HOUSING MORTALITY PROCESS BASED ON SOCIAL, ECONOMIC, POLITICAL AND TECHNOLOGICAL FACTORS

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Submitted to the Faculty of the Graduate College
of the Oklahoma State University
in partial fulfillment of the requirements
for the Degree of
DOCTOR OF PHILOSOPHY
December, 1983

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Dedicated to Wilda Schaefer

ACKNOWLEDGEMENTS

Dr. Margaret Weber, who served as chairperson of my advisory committee, receives my genuine gratitude for her dedication to excellence and thoroughness as well as the guidance necessary for the completion of my doctoral studies. I also am deeply indebted to Dr. Carl Hall for his guidance and moral support throughout my doctoral program.

My sincerest thanks are extended to the other members of my doctoral advisory committee, Dr. Elaine Jorgenson and Dr. George E. Arquitt, whose enthusiasm and helpful criticism made the development of this dissertation a meaningful and rewarding learning experience.

The cooperation of the faculty at the Texas Tech University College of Home Economics' Department of Family Management, Housing and Consumer Science was essential to the completion of my doctoral program. I am appreciative of their support and encouragement.

I wish to express my appreciation to the Jewell Taylor Fellowship Committee for their financial support and encouragement throughout my doctoral program. The Committee encouraged me to pursue my goals and financially provided for this achievement.

I gratefully acknowledge those jury members who responded both negatively and positively and offered suggestions distilled from their reasoning, experiences and knowledge. I benefitted from each reply.

Also, I offer a special thanks to Mrs. Eric Palmer for her editorial comments and the typing of the final draft of this manuscript. In

addition, I appreciate her friendship and moral support throughout completion of this study.

Finally, the support and cooperation of my family have been essential during this project. The love, patience and understanding of my husband Dewey has been a sustaining force throughout my studies. The cooperation, patience and tolerance of my children Brenda and Trayle also have contributed significantly to the successful completion of this effort. Also, I appreciate the continuing support, encouragement and love of my parents.

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CHAPTER I

INTRODUCTION

Housing provides shelter, one of the basic physical needs of people. Gutman (1970, p. 125) states that "the house by virtue of its condition as a possessed object, has a significance in addition to its significance as a physical facility - it also has a symbolic meaning." Greenbie (1969, p. 359) points out that "houses are merely building blocks of a community organism." Smith (1970, p. 96) defines housing as "a group of services - shelter, amenities, accessibility, etc. - to be used daily and, often, to be paid for periodically." As viewed in these contexts, housing is impacted directly by society physically, psychologically and sociologically. Increasing recognition of the relatedness of housing to these contextual environments, of the need to incorporate existing housing information as a vital ingredient toward understanding the housing mortality process and of the multidisciplinary and multi effect of the built environment on this process is the beginning of a rationale for more order in the organization of existing information and knowledge. Therefore, the study of essential factors which contribute to housing mortality helps explain stability and change as they occur in total housing stock. Accountability and responsibility for housing conditions are important concerns to people in housing-related professions. Consequently, there is a need for continued research on the inter-relatedness of certain factors and housing conditions.

This study theoretically and logically analyzes the importance of social, economic, political and technological determinants as they impact the housing mortality process. These determinants are identified in matrices which have been developed independently and include six housing life-cycle stages which have been identified as single-family ownership, merger, conversion, abandonment, deterioration and demolition.

Overview of Problem

Single-family residential units are viewed as an investment which provides both psychological and financial security. Owning a housing unit frequently is a symbol of financial stability and often is the most important wealth a family will accumulate. Individual living units provide physical environments in which people live, grow and expire. Consumers are confronted with the decision of choosing between newly-constructed and previously-owned residential units, a decision that could be viewed as a problem of perception.

Policy and decision makers are forced to make judgments impacting housing stock based on information which does not include conceptual housing frameworks designed to illustrate the web of relationships among inherently connected phenomena. Capra (1975), a Berkeley physicist, sees the core of many problems as people attempting to apply worn out philosophical assumptions of Descartes and Newton to modern problems. Although Capra does not directly address housing stock, his concept is applicable to the present attitudes of policy makers and housing specialists regarding the life-cycle of a residential unit.

The review of literature provides specific housing life-cycle information which has been categorized into the areas of social, economic,

technological and political determinants. However, attempts by researchers to conceptualize the existing information in a comprehensive manner has not been found.

The review of literature also reveals several trends relevant to a study of the housing life-cycle. For example, housing authorities and policy makers share a common objective regarding housing life-cycles. This objective is believed to be the maximization of expected useful life of residential units. Integrated concepts relevant to housing mortality provide information for meeting this objective. In addition, information is provided as to reasons for previous studies not developing integrative housing mortality concepts. There are definitional problems in existing research regarding the type of information needed for understanding the housing mortality process.

Another existing problem is lack of organized data (Gleeson, 1981). Although data exists, it is not designed to be utilized easily for analyzing the housing mortality process. Also, recommendations are needed as to types of information required in local housing surveys which could assist in accurate assumptions concerning quality of existing housing stock and projection of future housing needs.

The expectations of this study are that if housing mortality is associated with certain phenomena at each life-cycle stage, anticipation and understanding of the impact of future phenomena might be possible. The conceptual approach suggests a direction for longitudinal testing of information as it becomes available through housing surveys and censuses. In addition, areas are identified to be further developed in local housing surveys when housing trends are measured. There is a paucity of information in this area and the information often is not readily available

at the local level (U.S. Department of Commerce, 1980).

The analyses are designed for some degree of predictability of theories, constructs or propositions and repeatability in geographic areas given certain conditions and trends. It generally is agreed that residential units occupy most of the land surface in urban areas. The lots, streets and green areas significantly impact the building of churches, schools and commercial establishments to service these residential areas. Therefore, maximum economy in providing these services depends upon long-range planning and analysis of the housing mortality process. In addition, the housing mortality concepts which include determinants impacting each housing life-cycle have implications for construction, design, manufacturing, mortgage and finance, insurance, city and regional planning, land development, water resources, pollution, public policy and all levels of government. This study conceptually presents the inter-relatedness of housing mortality and related determinants.

Galt and Smith (1976, p. 21) state that graphic representations, as compared to hypotheses, assumptions and laws, are more adaptable "to producing a classification scheme which is cross-disciplinary." These authors believe that developmental processes such as matrices and models contribute to interdisciplinary understanding and are the first step in theory development. Matrices are used as presentation devices to assist in simplifying the complexity of the problem being studied.

Purpose and Objectives

The purpose of this study is to identify selected, functional relationships of social, economic, technological and political factors as they impact the six housing life-cycle stages included in the housing

mortality process. To study the conditions under which the process occurs, the housing life-cycle stages have been specified as single-family ownership, merger, conversion, abandonment, deterioration and demolition.

To determine the relationship between social, economic, technological and political determinants and the six housing life-cycle stages, these objectives have been established for this study.

1. To determine social, economic, technological and political determinants which impact the six housing life-cycle stages: single-family ownership, merger, conversion, abandonment, deterioration and demolition.

2. To develop integrated conceptual frameworks which illustrate the relationships between social, economic, technological and political determinants and the housing life-cycle stages.

3. To suggest conceptual development of social, economic, technological and political frameworks for organizing information relevant to understanding the housing mortality process.

Research Questions

Because this study is methodological in nature and is concerned primarily with the activity of conceptual theoretical development of the housing mortality process, research questions are used. Since the three primary questions are stated explicitly, they assist in defining the specific context of the study.

1. What are the social, economic, technological and political determinants which impact the housing mortality process, including the life-cycle stages of single-family ownership, merger, conversion, abandonment, deterioration and demolition?

2. Are matrices which illustrate the relationship between social,

economic, technological and political determinants and the housing life-cycle stages feasible for integrated concept development in the study of housing mortality?

3. What are implications for using matrices as conceptual frameworks to organize information relevant to understanding the housing mortality process?

Definition of Terms

The following definitions are used to clarify terms, concepts and principles referred to in this study.

Abandonment - characterizes the life-cycle stage when dwelling has been "deserted" (Webster's New World Dictionary, 1978, p. 2).

Conversion - characterizes the life-cycle stage when dwelling has been "converted or changed to a non-residential use" (Gleeson, 1981, p. 185).

Demolition - characterizes the life-cycle stage when dwelling is demolished or "destroyed by natural causes" (Gleeson, 1981, p. 185).

Deterioration - characterizes the life-cycle stage when dwelling is in process of quality "depreciation" (Webster's New World Dictionary, 1978, p. 384).

Determinant - "factors that determine" rate of housing mortality (Webster's New World Dictionary, 1978, p. 384).

Housing Life-Cycle - includes stages of "single-family ownership, merger, conversion, abandonment, deterioration and demolition" (Gleeson, 1981, p. 185).

Housing Mortality - assumption developed for "estimating survival, loss and expected useful life of housing inventories" (Gleeson, 1981,

pp. 185-193).

Housing Stock - total of residential units which "provide shelter, amenities and accessibility to be used daily" (Smith, 1970, p. 96).

Merger - single-family unit which has been absorbed or combined with other dwellings (Gleeson, 1981, pp. 185-193.)

Assumptions

Matrices developed in this study function as assumptions relative to the developmental process of housing mortality. These matrices also might be used to develop other housing ideational structures and to relate specific housing mortality theories to empirical reality.

Limitations

The limitations of this study relate to the scope of the social, economic, technological and political matrices and the manner in which these ideational structures are validated. Rather than being tested empirically, the matrices will be developed in logical terms on the basis of information obtained in the areas of sociology, economics, technology and political science.

Information for conceptual theory development in interdisciplinary applications is not readily available. The literature reveals a lack of interdisciplinary theory in the area of housing mortality. Additional limitations are time, availability of appropriate census data and organization of existing housing information.

In order to develop and validate the social, economic, technological and political matrices, a jury of experts representing these four areas

have been selected. Both their input and assessment of the matrices are presented in this study.

Summary

Society is a social system, and housing is a product of that system. As a part of this social system, there are a number of factors which impact housing units at each of the six life-cycle stages during the housing mortality process.

> The life cycle of a building is considered to be that period during which the building produces an income adequate to justify the investment involved; or, in the case of owner-occupied homes, that period wherein the home is in direct use (Davidson, 1972, p. 63).

Each life-cycle stage is believed to be impacted by determinants from four disciplines and areas: social, economic, technological and political. If housing is viewed in a conceptual framework, the information provided can strengthen, encourage and expand interdisciplinary research. The development of integrated housing mortality concepts could lead to the accumulation of additional knowledge within the area of housing. This investigation is limited to single-family residential units in order to keep the problem manageable but is not intended to suggest that commercial or multi-family housing is less important or that many of the concepts considered would not be applicable to other types of housing.

CHAPTER II

REVIEW OF LITERATURE

Introduction

A number of factors are believed to impact single-family detached housing during the unit's lifespan. A housing unit generally progresses through six life-cycle stages: single-family ownership, merger, conversion, abandonment, deterioration, and demolition (Gleeson, 1981; de Leeuw and Struyk, 1975; Catanese, 1979; Smith, 1970; Leigh, 1980). Different factors impact the progression of the housing unit through each stage. At each life-cycle stage, the unit is affected by a complex mixture of interrelated factors which can be classified as either a social, economic, technological or political determinant.

Several studies using different methodologies and statistical procedures have produced data relevant to factors which affect housing stock at various stages of the housing life-cycle. However, the collected information has not been presented in comprehensive matrices which could be utilized by housing specialists and policy makers.

Previous Studies

Gleeson (1981) developed a model which could be utilized in the development of a housing life-table, a table similar to the human life-tables used by life insurance companies. A housing life-table is used

for illustrating relationships that exist during periods of growth, stagnation and decline. Complex mathematical formulations are necessary for a housing life-table to be developed. However, housing life-cycle matrices can be used to symbolically represent real world phenomena (Catanese, 1979) and pinpoint similarities between human life-cycle stages and housing life-cycle stages.

After extensive research, de Leeuw and Struyk (1975) have developed a model which illustrates private and public interactions in urban housing. The two researchers believe that the model has possibilities for prediction of how proposed housing policies and programs impact the volume and condition of housing stock. de Leeuw and Struyk (1975) find that policies and programs contribute to a filtering process which eventually supplies low-income housing for the poor. Bawer (1951) contends that the filtering process is central to many debates about housing policy.

The model developed by de Leeuw and Struyk (1975) has been used in six urban areas which differed significantly in the basic neighborhood conditions included in the model. The applications have important policy and program implications when straight-line projections which do not assume variances in different geographic locations are used. de Leeuw and Struyk dealt with long-run events over a 10-year period which they felt had a major impact on housing quality. Significant factors considered are population grwoth, population shift, income distribution, income levels and housing life-cycle cost factors.

The study contributed information about housing shortages, abandonment, long-term vacancy, conversion and demolition. Also included in the study is information relative to what people can afford and what people spend for different qualities of housing based on structural and

neighborhood qualities.

Features of the model are market segmentation which illustrates price differences in different sectors or submarkets of the housing stock. Various policies impact submarkets differently. Imperfect substitution is an empirical finding which related to household preferences relative to housing quality and neighborhood effects. Durability is a feature which separated the housing supply into new and existing housing stock. Elastic new supply dealt with past assumptions that in a 10-year period new housing is elastic based on supply and demand. The inelastic existing supply proved that over a 10-year period, services such as space, shelter, privacy and design are not elastic. Supply trends are found to exist at various times during the 10-year period which slowly affects housing services. Demand trends for increased housing services are reflected as a result of growth in real income and population growth. de Leeuw and Struyk (1975) express a concern and need for additional research in the area of housing loss and into the factors which ultimately affect this cycle, especially services provided by housing. It generally is agreed that the life-cycle of a housing unit is that period during which the unit produces an income adequate to justify the investment of the user (Smith, 1970).

Using Census of Housing data from 1950, 1960 and 1970, National Income Product Account, Housing Investment data and statistics from the National Housing Inventories of 1956 and 1959 as well as from the 1960 and 1970 components of Inventory Change Studies, Leigh (1979) estimates, reports and discusses depreciation/replacement rates for housing stock in the United States. Leigh feels that this area of research needs further study and development and expresses the need for an economic theory

of depreciation/replacement rates of housing from 1950 to 1970. In addition, a technique is presented for estimating depreciation/replacement rates for the residential housing stock based on United States Housing data for the 20-year period.

The housing stock net removal rate used by policy makers and housing professionals is the ratio of demolitions, mergers, conversions and other losses to the average total inventory of housing units for the specified period. This ratio is influenced by a variety of factors, including average age of inventory, land value and government policies and programs.

As indicated in previous studies, there are many independent and collective factors which impact housing at different stages of the housing life-cycle. For the purpose of this study, the review of literature is divided into four classifications which impact the housing life-cycle: social, economic, technological and political factors.

Social Factors

Sociology includes those factors associated with change as well as principles and processes relative to human society as a whole. Therefore, many social phenomena directly impact housing in each life-cycle stage.

The 1979 Annual Housing Survey provides data relevant to the arrangement of American households. The typical household contains three people or less; the median size is 2.8 people. Generally, large households are those with six or more people. According to the 1979 Housing Survey, the rate of housing flaws will vary according to the household's race, ethnic background and size, particularly those households with six or more members.

The Survey also includes information pertaining to inadequate housing

based on seven specific defects: plumbing, incomplete kitchen facilities, absence of proper sewage systems, lack of adequate heating, lack of maintenance, accessibility to toilet and substandard electrical wiring. According to Simms (1981), the leading defects are in the areas of maintenance, plumbing and toilet access. Lack of any one of the facilities could alter the progression and life span of the housing unit through the different life-cycle stages.

Social phenomenon which impacts housing life-cycles is population change which results from several significant factors. A natural change in population is created by subtracting the number of deaths from the number of births over a given period of time. Another important factor is immigration of people needing housing (e.g., in 1975, 130,000 Vietnamese people entered the United States). Legal immigration into the United States in 1976 was 314,000 (Sternlieb and Hughes, 1978). These population changes are constantly fluctuating and have a total impact on housing in each life-cycle.

As technology and medicine advance, so does the life span of man. Presently there is an increase in the elderly population of the United States (Steffl, 1978). The housing needs of the elderly have created a demand for units which can provide inexpensive, safe shelter. Housing as it proceeds downward through the housing life-cycle stages is believed to provide housing for special groups such as the elderly (Nathanson, 1980).

Sternlieb and Hughes (1978) further point out that approximately 47 million children were born between 1945 and 1957; those children account for over 21 percent of the current population. During the 1950s and 1960s, schools became flooded with those children. Likewise, institutions

of higher education swelled with this same group in the 1960s and 1970s. Since 1970, this group significantly has been impacting the housing market and has created a permanent need for housing in the stages of single-family ownership, merger and conversion.

Currently policy and decision makers, architects, planners and builders are asking "To what does the housing consumer aspire?" The answer to this question is increasingly important as land use and allocation of energy and resources are considered. Other concerns being addressed by policy and decision makers pertain to the values and preferences of the older generation of housing consumers. Of primary concern is whether the population as a whole will become increasingly conservative and more resistant to change. If so, how will the older generation's values affect the broad area of housing, both new construction and existing stock (Sternlieb and Hughes, 1978)?

Sternlieb and Hughes refer to the population shift as an important part of any housing demand and supply question. "Housing demand is not so much a function of total population size, but rather of the total number of households" (Sternlieb and Hughes, 1978, p. 29). The two authors mention availability of housing in existing neighborhoods, welfare stipulations changing societal and cultural norms, the marriage institution (decreasing marriage rate and increasing divorce rate) and the fertility rate as some of the social factors which have a direct influence on housing stock.

As people redistribute themselves throughout the nation, a new geography of the nation's population evolves (e.g., population shift from the North to the South). The 7.8 million people who moved from the northern United States to the southern United States between 1960 and

1970 illustrate how the nation's population is shifting. Redistribution impacts political jurisdictions and redefines domestic issues of different areas such as urban development, inner city growth, agriculture, energy use, land use, housing construction, institutional demands, social services, national domestic political policy and daily activities of planners at national, state and local levels. When examining housing stock, this population shift must be considered by policy makers and planners. Indeed, population shifts are more significant than the energy problem (Sternlieb and Hughes, 1978; Garreau, 1981).

Bogue (1959) identifies three components of population changes: migration, mortality and fertility. These are mechanisms by which a population increases or decreases. In addition to these components, industrialization contributes to population redistribution. Population changes are considered major influences on housing stock in any given geographic location. Some authorities believe that when an industry is approved, housing needs should be analyzed based on the kind of industry. In addition to having major effects on housing, redistribution affects the services utilized by housing.

Other geographical conditions which affect population redistribution and housing choice are water, climate, soil, flora and fauna. These conditions often are determinants of population location which directly affects density. Other social factors which could be included are age, life style, leisure activities and residence of other family members (Sorikin, 1928).

Leslie and Richardson (1961) have conducted a study which analyzed the relationship between careers and mobility. They find that residential mobility appears to be associated with both the expansion stage of the

family and career patterns. Chevan (1971, p. 451) adds that "At any given marriage duration, the birth of children is associated with higher rates of moving." Also included in the study are households' density and duration of marriage which are found to be associated with higher rates of mobility. Differences in family income determine differences in housing quality and location within the metropolitan area (Fieldman and Tilly, 1966).

> . . . in general, there is more permanence than changes; therefore any model should account more for stability than for change, especially the even rarer, abrupt changes. Changes in society do not occur in a vacuum - depending only on intrinsic features - but in history and they cannot be understood without reference to historical events. In this sense changes are unique and cannot be fitted into a general developmental scheme (Back, 1971, p. 660).

In summary, the primary social factors which impact housing at different life-cycle stages are population changes as a result of births, deaths, marriages, divorces, employment, immigration and migration. Additional factors include the household's age and size and services provided by houses, such as plumbing, kitchen facilities, sewage systems and heating.

Economic Factors

As they apply to the housing life-cycle, economic factors are social in nature. Many economic theories and precepts relative to housing choice are based on social phenomena and cultural norms since they impose constant changes throughout all aspects of the family's economy. Changes in employment and marital status are examples.

Historically, home ownership has been desired by everyone. Early economists believed that home ownership promoted thrift and economy among

individuals; consequently, there should exist services such as building and loan associations which would allow individuals and families to purchase a dwelling with small monthly payments over a period of time. Most housing authorities believe that home ownership has become popular because of government policy and the emphasis placed on ownership of land and dwellings. Closely related to the desire for home ownership is family and social prestige. Home owernship is believed to also foster community and civic responsibility.

The allocation of economic resources for housing needs is discussed by many policy makers and housing authorities. Reid (1962) believes that when an increase in both population and income is experienced, an increase in housing demand also is experienced. However, "current incomes do not represent ability to consume housing; hence the relation of current incomes to the average cost of new dwelling units gives little information as to who is likely to be a prospective buyer or renter of a new unit" (p. 391).

> We also know that families with different interests and activities with different assortments of members, with different incomes and abilities to pay and at different stages of development jump into the chile waters of mortgage indebtedness under varying market conditions. But we know next to nothing about how all these various elements are perceived by different types of home purchasers, how they combine in the decision to buy, and how they relate to the satisfaction of housing needs (Dean, 1951, p. 68).

In today's housing market, several major factors directly impact housing costs. These factors include land cost, labor, site value, square feet enclosed, value per square foot, materials, method of financing, marketing techniques, overhead of marketing agency, profit margins and regional differences (Behman, 1971).

Eshleman (1974) feels that the economy of a nation at any given time affects the family and its system of functioning. To better understand the impact of economics, researchers should look at various population changes (e.g., divorce rates, birth rates, death rates, migration and immigration) (Eshleman, 1974).

Goode (1963) emphasizes that changes which can occur in a family's economic system, both in the form of government policies and employment, can impact family patterns which include mobility, divorce, kinship ties and general ability to maintain the family ecosystem. The ecosystem would include the family's housing and would affect the life-cycle of the house. Morris and Winter (1978) have indicated several societal conditions which influence the economic aspects of home ownership and which would have a direct influence on the life-cycle of a house.

> Lending institutions have long been criticized as "taste-makers," dictating housing standards according to hoped-for high resale values. Mortgages are not often granted for the purchase of homes made from very unusual materials or techniques, homes that are very small or very large, or homes in "changing" neighborhoods. In short, mortgages are not easy to obtain on homes that might be difficult to resell (p. 38).

The Housing and Urban Development Act of 1968 made national commitments to increase the number of housing units. The counts of the housing stock and the factors which impact this stock need to be determined if the commitments are to be understood and implemented fully by professionals in all housing areas (Behman, 1971).

In summary, six economic factors most likely to impact housing during its various life-cycle stages are changes in job status, marital status, government policy, population shifts, business-related costs and the general state of the national and international economy. The impact of both macro and micro economic factors will fluctuate at each stage of the

housing life-cycle based on services to be derived from the structure.

Technological Factors

Technological factors are both social and economic in nature. At each stage of the housing life-cycle, societal and cultural norms impact technological factors and features desired by housing consumers.

Researchers agree that home selection and design choices have an important affect on family life and are in the hierarchy of items consumed by individuals and families. Families and individuals differ as groups and also within each independent group. To meet this constant change, the private housing markets are challenged to meet the housing consumer's needs and tastes in housing design (Beyer, 1955).

Housing specialists and policy makers are looking at housing in terms of its usefulness during the entire loan period. Riemer (1947, p. 155) states: "We know that the immediate market situation reflects the past rather than the future of attitudes toward the family home." Based on this premise, the life-cycle of the house is not likely to be a major consideration in the initial housing construction phase. Home planning should include knowledge and understanding of societal trends as these reflect design and technology.

> Whatever we are going to do, whether we are going to plan carefully or not, whether we are going to base our decisions upon research or not, we cannot help but initiate a self-perpetuating chain of cause and effect relationships that will assist in determining the housing demands of the future (p. 159).

Ogburn (1923) explains technological change based on a theory he calls "cultural lag." The material culture which includes technology changes first. The non-material culture, including customs, beliefs, philosophies, laws and governments, lags behind. He explains that many

family changes result from the technology in a given generation. As technology exposes people to change, different cultures, social institutions and life patterns change. This cultural lag, as a result of life pattern changes could be one factor which accounts for the housing life-cycle stages of merger, conversion, abandonment and deterioration.

A key factor in considering design trends is family change. As families change to different economic levels as a result of divorce, marriage, death and job-related transfers, their housing choice also changes.

> Housing attitudes are bound to change in time. . . . They will also change under the impact of new inventions. Our home culture has been deeply influenced by the automobile and the radio. It is currently influenced by storage facilities, such as the refrigerator and the deep-freeze locker. It will be influenced by the television set. Community facilities influence the home life through the many activities which they take over from the family (Riemer, 1951, p. 150).

It is felt by most designers that an uncertain future is being built. Livability studies cannot presently furnish needed information. Studies which investigate the relationship between family functions and preferences for specific features of home construction could help both architects and builders; however, the studies are not widely available and rarely are utilized in the initial design phase (Riemer, 1951). Therefore, technological preferences often are not a consideration in the first life-cycle stage. As the structure progresses through the stages of merger, conversion, abandonment, deterioration and demolition, the methods of construction and technology become increasingly important.

Adaptive reuse of existing structures is a conservation measure which has gained support and popularity in the past few years. This recycling trend reflects a major attitudinal change both in government

and society. Most housing professionals feel older buildings can be adapted to meet current housing needs. These professionals also feel the technology of any period determines the lifespan of the housing unit.

Housing satisfaction and the relationship of housing quality have been a topic of research for most societies. Societie have norms and expectations relative to kinds of technology used in housing construction. A deficit in these norms occurs when housing is below expectations based on society's norms (Harris, 1976; Morris and Winter, 1974; Speare, 1974). When a family experiences deficits in its housing, changes such as abandonment and deterioration are likely to occur.

Several components can be used to describe facilities within a residence. Individual tastes and preferences are an important element to consider when evaluating housing quality since families and individuals tend to be subjective in their evaluation of housing quality. The U.S. Bureau of the Census in its 1940, 1950 and 1960 censuses attempted to rate structural quality of housing on a broad scale. However, structural housing quality was eliminated in the 1970 census because of reliability problems (Morris, Woods and Jacobsen, 1972). Consequently, this type of information is no longer readily available.

The National Bureau of Standards has completed a one-year study on some aspects of the effects of technology in achieving conservation of existing housing stock. The report findings identified several major technological gaps and needs in the area of materials used for housing construction. New technological developments are needed for measuring and assessing the performance and predicted durability of certain building elements in existing houses (Metz and Berger, 1978).

A number of technological changes have impacted both housing choice and design and ultimately the housing life-cycle. Some of these changes are ownership of boats, recreation vehicles and cars, control over the thermal environment, energy cost, communication and travel, synthetic materials and advanced methods of construction (Fish, 1979).

> The style of the exterior and the interior of a home reflects - within resalable limits - the personality of the residents and may be selected on the basis of the residents' concept of who they are. Many people will even admit to buying a house that bolsters the image of self, since the house in the American culture is a symbolic statement of the status of the family in society (Cooper, 1974, p. 132).

Greblen (1950) believes that there should be more emphasis placed on the efficiency of housing production. Efficiency should include both productive factors and the effectiveness of the institutional framework in which new housing is produced. The author concludes that there exists many problems relative to accurate interpretation of data concerning housing stock and future production needs.

Generally speaking, technology and its availability at different stages of the life-cycle impact the progression of the structure throughout each stage. Each new technological achievement will impact the durability and lifespan of the structure.

In summary, human evolution can be measured in part through the study of technology. Through technology, change at ever faster rates has marked the process of housing mortality.

Political Factors

As housing stock is surveyed and analyzed, it is important to view federal housing policies both historically and in the sequence of political, social, economic and technological events. According to

Meeks (1980) many policies are based on a minimum of criteria (e.g., average unemployment, age of housing in the community, percentage of persons at the poverty level, lag in per person income, lag in population growth and stagnating manufacturing and retailing employment).

> Over half a century of housing programs have come and gone, altogether involving a wide range of government initiatives that have long since atrophied; new programs will have to differ radically from those of the past if the same cynical cycle is not to be repeated (Plunz, 1980, forward).

New dwellings are added to the housing stock each year; however, little attention is given to the existing housing stock which houses the majority of the population. Each year new housing construction and policies are based on straight-line projections. These projections are based on inventories of existing units plus additions of new housing units minus removals of existing units which equals total housing supply (Kokus, 1974; Sternlieb and Hughes, 1978). Based on this information, national shelter requirements are projected by policy makers.

Most housing authorities refer to the present housing market as decentralized. In this kind of market, the administrative functions of the housing industry are distributed among many federal, state and local authorities. Therefore, owner-occupants and landlords often meet the needs of changing demands by housing consumers through conversion of existing structures. Conversions can be upward or downward; but in existing structures, the trends most often are downward to a lower quality of housing. As a structure proceeds through the housing life-cycle, it is owned and occupied by a succession of families and individuals. Generally, each new owner or occupant is lower in the socio-economic hierarchy. There has been discussion regarding this filtering process by various housing authorities and researchers. They agree that the

need exists for reliable research information relative to the development stage of housing mortality (Kiefer, 1980; Grigsby, 1962; Little, 1976; Ohls, 1975).

Fried (1971) identifies other factors which are affected by government participation in the form of housing policy, including spending priorities which are often outside the area of housing and which are a direct result of fiscal arrangements of the American government. Also, the restrictions on where money can be obtained and how it will be used further limits the provisions of sufficient quality housing. In addition to these factors, cities rely on property taxes for most of their housing revenue. Due to an increase in municipal services, property tax rates have steadily increased which places additional economic responsibilities on homeowners. Fried concludes that outmoded and excessive restrictive provisions in building codes and zoning regulations have contributed significantly to perpetuation of housing problems.

Governmental decisions in relation to housing policy reflect societal concerns primarily based on economic, political, social and technological trends. This premise gives further significance to the study of housing in all its aspects which apply to housing mortality matrices. Trends in these four areas are changing the essential aspects of the course of housing; therefore, some increased awareness of the functional wholeness of the housing life-cycle as it leads to housing mortality is mandatory.

Summary

Research studies and literature provided information relevant to a study of residential units at various stages of the housing life-cycle.

Factors significant to a study of housing mortality include geographic locations, population changes, income distribution and government policies and programs.

As it shifts to different life-cycle stages, housing stock is acted upon by a number of independent elements. These elements are believed to impact housing stock at every stage of the housing life-cycle with some degree of predictability. However, a study including social, economic, political and technological factors as well as the elements in each area has not been attempted. The nature of these factors is believed to contribute significantly to man's understanding of the mortality of residential housing units. Each element within the different areas functions both independently and in conjunction with the other elements. Literature included in this review suggests a complex mixture of interrelationships during each life-cycle stage. The literature indicates that the elements fall into the four general areas of social, economic, political and technological determinants.

Information necessary for development of theoretical matrices is available. The matrices could assist policy makers and housing professionals in both estimating and characterizing housing stock. These judgments could be based on matrices which illustrate factors to be considered during housing life-cycle stages.

CHAPTER III

METHODOLOGY

Introduction

The major purpose of this study is to identify social, economic, political and technological determinants which impact each of the six housing life-cycle stages in the housing mortality process: single-family ownership, conversion, merger, abandonment, deterioration and demolition. A secondary purpose is to develop and evaluate four matrices, each of which represents the housing mortality process in one of four areas: social, economic, political or technological. An overall view of the social, economic, political and technological areas will be presented by identifying the factors comprising each of the six housing life-cycle stages. An additional dimension of the study is to determine the value of the matrices to housing research. The integrative nature of this research is important to the conceptualization, understanding and application of the housing mortality process.

Research Design

The first task is to design four qualitative matrices based on philosophical and theoretical knowledge. Best (1981, p. 156) defines qualitative studies as "those in which the description of observations is not ordinarily expressed in quantitative terms." Kirte (1982, p. 42) emphasizes the importance of qualitative research based on its general

orientation "toward the context of discovery." Indeed, qualitative research is hypothesis-generating rather than hypothesis-testing. Kirte (1982, p. 43) also emphasizes the need for qualitative research when he states that "methodology in qualitative research is less structured than in quantitative research in order to facilitate discovery." Considering the need for qualitative research and the incorporation of existing housing mortality information into an integrative network for understanding, creative methodological applications are encouraged.

To better understand the housing mortality process, the essential factors which impact each of the six housing life-cycle stages have been studied. Through the review of literature, social, economic, political and technological factors have been found to impact housing units throughout their lifespans. Researchers generally agree that phenomena impacting a housing unit, such as housing mortality, do not exist in isolation but in relationship to a variety of social, economic, political and technological factors. The constant convulsive changes in these four areas necessitate a multi-disciplinary research approach. Horn (1981) acknowledges the integrative nature of Home Economics as it reflects the need for research which includes information in related areas and disciplines.

Housing, this country's major industry and a family's largest single investment, is a critical area for knowledge and information development. Stauffer (1983, p. 51) states, "Higher education, in spite of current hard times, must be alert to the nation's and the world's future needs." Since housing is critical to the future well-being of society, housing needs should be addressed continually at the university level through research and development. As the nation's society becomes more complex, housing research must make important contributions to consumer

understanding of housing and its related processes. In addition, increasing technical complexity in the area of housing requires more in-depth research if affordable, satisfactory housing units are to be provided.

Galt and Smith (1976) believe that social science research designs which often do not use quantitative methods are frustrating to scientists who are accustomed to working in laboratories with empirical data. When studying social, economic, political and technological phenomena in relationship to housing, information disorganization and definitional problems due to multidisciplinarity complicate theory development. However, it is believed that matrices can be the initial step in organizing the qualitative factors which affect the housing mortality process. It is recognized that later matrix testing can offer insight and modification of the theoretical structures presented in this study. Best (1981) states:

> Traditionally, educational research has emphasized the quantitative approach. A substantial number of researchers feel that qualitative studies have, for too long, remained outside the mainstream of educational research. Some investigations could be strengthened by supplementing one approach with the other (p. 157).

Matrices that are utilized in this study organize and relate knowledge relevant to the housing mortality process. Kerlinger (1973, p. 557) states, ". . . a matrix is a rectangular array of numbers or other symbols." This data analysis technique has been chosen as a vehicle for further explaining and organizing information relevant to the housing mortality process.

Sample

In order to construct and validate the appropriateness and

qualitative nature of the matrices developed in this study, a jury of housing-related experts has been selected for each of the four areas: social, economic, political and technological. These scholars have been selected on the basis of their expertise in one of the four disciplines represented. Eight experts were selected for each area. In addition to having an earned Ph.D., the jury members have attained recognition in their respective areas through scholarship, housing-related research and juried publications. Most of the 32 individuals have responded to the initial request for their participation in the study, with 16 people agreeing to participate, (see Appendix A).

Jury members are from different geographic locations and represent educational institutions, offices of city planning and development as well as several divisions of the Department of Housing and Urban Development. Each respondent has both distinct and convergent opinions relative to specific factors which have been identified for each residential housing life-cycle stage. The data collection method provides the means for securing both distinct and convergent opinions relevant to the identification of factors affecting the housing life-cycle without bringing the individuals together in a group setting.

The purpose of the jury is to gain the expertise of representatives from both educational and government agencies in a relatively short period of time. In addition, the jury members are attuned to the most recent legislative regulatory requirements and to current and emerging socio-economic trends and technological innovations impacting the housing mortality process. The use of a jury of experts also makes it possible to secure the benefit of both individual and group judgments regarding specific areas of the study. Whatever the validity of the formal results,

the participating people are both vital and informed in housing research.

There have been several administrative problems associated with the identification of jury members and the data collection. These problems are primarily in the synthesis of free responses into communicable generalizations, preparation and mailing of two questionnaires during a short period of time so as not to lose communication with jury members and data tabulation. Unsolicited comments often are included in the responses making tabulation more complex and difficult.

Data Collection Technique

The research method for data collection utilized in this study has been a two-phase process based on the Delphi Technique. The Delphi Technique can be modified to fit the needs of studies concerned with opinion survey designed to elicit preferences from special groups. Helmer and Rescher (1959, p. 47) present the classic definition of the Delphi Technique: ". . . a carefully designed program of sequential individual interrogations (best conducted by questionnaire) interspersed with information and opinion feedback." Linstone and Turoff (1975, p. 3) characterize the Delphi as "a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem."

Rasp (1973, pp. 29-30) cites the following three characteristics of the Delphi Technique:

> 1. Each participant contributes at each step of the questionnaire process before seeing the inputs of the other participants for that step.
> 2. While the individual knows his own responses throughout the process, input of others remains anonymous.
> 3. Input gained at one step of the process is shared as part of the next step.

According to Linstone and Turoff (1975, p. 4), the key characteristics of using the Delphi are to provide "structural communication" including feedback of individual contributions of information and knowledge, assessment of information and knowledge, opportunity for individuals to revise views and a degree of anonymity for individual responses. They further identify the following characteristics as situations that may lead to selection of the Delphi as a research technique:

> 1. The problem does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis.
> 2. The individuals needed to contribute to the examination of a broad or complex problem have no history of adequate communication and may represent diverse backgrounds with respect to experience or expertise.
> 3. More individuals are needed than can effectively interact in a face-to-face exchange.
> 4. Time and cost make frequent group meetings infeasible.
> 5. The efficiency of face-to-face meetings can be increased by a supplemental group communication process.
> 6. Disagreements among individuals are so severe or politically unpalatable that the communication process must be referred and/or anonymity assured.
> 7. The heterogeneity of the participants must be preserved to assure validity of the results.

The Delphi Technique, developed in the 1950s, was designed to provide a structured method for obtaining group consensus and as a forecasting technique of future events. In its most common usage, a small monitor team designs a questionnaire to obtain initial input from a group. The initial responses are tabulated and formulated into a new questionnaire which is again sent to the respondent group. Respondents are given one or more chances to revise their responses based on feedback of the group's responses to the previous questionnaire. The Delphi Technique has the advantages of objectifying group processes and of eliminating many of the problems usually associated with group processes.

This study differs in principle from the original use of the Delphi

Technique as it is not used as a forecasting tool. In this study, respondents have been asked to focus on what they believe to be presently true rather than what is likely to happen in the future. The major purpose has been to collect conjectures about prospective social, economic, political and technological developments that might have an impact on the housing mortality process.

The study is conceived as not to prepare a detailed description of the future but to examine factors impacting housing mortality in several domains of housing mortality. The study is intended to be only an initial step and not a final or conclusive analysis of the housing mortality process.

A number of difficulties have been encountered during the research. First, there are no comprehensive theoretical frameworks to guide the inquiry. Second and fundamentally, the academic areas of housing do not share a consistent definition of the housing life-cycle process, thus prohibiting consistent opinions among housing researchers. Third, the data base available to housing mortality research is shifting and often is unreliable due to numerous extraneous and unpredictable variables. Fourth, judgments in the four areas - social, economic, political and technological - are subject to considerable variances due to disagreement about the meaning of categories used to identify the factors.

Instrumentation

The researcher feels that the resourcefulness of design and the methodology provides objective opinions from individuals on the basis of reason, experience and knowledge. These opinions are obtained through the use of two successive questionnaires. The first questionnaire is

designed to obtain each jury member's ideas of the factors which impact the housing life-cycle during each stage causing a housing unit to shift into the next stage. The second questionnaire is designed to procure analysis of a matrix which represented the collective results obtained by Questionnaire I. In addition, each jury member is asked to evaluate and provide additional feedback for further refinement of the matrix and to assess the information collected. In most instances the replies support findings provided in the review of literature. However, additional information is provided regarding the value of the study in the form of personal comments, suggestions and telephone conferences.

Questionnaire I has been developed by the researcher. Comprised of six open-ended questions, the two-page questionnaire, along with a cover letter, has been mailed to each of 32 jury members, (see Appendixes B and C). Telephone conversations have been held with several respondents to discuss the study and its objectives. The researcher also has identified factors impacting the six housing life-cycle stages based on the review of literature. Respondents have been asked to return the questionnaire within three weeks. Questionnaire I is described below.

Instructions for responding to Questionnaire I immediately followed the respondent's name. The respondent was asked to identify the primary factors believed to impact each of the six housing life-cycle stages: single-family ownership, merger, conversion, abandonment, deterioration and demolition. Each stage was defined according to its proposed use in the study. Jury members received only the questionnaire for their area of expertise (i.e., social, economic, political or technological). Social, economic, political or technological was printed on each questionnaire.

The open-ended questions provided respondents an opportunity to

give free, objective responses to each question (Babbie, 1979). Responses were not listed in order of importance. The responses have been used in conjunction with information obtained during the review of literature; and categories appropriate for matrix development have been identified for each specific area in relationship to each housing life-cycle stage.

Questionnaire II also was developed by the researcher. Questionnaire II, a two-page instrument accompanied by a cover letter which expressed the researcher's appreciation for jury participation in the validation of the questionnaire, was sent to each jury member, (see Appendix D). The second page of the questionnaire included definitions of the housing life-cycle stages as stated in Questionnaire I, (see Appendix E). Questionnaire II was presented in two parts.

Instructions for responding to the second questionnaire were printed first in Part One. An independent matrix was presented which collectively illustrated the jury members' responses to Questionnaire I for each of the four areas: social, economic, political and technological, (see Appendixes F, G, H and I). Eleven factors were listed on the left side of the instrument. The center portion of the matrix consisted of cells containing an X and a number to represent jury member responses derived from Questionnaire I. Space for reactions to or expansion of questions 1 through 11 was provided. Likert-type scales measured the adequacy of variables, using the three validity categories of adequately, inadequately and no response. Respondents responded by circling the level of adequacy they perceived for each factor of the housing life-cycle. Question 12 was designed to obtain assessment of the life-cycle stages identified in this study.

The five open-ended questions in Part Two were designed to solicit

additional information, including respondents' areas of expertise, suggested matrix uses and respondents' impressions of the matrix, (see Appendix J).

Data collected from Questionnaire I have been processed and recorded by the researcher. Formal data analyses include distillation, assimilation and summation of jury responses. A format which includes tables, graphs and discussion will be used to organize and present data due to the integrative nature of the information and diverse responses of each jury member. Research questions identified earlier in this study will be addressed individually based on the analyses and summaries of jury responses.

Summary

Qualitative research is receiving attention due to an increased emphasis on "Quality of Life." The qualitative matrices presented in this study offer insight and a conceptual framework for understanding the housing mortality process. An important consideration of this particular jury inquiry is that the jurists' approaches to the individual matrices are from differing and sometimes conflicting schools of thought. It is important to discover whether these differences cause the jurists' responses to be in opposition to or in conflict with each other. General agreement would be both remarkable and desirable, since the housing life-cycle matrices intentionally have sought to link together distinct fields of inquiry. This linkage provides workable and comprehensive housing life-cycle matrices for theory development frameworks relevant to housing mortality.

Completed questionnaires have been evaluated using tables, graphs

and formalized matrices to present data. In addition, the general discussion of suggested strengths, limitations and perceptions of use as well as the concluding remarks of each jury member have been evaluated.

CHAPTER IV

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

This study has been conducted to determine the social, economic, political and technological factors impacting the housing mortality process. The housing mortality process includes six housing life-cycle stages: single-family ownership, merger, conversion, abandonment, deterioration and demolition. Identification of the factors in each life-cycle stage included two questionnaires completed by 16 jury members. The data and information provided by the jury members is presented in this chapter.

Purpose of the Analyses

This study has been concerned with the search for answers to three basic questions.

1. What are the social, economic, political and technological determinants which impact the housing mortality process, including the life-cycle stages of single-family ownership, merger, conversion, abandonment, deterioration and demolition?
2. Are matrices which illustrate the relationship between social, economic, political and technological determinants and the housing life-cycle stages feasible for integrative concept development in the study of housing mortality?
3. What are implications for using the matrices as a conceptual

framework for organizing information relevant to understanding the housing mortality process?

The presentation, analysis and interpretation of the data are oriented toward the answering of these research questions.

As indicated in the review of literature and by responses to Questionnaire II, there are many independent and collective factors which impact a housing unit at different stages of the housing life-cycle. Since the intent of this study is to identify major factors which impact the housing mortality process, only factors considered to be of principle importance are reflected in the analysis.

Research Question I

What are the social, economic, political and technological determinants which impact the housing mortality process, including the life-cycle stages of single-family ownership, merger, conversion, deterioration, abandonment and demolition?

Social

Population changes are believed to impact the housing life-cycle stages. Occupants' ages often impact the progression of the unit through the stages (e.g., older individuals unable to afford maintenance and repairs cause deterioration of the structure which impacts the individual unit and the neighborhood). As the unit deteriorates, other units may reflect this same phenomena, resulting in a population shift from an existing area to another more recently developed and more desirable area. Immigration of different cultures also impacts neighborhoods and individual housing units. The study of housing in relationship to culture has made

important contributions toward understanding differences in life-styles which often impact the housing life-cycle.

As man's lifespan is increased through technology and medicine, increased importance is placed on shelter and its longevity in order to meet housing needs. Housing units need to have special considerations in terms of safety, maintenance and cost relationships. In addition, the population is increasing; as a result, more housing units are needed. Since land is not an item that can be manufactured, preservation of existing units becomes an important consideration. As cities redefine boundaries to include suburbia, exurbia and rural communities, understanding of housing mortality and its related social processes are important considerations for decision makers.

It is believed that location decisions made by industry impact the housing stock in any given location. The kind of industry, its longevity and its size are factors to be analyzed in the housing mortality process. In addition, industry generally considers water, housing availability, cost and quality, climate, soil, flora, fauna and air quality when determining a site location for its activity.

Social changes which impact housing are relative to many extraneous variables and are difficult to measure. However, the major variables identified appear to have observable impact on a housing unit as it progresses and shifts from one life-cycle stage to the next. Both the review of literature and questionnaire results support demographics, family size and composition, population growth and geographic composition of population as major social aspects of society which should be considered as major factors impacting the housing mortality process.

Economic

The major economic variables impacting the housing mortality process include dynamic and convulsive changes at both the macro and micro levels of the economy. The fundamental networks and relationships which interact produce a need for constant surveillance of land cost, cost of labor, site values, square feet enclosed, value per square foot, materials, methods of financing, marketing techniques, national economic trends and significant social factors, e.g., divorce and marriage rates.

The ecosystem which includes a family's housing is impacted by lending policies of institutions concerned with home loans, by the real estate industry and by builders. Individuals associated with these institutions often are influential in an individual's and a family's choice of location and the decision to buy new or existing units.

Due to their quantitative nature, the impact of economic factors in a qualitative study are more difficult to define and identify. However, the review of literature in conjunction with the jury responses reveal that the integrative nature of these factors in relation to the social, political and technological areas support the need for understanding the housing mortality process, its role in the national economy and such indicators as consumer price index and employment/unemployment trends. The factors to be considered are maintenance costs and financial considerations (national, state and local), including mortgage and loan policies, tax structures, insurance requirements, general overall construction costs and land development costs.

Political

Primary political factors generally are identified in relation to

new housing stock. Traditionally, little attention has been given to existing housing stock and its progression through the housing mortality process. Stages of housing units as presented in this study have received little consideration by political decision makers. Since the housing industry is decentralized and administrative functions are distributed among federal, state and local authorities, the housing mortality process often is complex and fragmented. This complexity and fragmentation often are responsible for housing units being merged or converted to promote or allow for tax advantages and to meet increasing consumer demands in existing locations, resulting in an unpredictable shift to the merger or conversion stage. Mergers or conversions can be upward or downward in relation to housing quality. However, the review of literature indicates that the trend generally is downward toward a lower housing quality. Conversions to a non-residential use often change the emphasis of a neighborhood to commercial status. The merger and conversion stages are primarily a result of codes and zoning regulations since regulatory considerations are major variables in both stages.

Primary political factors impacting the total housing life-cycle are public health and safety and neighborhood services and conditions which are the major functions and concerns of regulatory agencies involved in codes and zoning decisions. In addition, the availability of public services such as public transportation also is a major concern of policy makers and city administrators. Together these political factors impact the integrative nature of the housing mortality process as it interacts with social, economic and technological factors.

Technological

Technological factors as they impact the housing mortality process

are considered to be social and economic in nature. As the education levels of individuals and economic standards change, the preferences of housing consumers are affected also. Therefore, the preference often is for new residential units. In addition, builders construct housing units based on marketability. Long-term implications of current building technology trends as they impact design generally are not a primary concern of builders, consumers or policy makers. As new technology is introduced and incorporated into housing construction, the desire for the "new" is a preference of most home buyers. This situation can contribute to the shifting of single-family units into other stages of the housing life-cycle. The identification of a structure of the technological innovations of the period can activate and increase the housing mortality process. Technology in general is believed to have a major impact on the housing mortality process.

The major technological variables believed to impact the housing life-cycle are general physical structural characteristics, including technology as it impacts building materials used in both interior and exterior design. Specific physical structural characteristics such as energy effective materials also are major considerations when analyzing the housing mortality process. These factors are impacted continually by social and economic factors and are reflected both in choice and affordability.

Research Question II

Are matrices which illustrate the relationship between social, economic, political and technological determinants and the housing life-cycle stages feasible for integrative concept development in

the study of housing mortality?

Since the intent of this study has been to identify determinants which impact the housing mortality process, a list of determinants for each housing life-cycle stage has been obtained from each jury member. Upon completion of the analysis of jury replies from Questionnaire I, 11 general categories were formulated by the researcher representing the factors impacting the life-cycle stages. In addition, factors and life-cycle stages were compiled in matrices for each area. Tables 1, 2, 3 and 4 illustrate major factors identified by the jury members as they impact each stage in the housing mortality process.

After analyzing Questionnaire I, four matrices were developed to represent each area studied: social, economic, political and technological. These matrices were designed to represent the relationship between the factors and the housing life-cycle stages. Factors identified by jury members were identified by placing an X in cells to graphically indicate the factor's relationship to the housing life-cycle stage.

The following sections present the jury responses representing each of the four areas: social, economic, political and technological. The jury members in each area evaluated the adequacy of factors as they represent major variables impacting the life-cycle stages. The jury members circled their ratings on a five-point Likert-type scale. These ratings have been compiled for each question.

Social

The factors of Demographics, Family Size and Composition, Population Growth and Geographic Composition of Population, Public Health and Safety, Neighborhood Services and Conditions, Specific Physical Structural

TABLE I

SOCIAL FACTORS IMPACTING THE HOUSING MORTALITY PROCESS

Life-Cycle Stage	Factors
Single-family ownership	Demographics (education, occupation, sex, age, income) Family Size and Composition Population Growth and Geographic Composition of Population Neighborhood Services and Conditions Selected Structural Characteristics (specific physical) Financial Considerations (national, state, local) Regulatory Considerations (codes, zoning)
Merger	Family Size and Composition Regulatory Considerations (codes, zoning)
Conversion	Family Size and Composition Population Growth and Geographic Composition of Population Neighborhood Services and Conditions Financial Considerations (national, state, local) Regulatory Considerations (codes, zoning)

TABLE I (Continued)

Life-Cycle Stage	Factors
Abandonment	Demographics (education, occupation, sex, age, income) Public Health and Safety Neighborhood Services and Conditions Financial Considerations (national, state, local)
Deterioration	Demographics (education, occupation, sex, age, income) Family Size and Composition Population Growth and Geographic Composition of Population Public Health and Safety Neighborhood Services and Conditions Financial Considerations (national, state, local) Regulatory Considerations (codes, zoning)
Demolition	Public Health and Safety Neighborhood Services and Conditions Selected Structural Characteristics (specific physical)

Characteristics, Financial Considerations and Regulatory Considerations were viewed as adequately representing the major social variables impacting the housing mortality process at various stages, (see Table I). According to the collective responses of the jury members, no social factors impact the entire housing mortality process. General Physical, Structural Characteristics and Availability of Public Services were evaluated as having no impact on the housing mortality process in the social matrix.

Jury members made several additional comments regarding the major variables as identified. One jury member commented on both the independent and dependent nature of the factors as they relate to the housing life-cycle at any given stage (i.e., some factors impact the housing life-cycle dependently and also in relation to or as a result of other factors). Another jury member indicated that a "set time-frame" is difficult to identify for each stage during the housing mortality process. Events which may occur such as gentrification and the receiving of block grants which encourage unit rehabilitation are difficult to anticipate yet can drastically impact the time-frame of the housing mortality process.

Economic

The factors of Demographics, Maintenance Cost, Neighborhood Services and Conditions, General Physical Characteristics, Specific Structural Characteristics, Financial Considerations, Availability of Public Services and Regulatory Considerations were viewed by the jury members as adequately representative of the major economic variables impacting the housing mortality process at various stages, (see Table II). According to the collective responses of the jury members, no economic factors impact the

TABLE II

ECONOMIC FACTORS IMPACTING THE HOUSING MORTALITY PROCESS

Life-Cycle Stage	Factors
Single-family ownership	Demographics (education, occupation, sex, age, income) Public Health and Safety Maintenance Cost Neighborhood Services and Conditions Financial Considerations (national, state, local) Availability of Public Services Regulatory Considerations (codes, zoning)
Merger	Neighborhood Services and Conditions Financial Considerations (national, state, local) Availability of Public Services Regulatory Considerations (codes, zoning)
Conversion	Neighborhood Services and Conditions Financial Considerations (national, state, local) Regulatory Considerations (codes, zoning)

TABLE II (Continued)

Life-Cycle Stage	Factors
Abandonment	Public Health and Safety Maintenance Cost Financial Considerations (national, state, local) Regulatory Considerations (codes, zoning)
Deterioration	Demographics (education, occupation, sex, age, income) Public Health and Safety Maintenance Cost Financial Considerations (national, state, local) Regulatory Considerations (codes, zoning)
Demolition	Demographics (education, occupation, sex, age, income) Maintenance Cost Financial Considerations (national, state, local) Regulatory Considerations (codes, zoning)

entire housing mortality process. Family Size and Composition were evaluated as having no impact on the housing mortality process in the economic matrix.

Several jury members commented on the integrative nature of the factors as they impact the housing mortality process. In addition, programs such as gentrification and other rehabilitative programs which "turn units around" in the housing mortality process were identified as extraneous variables. Also suggested was the combining of the merger and conversion stages since a housing unit usually does not experience both cycles. One jury member felt demolition was not a stage since the structure would not exist at this point.

Political

The factors of Demographics, Population Growth and Geographic Composition of Population, Maintenance Cost, Neighborhood Services and Conditions, General Structural Characteristics, Specific Structural Characteristics, Financial Considerations, Availability of Public Services and Regulatory Considerations generally were viewed as adequately representative of the major political variables impacting the housing mortality process at various life-cycle stages, (see Table III). According to the collective responses of the jury members, Financial Considerations and Regulatory Considerations impact the entire housing mortality process. Family Size and Composition and Public Health and Safety were evaluated as having no impact on the housing mortality process in the political matrix.

Additional comments from the jury included the implied assumption of the housing mortality process as a continuing deterioration process. It was felt that residents of multi-family housing units often maintain

TABLE III

POLITICAL FACTORS IMPACTING THE HOUSING MORTALITY PROCESS

Life-Cycle Stage	Factors
Single-family ownership	Demographics (education, occupation, sex, age, income) Public Health and Safety Maintenance Cost Neighborhood Services and Conditions Financial Considerations (national, state, local) Availability of Public Services Regulatory Considerations (codes, zoning)
Merger	Neighborhood Services and Conditions Structural Characteristics (general physical) Selected Structural Characteristics (specific physical)
Conversion	Neighborhood Services and Conditions Financial Considerations (national, state, local) Regulatory Considerations (codes, zoning)

TABLE III (Continued)

Life-Cycle Stage	Factors
Abandonment	Public Health and Safety Maintenance Cost Financial Considerations (national, state, local) Regulatory Considerations (codes, zoning)
Deterioration	Demographics (education, occupation, sex, age, income) Public Health and Safety Maintenance Cost Financial Considerations (national, state, local) Regulatory Considerations (codes, zoning)
Demolition	Demographics (education, occupation, sex, age, income) Maintenance Cost Financial Considerations (national, state, local) Regulatory Considerations (codes, zoning)

a neighborhood well and a "tasteful" conversion can be an asset to a declining neighborhood.

Technological

The data presented in the technological matrix indicate that the major variables to be considered at selected life-cycle stages are Demographics, Family Size and Composition, Maintenance Cost, Neighborhood Services and Conditions, General Structural Characteristics, Selected Structural Characteristics, Financial Considerations, Availability of Public Services and Regulatory Considerations, (see Table IV). Most of these factors received ratings indicating that they adequately represent major determinants to be considered at specific housing life-cycle stages. According to the collective responses of the jury members, none of the technological factors impacts the entire housing mortality process. Population Growth and Geographic Composition of Population as well as Public Health and Safety were evaluated as having no impact on the housing mortality process in the technological matrix.

Several jury members commented on the interrelatedness of the factors and viewed the factors as having causal effects on each of the housing life-cycle stages. In addition, members of the jury suggested the existence of integrative networks among the four areas: social, economic, political and technological.

Research Question III

What are the implications for using the matrices as a conceptual framework for organizing information relevant to understanding the housing mortality process?

TABLE IV

TECHNOLOGICAL FACTORS IMPACTING THE HOUSING MORTALITY PROCESS

Life-Cycle Stage	Factors
Single-family ownership	Maintenance Cost
	Structural Characteristics (general physical)
	Selected Structural Characteristics (specific physical)
	Financial Considerations (national, state, local)
	Regulatory Considerations (codes, zoning)
Merger	Maintenance Costs
	Structural Characteristics (general physical)
	Selected Structural Characteristics (specific physical)
	Financial Considerations (national, state, local)
	Regulatory Considerations (codes, zoning)
Conversion	Neighborhood Services and Conditions
	Structural Characteristics (general physical)
	Selected Structural Characteristics (specific physical)
	Financial Considerations (national, state, local)
	Regulatory Considerations (codes, zoning)

TABLE IV (Continued)

Life-Cycle Stage	Factors
Abandonment	Maintenance Costs Neighborhood Services and Conditions Structural Characteristics (general physical) Selected Structural Characteristics (specific physical) Regulatory Considerations
Deterioration	Maintenance Cost Structural Characteristics (general physical) Selected Structural Characteristics (specific physical) Availability of Public Services
Demolition	Demographics (education, occupation, sex, age, income) Family Size and Composition Maintenance Cost Structural Characteristics (general physical) Selected Structural Characteristics (specific physical) Regulatory Considerations (codes, zoning)

The results of Questionnaire II are presented in Table V. Each of the four areas are identified by individual line symbols as indicated in the legend. Trends and tendencies lend themselves to the development of concepts and propositions relative to further understanding of the housing mortality process.

Financial considerations and regulatory considerations were found to be prevalent in all six housing life-cycle stages. This finding suggests that factors which are government regulated are believed to have a stronger impact during the housing mortality process than social or technological factors. Economic factors such as taxes and home loan interest rates are determined at national, state and local levels. Regulatory considerations often are results of economic contingencies as well as political trends and entrepreneurial involvement. Therefore, individuals and families often are unable to control these variables believed to be principle determinants in the housing mortality process.

Technology was considered an important consideration during the stages of merger, conversion, abandonment, deterioration and demolition. However, technology was not viewed as important during the single-family ownership stage. It can be assumed that the interior and exterior design of a newly-constructed unit are satisfactory and meet governmentally-imposed building standards and codes. Therefore, technological considerations are viewed to be more important as a unit begins to progress through the housing life-cycle due to age of materials and climatic inconsistencies which cause changes in materials and require maintenance.

The majority of the factors identified were considered major determinants to the social and economic areas during the stages of single-family ownership and deterioration. These stages can be associated with

TABLE V

COMPOSITE OF THE FACTORS IMPACTING THE AREAS OF SOCIAL, ECONOMIC, POLITICAL AND TECHNOLOGICAL

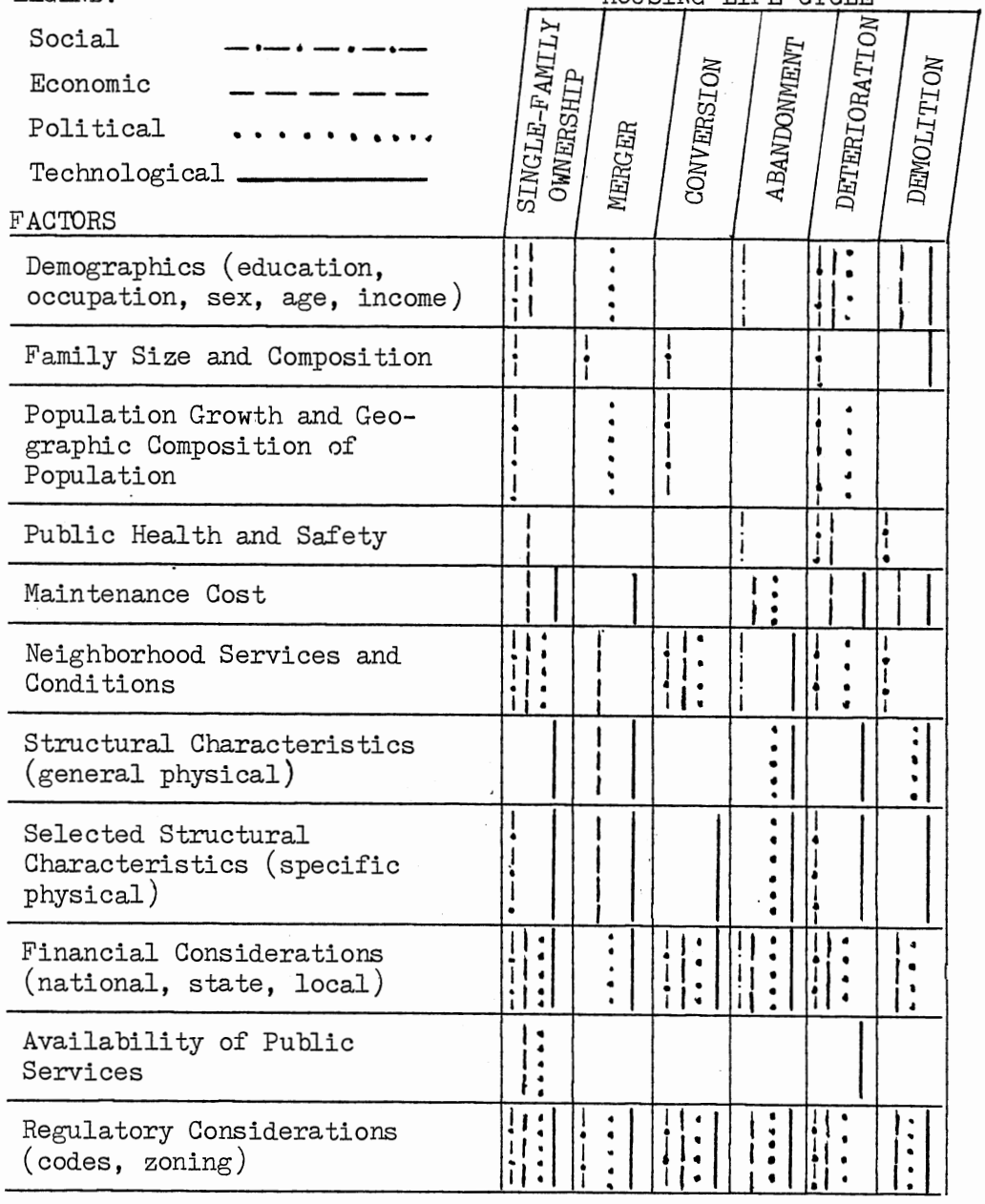
LEGEND:

Social —·—·—·—·—

Economic — — — — —

Political . . . . . .

Technological ————————



economic change at the micro level. The decision to purchase a single-family residence is often the largest single investment a family or individual will make. Deterioration of a unit often can be associated with a family's inability to afford maintenance and repair on a dwelling due to changes in economic status such as unemployment and divorce. Therefore, most of the factors are believed to impact an individual's or a family's ability to purchase and maintain a single-family unit.

The majority of the factors identified were considered primary to the political area during the abandonment and deterioration stages of the housing mortality process. This relationship could be a result of decisions by policy makers to change zoning regulations which often result in abandonment of units. When a unit is no longer occupied and maintained, deterioration is a logical result. Additional consideration can be given to social and economic phenomena as they impact abandonment and deterioration and are integrated with the political factors.

Integrative concept development is relative to the housing mortality process in the four areas: social, economic, political and technological. The integrative structure and patterns presented in the composite matrix have specific characteristics. These characteristics can neither be derived from the factors in relationship to the housing life-cycle nor considered simply as the result of the housing mortality process. The organization of the structure and patterns implies a complex integrative nature of the housing life-cycle stages as they are continually acted upon by the determinants.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Summary and Conclusions

The foregoing study has attempted to provide a thorough and unbiased investigation of the selected functional relationships of social, economic, political and technological factors as they impact the six housing life-cycle stages in the housing mortality process. An additional aspect of the study has been identification of a housing life-cycle representative of the housing mortality process. Assessment has been made to determine major social, economic, political and technological factors which impact each housing life-cycle stage.

Questionnaire I was designed to solicit objective opinions concerning factors which each jury member considered to be major determinants in each of the six housing life-cycle stages. A cover letter which appealed to the professional for his/her participation and explained the purpose of the study was included with each questionnaire. Sixteen jury members agreed to participate in the study.

Both the review of literature and the jury responses have been utilized in developing the matrices designed to graphically illustrate the relationships between the factors and housing life-cycle stages. The matrices were used in Questionnaire II. Part One of Questionnaire II employed Likert-type scales to assess adequacy of variables as they were

identified with the housing life-cycle stages.

Part Two of Questionnaire II was designed to accumulate additional information concerning the use of the matrices. Jury members were asked to respond to open-ended questions to determine both uses and limitations of the matrices. Jury members also were asked to assess the housing life-cycle as it was presented. A cover letter which expressed appreciation for the participant's help with the study and explained the content of the matrix accompanied Questionnaire II. Follow-up telephone calls insured the return of materials.

The review of literature revealed several important areas which impact the housing mortality process. Factors as they relate to the social area were identified more easily than factors related to the economic, political and technological areas since most existing literature relating to the housing mortality process is in the social area. However, the literature search yielded general topical areas which suggested topical headings used to group factors into general categories. Also, the literature review revealed housing life-cycle stages which were organized to represent the housing mortality process.

Some increased awareness of the functional wholeness of the housing life-cycle may be mandatory as science, technology and political environments along with social climates change essential aspects of the course of the housing mortality process. Multidisciplinary studies can help define in practical and applicable terms what is common to all areas associated with the housing mortality process.

Since the objective of America's national housing policy is a decent home for families and individuals, understanding of the social, economic, political and technological determinants as they impact the housing

mortality process is important. It can be stated further that the determinants must be broken down into components and studied productively.

An important aspect of this study has been the contact with other professionals on a common issue. As multidisciplinary research is pursued, the Delphi Technique can be a means toward achieving vision and the perspective necessary for housing research to continue in its most vital role - to prepare for future generations of housing consumers. The methodology in this study produced a conducive atmosphere of commitment and a continuous developmental character for thinking and planning for uncertainty and change. If components of the housing mortality process can be identified, the process can be simulated and its relevance can be described to policy and decision makers as they formulate housing policy relative to this process.

Matrices illustrating the relationship between social, economic, political and technological determinants are the initial phase of evaluating the housing mortality process which is the key link to understanding what causes a unit to progress through the life-cycle stages. This relationship is a major area in which ambiguity and contradiction in the evaluation of housing stock lies. In addition, this aspect of the process has been unobservable and misunderstood in the past. It is further believed that the matrices can aid in the problem-solving process for achieving an acceptable level of competence in the area of evaluating the housing mortality process.

The Delphi Experiment

The Delphi experiment has been used to develop the six stages of the housing mortality process and to identify the factors which impact

the stages of this process. One of the most difficult phases of the Delphi method proved to be selection of jury members. The difficulty was made more complex due to the multiplicity of the four areas included: social, economic, political and technological.

The study did not pretend to provide all the answers in the identification of factors impacting the housing life-cycle, but it provided the necessary basis to ask appropriate questions for further development and understanding. The study's purpose was not to accurately identify the isolated determinants impacting the housing life-cycle stages. More important than trying to achieve an artificial degree of accuracy which will become invalidated by subsequent events such as economic fluctuations and technological advancements was the determination of major factors that impact the housing mortality process with a degree of understanding, given certain existing conditions relative to the housing mortality process.

Analysis of the Delphi findings relative to the most promising features of the matrix can be summarized by the following principle conclusions in each of the four areas.

Social. Jury members felt that the identification of factors likely to impact housing during a normal life-cycle was a positive feature of the matrix. However, additional analysis and clarification would be necessary.

Economic. The identification of factors likely to impact a housing unit during a normal life-cycle was believed to be a contribution to housing research. It was suggested that the identification of factors which impact housing life-styles would need to be considered in conjunction

with the factors identified in this study.

Political. The identification of factors which could impact supply and demand was believed to be important. Also, the descriptions of housing life-cycles were viewed as promising features of the study. Further research was suggested in this area also.

Technological. The identification of the six housing life-cycle stages and their definitions were viewed as promising features of the technological matrix. Additional subcategories for each factor were suggested.

Analysis of the Delphi findings relative to the limitations of the matrix can be summarized by the following principle conclusions in each of the four areas.

Social. Definition and clarification problems were believed to be primary limitations of the social matrix. More specifically, the factor of demographics should include ethnicity and marital status. Also, several jury members commented that the factors act dependently rather than independently.

Economic. It was suggested that the economic matrix should be more integrative and show the interaction among the determining factors and also that the degree of effect should be identified. It was felt that the connections between variables were unclear and should be considered in the design of the matrix. Gentrification and rehabilitation programs were believed to be important considerations in the study of the housing mortality process. The stages of merger and conversion were viewed as one stage as a housing unit is not likely to experience both

stages.

Political. The limitations of the political matrix appeared to be in evaluating the factors for the total life-cycle. It also was believed that center city, fringe, suburb and rural applications would pose different sets of conditions to be considered. Recycling of materials after demolition also needs to be considered. It was suggested that cycles may be skipped or repeated during the housing mortality process which makes straight-line projections sometimes inappropriate.

Technological. Applicability to "real world" situations would be difficult due to changes in occupancy often as a result of neighborhood changes instead of individual dwelling conditions. All dwellings do not go through the six life-cycle stages. Again, identification of the degree of impact each factor has on the life-cycle stage was believed to be necessary for understanding and clarifying the housing mortality process. In addition, the need for more factors such as operating costs was identified.

Analysis of the Delphi findings relative to the problem of overcoming these limitations can be summarized by the following principle conclusions in each of the four areas.

Social. Suggestions included further clarification of the factors. Also, identification of additional factors which impact the housing life-cycle such as family life style was suggested.

Economic. Further clarification and definition of terms were suggested for overcoming the limitations of the economic matrix. In addition, delineations of the macro and micro economic factors were

suggested.

Political. It was suggested that multiple cycles might be considered. Also, evaluation of one stage and one factor was suggested as opposed to evaluation of the entire life-cycle and one factor.

Technological. Jury members responded by offering suggestions for improvement of the technological matrix in several ways. It was suggested that the primary factor which contributes to the housing life-cycle is the community life-cycle which has an economic base and often is controlled through individual leadership. Therefore, the primary factor could be entrepreneurship. Also, the degree of impact (minor or major) each factor has on each life-cycle stage would be a necessary component in understanding the housing life-cycle. Clarification of factors for each of the four areas - social, economic, political and technological - was suggested.

Analysis of the Delphi findings relative to uses of the matrix in its present state can be summarized by the following principle conclusions in each of the four areas.

Social. The general feeling of the jury members was that the social matrix could be used as a basis for the formulation of additional matrices and eventually theory development in the area of housing mortality. Further definition and clarification of factors were suggested.

Economic. Jury members suggested further development of the economic matrix before using it to generalize the housing stock in any given location. Information obtained from the present matrix should be used to further develop matrices and formulate a basis for theory

development.

Political. Additional identification of political factors and their applicability to the housing life-cycle was suggested. The political matrix in its present form was believed to be a beginning to the formulation of usable theory in relationship to the housing mortality process.

Technological. Jury members suggested clarification of the technological matrix in its present form and a study of more complex areas as they interact with each life-cycle stage. The jury members felt that the life-cycle definitions were clear and an asset to the study. In addition, encouragement was expressed to the researcher in continuing the development of the matrices and further identification and clarification of factors as they relate to the housing mortality process.

In summary, major findings of this study were that Financial Considerations and Regulatory Considerations impact the entire housing mortality process. None of the technological factors impact the entire housing mortality process.

Implications and Recommendations for Further Research

Implications

Data acquired from the study were limited to four areas: social, economic, political and technological. Based upon the analyses of the data and interpretations of the findings, the following implications appear appropriate.

1. Housing authorities and policy makers should work toward a common objective regarding the housing life-cycle. This common objective

is the extension and successful life of residential units. This study provided a basis for identifying the primary social, economic, political and technological determinants which impact the housing mortality process.

2. The area of housing research can be viewed as an important link between social need and social improvement as they impact quality of life for individuals and families. The matrices can provide a means for evaluating and anticipating the phenomenon which might occur at any given stage in the life-cycle.

3. Long-range planning and anticipation of housing needs in the future are major issues within the housing area. The matrices provide a basis for consideration and for further development of comprehensive matrices which can further illustrate the complex relationships between social, economic, political and technological factors as they impact the housing mortality process.

4. The knowledge gained through this study contributes to the bank of knowledge concerning housing mortality. It further suggests both the complexity and the integrative nature of the factors and the housing mortality process.

5. The information presented in this study has implications for de-centrating currently held opinions of policy makers relative to the housing mortality process. The consideration of social, economic and political factors as they impact this process provides additional information for development of a housing mortality model.

6. Insurance companies that provide various types of policies for residential structures could consider the information in this study as a basis for determining a unit's housing life-cycle. Incorporation of

factors and consideration of their impact on the housing mortality process could be a consideration when appraising property and determining company options relative to residential units.

Recommendations for Further Research

The study has revealed the need for additional research in the area of housing mortality. Further investigation is needed before conclusions may be drawn concerning this process. Recommendations for further research include the following.

1. The study should be replicated utilizing a larger jury of experts in each of the four areas: social, economic, political and technological. This process would allow for statistical analysis to provide measures of degree and frequency for further identification of significant determinants as they impcat each housing life-cycle.

2. A longitudinal study should be conducted beginning with newly-constructed units and existing units at various stages of the life-cycle. This study would provide additional data and further validate the housing life-cycle as it is presented.

3. Research should be designed to replicate this study with the addition of subcategories of factors presented in this study. This application would further clarify and define specific factors relative to the housing mortality process.

4. Further research needs to be done on the individual factors presented in this study. Additional conceptual frameworks which represent the integrative nature of the factors relative to the housing mortality process should be developed.

5. Based on the results of this study, hypothesis-testing processes

should be developed to further analyze and define relationships. These processes would assist in determining reliability in various geographic locations.

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APPENDIXES

APPENDIX A

PARTICIPATING JURY MEMBERS

PARTICIPATING JURY MEMBERS IN THE SOCIAL AREA

Don Dillman
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U.S. Bureau of Census
Center for Demographic Studies
Washington, D.C.

Donald Sullivan
Urban Planning
Hunter College of City University New York
New York, New York

APPENDIX B

COVER LETTER ACCOMPANYING QUESTIONNAIRE I

Oklahoma State University

COLLEGE OF HOME ECONOMICS
Department of Housing, Design and Consumer Resources

STILLWATER, OKLAHOMA 74078
HOME ECONOMICS WEST BUILDING
(405) 624-5048

Return Address

Date

Jury Member's Address

Jury Member,

I am in the process of completing doctoral-level research at Oklahoma State University in Stillwater, Oklahoma. This study includes four conceptual models based on social, economical, technological and political determinants as they impact the life-cycle of residential housing stock. The models are being developed on a theoretical basis through the use of a jury to analyze the residential housing life-cycle.

Because of your expertise and writings in the area of housing, I am requesting your participation in the jury. Your comments will serve as a basis for development of a housing life-cycle model and to enhance the model's credibility as a tool for predicting housing life-cycle stages. In the next few months, I plan to develop a theoretical housing life-cycle model based on your initial responses. I would then like your evaluation of the model.

This problem area, although theoretical in nature, is basic to both housing policy formation and analysis of housing stock. Please complete and return the enclosed questionnaire to me by May 13, 1983.

Sincerely,

JoAnn Shroyer
Graduate Researcher

Margaret Weber, Ph.D.
Graduate Adviser

Enclosure

APPENDIX C

PRELIMINARY QUESTIONNAIRE I

PRELIMINARY QUESTIONNAIRE

Name _____

What primary political factors impact the housing life-cycle in each of the following stages?

1. SINGLE-FAMILY OWNERSHIP (newly constructed single-family unit with first owner)

2. MERGER (single-family unit which has been absorbed or combined with other dwellings)

3. CONVERSION (single-family unit which has been converted or changed to a non-residential use)

4. ABANDONMENT (single-family unit which has been deserted)

5. DETERIORATION (single-family unit in the process of quality depreciation)

6. DEMOLITION (single-family unit is demolished)

APPENDIX D

COVER LETTER ACCOMPANYING QUESTIONNAIRE II

Oklahoma State University

COLLEGE OF HOME ECONOMICS
Department of Housing, Design and Consumer Resources

STILLWATER, OKLAHOMA 74078
HOME ECONOMICS WEST BUILDING
(405) 624-5048

Return Address

Date

Jury Member's Address

Jury Member,

I appreciate your response to the questionnaire asking you to list factors which impact the six housing life-cycle stages: single-family ownership, merger, conversion, abandonment, deterioration and demolition.

The enclosed matrix pertains to the area of economic factors. It has been developed from a collective evaluation of jury responses in the economic area. I am requesting that you complete and return the questionnaire by September 9; I then can meet deadlines for graduation in December 1983. A composite matrix incorporating economic, social, political and technological factors will be developed when the computer analysis is completed.

Thank you for your willingness to participate on the jury to finalize and validate the housing life-cycle matrix. I look forward to reading your impressions regarding both the individual matrix and its use in the housing research area.

Sincerely,

JoAnn Shroyer
Graduate Researcher

Margaret Weber
Margaret Weber, Ph.D.
Graduate Adviser

Enclosures

APPENDIX E

INSTRUCTIONS AND DEFINITIONS FOR QUESTIONNAIRE II

As a jury member, you are being asked to respond to two types of questions: questions regarding identified factors which impact housing life-cycle-stages and general questions relating to the use of the information. Part One consists of twelve questions which are specific and require you to rate a given factor by placing a circle around the number in the column which best represents your opinion. If you elect not to answer a question, please place a check on the line to the right of the scale. In addition, space is provided below the matrix for you to amplify or qualify your responses. Questions 13 through 17 in Part Two are open-ended; your responses to these questions will be in the form of written comments.

Definition of housing life-cycle stages.

Single-family ownership - newly constructed single family unit with first owner.

Merger - single-family unit which has been absorbed or combined with other dwellings.

Conversion - single-family unit which has been converted or changed to a non-residential use.

Abandonment - single-family unit which has been deserted.

Deterioration - single-family unit in the process of quality depreciation.

Demolition - single-family unit is demolished.

APPENDIX F

SOCIAL MATRIX

Part One. Reactions to identified factors which impact housing life-cycle stages.

Part one of the questionnaire attempts to identify, through the use of a matrix, factors which impact a single-family residence at each of the six stages: single-family ownership, merger, conversion, abandonment, deterioration and demolition. If one or more of the jury members answered, an x was placed in the cell. Number placed above an x indicates the number of responses.

SOCIAL

Factors	HOUSING LIFE-CYCLE: SINGLE-FAMILY OWNERSHIP	MERGER	CONVERSION	ABANDONMENT	DETERIORATION	DEMOLITION	In your opinion, how adequately does each factor listed below identify the major variables in the housing life-cycle? adequately 1	2	3	inadequately 4	5	no response
Demographics (education, occupation, sex, age, income)	3 x			1 x	1 x		1	2	3	4	5	___
Family Size and Composition	2 x	3 x	1 x		2 x		1	2	3	4	5	___
Population Growth and Geographic Composition of Population	1 x		1 x		3 x		1	2	3	4	5	___
Public Health and Safety				2 x	2 x	1 x	1	2	3	4	5	___
Maintenance Cost							1	2	3	4	5	___
Neighborhood Services and Conditions	1 x		1 x	2 x	2 x	1 x	1	2	3	4	5	___
Structural Characteristics (general physical)							1	2	3	4	5	___
Selected Structural Characteristics (specific physical)	1 x					1 x	1	2	3	4	5	___
Financial Considerations (national, state, local)	2 x		1 x	1 x	1 x		1	2	3	4	5	___
Availability of Public Services							1	2	3	4	5	___
Regulatory Considerations (codes, zoning)	1 x	1 x	2 x		1 x		1	2	3	4	5	___

APPENDIX G

ECONOMIC MATRIX

Part One: Reactions to identified factors which impact housing life-cycle stages.

Part one of the questionnaire attempts to identify, through the use of a matrix, factors which impact a single-family residence at each of the six stages: single-family ownership, merger, conversion, abandonment, deterioration and demolition. If one or more of the jury members answered, an x was placed in the cell. Number placed above an x indicates the number of responses.

ECONOMIC	HOUSING LIFE-CYCLE: SINGLE-FAMILY OWNERSHIP	MERGER	CONVERSION	ABANDONMENT	DETERIORATION	DEMOLITION	In your opinion, how adequately does each factor listed below identify the major variables in the housing life-cycle? adequately			inadequately		no response
Factors												
Demographics (education, occupation, sex, age, income)	1 x				2 x	1 x	1	2	3	4	5	___
Family Size and Composition							1	2	3	4	5	___
Population Growth and Geographic Composition of Population							1	2	3	4	5	___
Public Health and Safety	1 x			2 x	1 x		1	2	3	4	5	___
Maintenance Cost	1 x			2 x	2 x	2 x	1	2	3	4	5	___
Neighborhood Services and Conditions	2 x	1 x	1 x				1	2	3	4	5	___
Structural Characteristics (general physical)		1 x					1	2	3	4	5	___
Selected Structural Characteristics (specific physical)		1 x					1	2	3	4	5	___
Financial Considerations (national, state, local)	1 x		1 x	1 x	1 x	1 x	1	2	3	4	5	___
Availability of Public Services	1 x						1	2	3	4	5	___
Regulatory Considerations (codes, zoning)	2 x		1 x	1 x	1 x	1 x	1	2	3	4	5	___

APPENDIX H

POLITICAL MATRIX

Part One: Reactions to identified factors which impact housing life-cycle stages.

Part one of the questionnaire attempts to identify, through the use of a matrix, factors which impact a single-family residence at each of the six stages: single-family ownership, merger, conversion, abandonment, deterioration and demolition. If one or more of the jury members answered, an x was placed in the cell. Number placed above an x indicates the number of responses.

POLITICAL

Factors	HOUSING LIFE-CYCLE: SINGLE-FAMILY OWNERSHIP	MERGER	CONVERSION	ABANDONMENT	DETERIORATION	DEMOLITION	In your opinion, how adequately does each factor listed below identify the major variables in the housing life-cycle? adequately			inadequately		no response
Demographics (education, occupation, sex, age, income)		1 x			1 x		1	2	3	4	5	___
Family Size and Composition							1	2	3	4	5	___
Population Growth and Geographic Composition of Population		1 x			1 x		1	2	3	4	5	___
Public Health and Safety							1	2	3	4	5	___
Maintenance Cost				1 x			1	2	3	4	5	___
Neighborhood Services and Conditions	1 x		1 x		3 x		1	2	3	4	5	___
Structural Characteristics (general physical)				1 x		1 x	1	2	3	4	5	___
Selected Structural Characteristics (specific physical)				1 x			1	2	3	4	5	___
Financial Considerations (national, state, local)	4 x	1 x	2 x	3 x	3 x	1 x	1	2	3	4	5	___
Availability of Public Services	1 x						1	2	3	4	5	___
Regulatory Considerations (codes, zoning)	4 x	3 x	3 x	4 x	4 x	3 x	1	2	3	4	5	___

APPENDIX I

TECHNOLOGICAL MATRIX

Part One: Reactions to identified factors which impact housing life-cycle stages.

Part one of the questionnaire attempts to identify, through the use of a matrix, factors which impact a single-family residence at each of the six stages: single-family ownership, merger, conversion, abandonment, deterioration and demolition. If one or more of the jury members answered, an x was placed in the cell. Number placed above an x indicates the number of responses.

TECHNOLOGICAL

Factors	HOUSING LIFE-CYCLE: SINGLE-FAMILY OWNERSHIP	MERGER	CONVERSION	ABANDONMENT	DETERIORATION	DEMOLITION	In your opinion, how adequately does each factor listed below identify the major variables in the housing life-cycle? adequately 1	2	3	4	inadequately 5	no response
Demographics (education, occupation, sex, age, income)						1 x	1	2	3	4	5	___
Family Size and Composition						1 x	1	2	3	4	5	___
Population Growth and Geographic Composition of Population							1	2	3	4	5	___
Public Health and Safety							1	2	3	4	5	___
Maintenance Cost	1 x	2 x		1 x	1 x	1 x	1	2	3	4	5	___
Neighborhood Services and Conditions			2 x	1 x			1	2	3	4	5	___
Structural Characteristics (general physical)	4 x	2 x	3 x	3 x	2 x	2 x	1	2	3	4	5	___
Selected Structural Characteristics (specific physical)	1 x	4 x	3 x	2 x	2 x	1 x	1	2	3	4	5	___
Financial Considerations (national, state, local)	1 x	1 x	1 x				1	2	3	4	5	___
Availability of Public Services					1 x		1	2	3	4	5	___
Regulatory Considerations (codes, zoning)	1 x	1 x	1 x	3 x		2 x	1	2	3	4	5	___

APPENDIX J

OPEN-ENDED QUESTIONS FOR QUESTIONNAIRE II

Additional Comments:

12. The matrix offers a foundational theory for identifying factors which impact housing at each of six housing life-cycle stages. How adequately does the matrix correspond to your perceptions of housing life-cycle stages?

adequately			inadequately		no response
1	2	3	4	5	_____

Part Two: Open-Ended Questions.

The next five questions are designed so that you can provide additional information and share your impressions, comments, concerns and suggestions regarding the matrix.

13. What is your field of expertise?

14. What do you consider to be the most promising features of the matrix?

15. What do you consider to be the limitations of the matrix?

16. What are your suggestions for overcoming these limitations?

17. In your opinion, what uses can be made of the matrix?

Name of Jury Member _____

VITA

JoAnn L. Shroyer

Candidate for the Degree of

Doctor of Philosophy

Dissertation: HOUSING MORTALITY PROCESS BASED ON SOCIAL, ECONOMIC, POLITICAL AND TECHNOLOGICAL FACTORS

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Education: Graduated from Sonora High School, Sonora, Texas in May 1959; received Bachelor of Science degree in Home Economics with emphasis in housing and interiors from Texas Tech University, Lubbock, Texas in 1977; received the Master of Science degree in Home Economics with emphasis in family management, housing and consumer science from Texas Tech University, Lubbock, Texas in Summer 1981; completed requirements for the Doctor of Philosophy degree in Home Economics with emphasis in housing, interior design and consumer studies at Oklahoma State University, Stillwater, Oklahoma in December 1983.

Professional Experience: Ceramics Instructor, self-employed, Lubbock, Texas, 1970-1976; Interior Design Intern, Spears Furniture, Lubbock, Texas, 1979; Teaching Assistant and Research Assistant, Texas Tech University College of Home Economics' Department of Family Management, Housing and Consumer Science, Lubbock, Texas, 1977-1981; Research Assistant, Oklahoma State University Extension, Oklahoma State University, Stillwater, Oklahoma, 1982; Instructor, Texas Tech University College of Home Economics' Department of Family Management, Housing and Consumer Science, Lubbock, Texas, 1981-present.