 5-year time horizon which lacked decision points until R29 000 for level 3 of housing.

What is remarkable in Figure 1 and 2 is that beneficiaries of the housing subsidy would prefer to attain the primary level of service for a housing unit where funding is disbursed over short periods of time. Hence Figures 1 and 2 results show that for a shorter time horizon the preference for levels 1 of housing was greater than in the longer time horizons given the same amount of resources as seen from the higher percentage of level completed in the 5-year horizon than in the 10 and 20-year horizons.

Figure 2 shows that preference for Levels 2 of housing is outstandingly reduced in preference for associated engineering services. Hence one would rather have a one-roomed house, have associated engineering services, and then upgrade to three-roomed housing unit. Otherwise, Figure 3 illustrates that choice of level 3 of housing was not remarkably affected by time.

Therefore, the results showed that time has an effect on choice of housing over some stages of incremental upgrading. It can then be argued that choice for housing as a package is affected by time over the initial stages of the exercise (where funds are limited) with preference for housing decreasing with an increase in time to delivery, and the preference for associated engineering services, in general, increasing with an increase in time to delivery. Thus, a small house with associated services proves convenient where short periods to completion are envisaged. The completion of a housing unit is delayed due to preference for associated engineering services where time to completion is extended.

CONCLUSIONS AND SUGGESTIONS

The emphasis on a serviced dwelling unit within the housing policy of South Africa and within the proposed

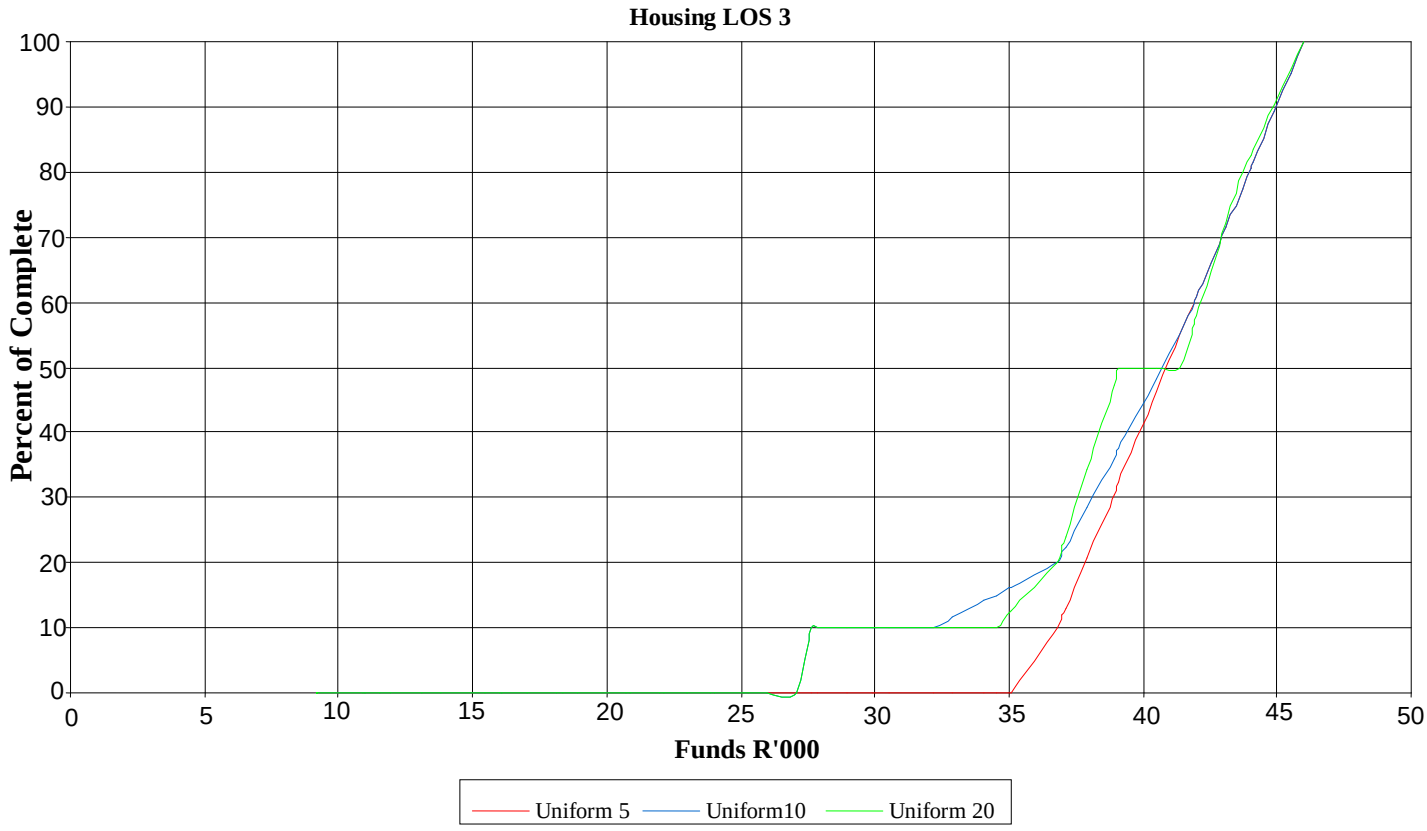

Figure 3. Percentage complete for uniform cumulative funds for housing LOS 3.

incremental upgrading strategy for Cape Town assumes that the preference for a serviced dwelling unit is invariable and rigid among the intended beneficiaries of the upgrading exercise. However results from this study show that:

1. The housing upgrading package can be disaggregated and can be managed as isolated packages of upgrading over a given time as indicated by literature reviewed in the study and,
2. That preference of beneficiaries is variable and may be affected by the time to delivery of an upgrading exercise; that is, short time horizons prompt respondents to allocate more funds to housing and, it may be argued that long-time horizons prompt respondents to allocate more funds to associated engineering services.

Therefore in the face of shortage of funds and hence a growing backlog in the provision of housing units, the government may change its goals in terms of time to delivery so as to match the available funding and beneficiaries preferences. Hence, the current policy on the provision of services may be adapted along an incremental approach which completely disaggregates the level of services within the serviced dwelling unit and managed as isolated packages of upgrading over a given time. In this way, the available resources can be used to provide some services to more people at each phase of upgrading unlike the once-off approach which provides for all services to a few people at a time.

In fact, if incremental upgrading is adopted as a mechanism to address backlogs in services provision, then the subsidy programme, would be in line with Smets' (1999) idea of the need to link the 'affordability criteria' in incremental housing upgrades with practices of incremental financing. However, for an incremental upgrading exercise to be successful, each project would need its own survey to identify the specific priorities of the residents.

In addition, further research on the following can be investigated in line with this study:

1. The effect of time on other services if housing is omitted from the list. The cost for other services are very minimal compared to the cost of the dwelling unit. Hence omitting housing from the shopping matrix would assist in determining the preference of particular levels of service with respect to time.
2. Incremental upgrading is a multi-attribute situation that occurs over a period of time and the final product may be achieved by different sequential combinations of the attributes in different time horizons. The attributes

involved in incremental upgrading incur different costs when upgraded incrementally.

Hence the different sequential combinations of these attributes over different time horizons result in a different total product cost if economic factors such as interest and inflation are taken into consideration. There is therefore a need to investigate the cost implications for alternative incremental upgrading strategies.

(a) The technical dynamics and logistics involved in implementing different alternative packages: for example, how many times would a road be dug up, to what extent would people be inconvenienced, what would inconvenience the community most, and what would be seen as inefficient?
(b) A policy shift from the current once-off approach to an incremental upgrading approach would suggest a change of mind set for the beneficiaries. A thorough investigation on a larger scale on the perceptions and views of communities on incremental upgrading is necessary.

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