Market Innovation, Rational Housing Supply and Urban Quality at the Neighbourhood Scale

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Market Innovation, Rational Housing Supply and Urban Quality at the Neighbourhood Scale

Valentina Puglisi [1], Alberto Celani [1]

[1] Politecnico di Milano, Department of Architecture, Built environment and Construction engineering (ABC), Via Bonardi 9 - 20133 Milano – Italy

valentina.puglisi@polimi.it

Abstract. Innovation of product, process and markets are the three categories to assess the improvement of a sector. This document is aimed to provide a review of papers about innovation in housing market and analyses solutions adopted by the international market in terms of definition of attributes of housing products. Enlightening aspects linked to quality attributes of housing products and it has been tried to read a common scheme in any study analysed to provide solutions to set innovation hints to enhance market innovation in the sector. The idea of choice, user and buyer categories definition, assessment and rating system is the backbone of the paper, as the parallelism between marketing of industrial goods and services and built environment objects. Quality of the neighbourhood and the idea of an ex-post assessment is the theme behind the last case presented, based on a research made by ABC Department of Politecnico di Milano in a neighbourhood in Milano, aimed to assess its quality.

1. Introduction

Environmental performances assessment and drivers of choices in promoting dwellings are topics apparently running in parallel but it must be considered the backbone of the category of choice from the consumer. Defining the housing buyer as a consumer the focus of the process is directly shifted on the idea of purchase, the customer is the subject of a purchase in a retail shop, for example.

Following this parallelism, we can assume the consumer as the end user of the Real Estate asset, it can be possible to draw a linear relationship between the two subjects in different scenario but it must be considered the typical peculiarity of the two different environment of purchase: manufacturing of common goods and Real Estate. The purchasing process of manufacturing goods has a richer pattern of data creation: usually when customers purchase a common good in a traditional market the creation of data and the data mining and analytics possibilities are potentially infinite and a direct boost for the business growth.

In Schafer, Konstan & Riedl the inner theme opens a window on a new topic in customer behavior and purchasing process: “while E-commerce hasn’t necessarily allowed businesses to produce more products, it has allowed them to provide consumers with more choices” [12] appear as crucial because brings the thesis that as the customer has to process a huge number of information before purchasing

goods, and not only producing data as it has been stated yet. Mass customization of common goods and potential customer profiling is a way to present the goods to the market.

The recommender systems used by e-commerce websites are the tool used to inform and drive the potential customer to the product into the e-shop. It must be considered the aspect of the relevance of the information available and usable about the potential customer and also the process of purchasing and the market (in this case a website) if developed a parallelism between e-commerce of goods and housing marketplace. It must be considered also another layer of complexity, the origin of the product. This study is focused into the development of an idea of ease of purchasing process for the buyer and the possibility for the market to produce housing responding to the needs of the potential customer, according to the right quantity and quality requested by the market.

In the process of determination of the equilibrium between dynamic markets of common goods and slow-paced markets of housing it must be considered also the different type of purchases enabled into real estate bouquet of occasions to spend money: purchasing of housing, renting of housing and buying services connected with the housing asset (loans, side services to the building, person and management of the sustainability of the investment such as insurances and plans of renewal and upgrade of the asset).

2. Types of environmental impact assessment

There are two main types of environmental impact assessment at international, European and national level:

- Strategic Environmental Assessment (SEA): is a decision-making support process the main aim of which is to estimate the environmental effects of plans and programs before their approval, during their implementation and at the end of their period of validity. Currently, the SEA is applied in Italy in fields such as: water management, telecommunications, tourism, town and country planning or land use. It also supports the planning process on a large-scale (at city, regional and national level).
- Environmental Impact Assessment (EIA): is referred to the design and authorization of specific projects, even on a territorial scale, and aims to assess their environmental impacts normally linked to an authorization process.

These evaluations have a static character and do not consider the interaction of several variables and how they react in relation to changes caused by external factors. In particular, in the case of interventions for new developments (greenfield) or re-development (brownfield): construction of new districts, re-functionalization of old industrial buildings, processing of degraded parts of the city, which in the context of environmental assessments are considered interventions at a micro-scale, no practical tools are available supporting the analysis of the consequences due to design choices and the actions needed accordingly.

As the design activity is affected by the lack of an integrated view [9], in the current practice the interventions are conducted by specialists and are the sum of specific contributions and not the best result of a real and effective integration of skills. A real integration can only be realized if we can systematize the process of assessing, checking and evaluating the results of the different contributions.

The planning of measures for the remediation of ambient air quality is therefore up to now carried out at the regional scale, but little is worked out at the finer scale of a district, also because of the supposed lack of operating analytical tools; the perception, on the part of authorities, planners and citizens, that the climate may be somewhat influenced by urban planning at district scale, is still weak. This theme is generally regarded as pertaining to a global scale and operations such as a SEA of a neighbourhood tend to contribute to the theme with the quantification of the contributes to global greenhouse gas budget [11].

3. Leed for Neighbourhood Development

Assessment tools are now available able to clarify the role of the planning of actions to the scale of neighbourhood on local climate. The nearest instrument to this approach currently existing is the Leed

Neighbourhood protocol (Leadership in Energy and Environmental Design), which is an American rating system for the design, construction and operation of high performance green buildings, homes and neighbourhoods. The main weakness of this protocol lies in the fact that it originates in a territorial context that is deeply different from the European one [8].

Leed for Neighbourhood Development bases its approach on the considerations related to the use of land and to the environmental issues, typical of the U.S. model: sprawl (not rational use of land), isolated portions of land only accessible by highways, mono-functional districts and districts on a car scale, characterized by pollution, respiratory disease and hostile spaces to the pedestrians. Leed for Neighbourhood Development hopes for the construction of districts recalling the places and the urban shape of traditional districts:

- open space of aggregation recognizable as the heart of the community;
- buildings and roads on a human scale;
- wide sidewalks;
- buildings behind the sidewalks to create a continuous road curtain;
- shops overlooking the road;
- variety of envisaged function;
- alive places days and nights;
- interesting street *fornitures*;
- multiple intersections and small blocks;
- trees, etc.

4. Strategic market measures and profiling

Considering re-generation as the development of a former industrial area as "abandoned, idled or underused industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination" [13] and the state of the art of over-production of residential buildings in the developed world [4] must be considered the category of quality of the product as a possible driver to absorb the stock of planned buildings in a way that a better-quality building can respond in a better way to the demand of the potential market.

Regenerating brownfield to create new housing is a difficult type of Real Estate operation in case of housing markets really competitive, with a slow demand and a low interest from the potential buyer, especially in case of lack of information and analysis. In order to better analyze the problem it must be considered the idea of production of buildings and the idea of absorption for the market. The idea behind the model is that a production of goods in the manufacturing environment can be compared to production of built environment goods. The framework of the marketing of the housing product can be as in figure 1.

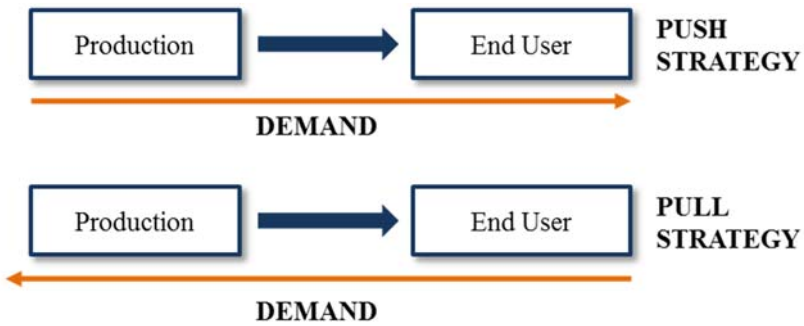

Figure 1. Push and Pull strategy in building objects

In the case of Push Strategy is the "production" part of the process (i.e. the subject who produce and trade or place the object) that, once having produced the objects, try to place them on the market. In this case, often, the research on the potential investor is weak and it is not connected with a demand

analysis. A Pull Strategy can be translated in construction industry as an observation of the market and a phase of proposition of a set of built environment objects in line with the market needs. The connection between the end user and the strategy of product placements is directly linked with the level of research of the Production sector. The definition of the potential buyer, defined as a customer or consumer of a common good can be seen in table 1, as studied in literature [14].

Table 1. Definitions of customer behaviour [4]

1	Activities people undertake when obtaining, consuming and disposing of products and services .	Blackwell, Miniard & Engel (2006, p. 4)
2	The study of how individuals groups, and organisations select, buy, use, and dispose of goods, services, ideas, or experiences to satisfy their needs and want.	Kotler & Kelle (2008, p. 150); Solomon (2008, p.7)
3	Consumers' behaviour in seeking, purchasing, using, evaluating and disposing of products and services that they expect to satisfy their personal needs.	Schiffman & Hansen (2012, p.5)
4	Consumer behaviour reflects the totally of consumers' decisions with respect to the acquisition, consumption, and disposal of goods, services, activities, experiences, people, and ideas by human decision-making units over time.	Hoyer & Macinnis (2010, p. 3)

5. Variables, attributes and segmentation of the consumer as drivers of choice in the housing market

The proper solution for a better understanding of the drivers of success of a housing project for the market has been analyzed considering as categories of choice the classical, economically rational consumer the factors: "place, shopping, and schools; quality of neighbourhood life and availability of public services; costs, including price, taxes, and travel costs; and dwelling characteristics, such as age, number of rooms, type of appliances" [10].

The market group strategy in the promotion and development of new housing projects [2] is analyzed though a study of the demand in its peculiarity as category of people rural to urban migrants defining a potential market for the dwellings created in the urban fabric, considering the drivers of choice as peculiarity of the city and linking directly to different transition priorities for the category analyzed:

- employment (i.e. living in the city for the migrant from the countryside will be a choice driven by housing-employment driver, living in conditions that maximize the time available for work);
- strong saving orientation linked with the uncertainty of the new condition and the orientation for diversifying risk;
- mobility priority: it affects the willingness to buy or renting homes and affects the propensity to commit a long term contract, migrants move from different part of the city, from city to city and from city back to the country with a different choice priority from city native buyers;
- family life, the desire to reunite families in the new condition can affect the categories of choice of the migrant.

This approach dividing the potential customer by category can be used for better understanding a modelling a different form of designing and promoting a dwelling. The mix between understanding the potential customer of the Real Estate investment, dividing it into categories based on the priorities of choice bases the strategy to promote the dwellings into the market for the developer can provide better data to the investor to provide the proper product to the market.

In Goodman & Thibodeau [7] the hedonic prices methodology is used to develop a system to sub-categorize different characteristics of the neighbourhood dividing structural characteristics and amenities as two different classes of interest for the potential buyer. Hedonic price methodology is based on the willingness to pay of the potential buyer of the housing, in this case, for different sub-characteristics of the asset. In Goodman & Thibodeau's research [7] a hierarchical linear model in which characteristics (dwelling and neighbourhood characteristics) and submarkets. Submarkets (e.g.

single-family detached, row house, town home, condominium), structural characteristics (property age-housing consumers may have a strong preference for newly constructed properties or a preference for historic properties), neighbourhood characteristics (e.g., public education, public safety) according to the last quoted research are the drivers of the price. This type of approach is parallel with the approach as segmentation of the household economic condition [2]. Usually the demographic approach is taken into account by the planner, forecasting migration processes into the cities but the developer is not currently performing analysis with strong data in this direction.

A cased based on the financial variables for determining the price of listings analyses three categories of variables so called [6]: financial variables, continuous variables, dummy variables. Financial variables (listing price, selling price, type of loan acquired by buyer, type and amount of loan of seller, property taxes before sale, real estate commission), continuous variables (number of bedrooms number of baths, age, lot size, square feet of living area, room sizes, distance to bus, distance to shopping) and dummy variables (pool, wall-to-wall carpeting, drapes, patio, covered patio, enclosed patio, laundry room, laundry area, 220v to property, sprinklers, paved street, yard access for boat or rv, dishwasher, view, type of construction, zoning, type of garage, type of heating, type of air conditioning, type of tv antenna, type of sewer service, type of fencing, type of built-ins, condition – excellent / good / fair or poor, fireplace, type of flooring) in the paper considered are the driver that satisfy the likelihood condition in the potential buyer.

In the paper already quoted about the case of Wuhan residential market [4] is defined the category of “housing attributes” as “location” and “aesthetics” and define four purchase factors: the environment surrounding houses (noise, width of road and passageways, greenery of adjacent street, rain water drainage system, street lighting and presence of footpath), the quality of services provided by suppliers (reliability, empathy, responsiveness, tangibles and assurance) and housing exterior design and space (the appearance of the house/building, presence of garden and size of garden, appearance of external walls, and exterior spaces).

Defining quality and quality perceived by the customer is a crucial point for the developer of housing. Defining the potential customer and the potential user is a driver to success for a project. Defining the potential customer for any project can be a complicate model: multiple interactions between different end users will determine the choice.

In the case of home buying the decision can be taken by two different players (joint decision making) for the same purchase (i.e. the case of a couple willing to buy a new or used house for living) and the system to assess the decision drivers can have a list of hard-to be-investigated options. Another layer of complexity can be represented by the extreme local characteristic of the asset, it is hard to be replicated an assessment of purchasing choice drivers for a global market. The push/pull model (presented in figure 1) is crucial at this point to define which characteristics are part of the market or part of the buyer’s sphere and what’s usable by marketers as tool to promote dwellings.

6. A new protocol by Politecnico di Milano

The project team received in 2012 a private commission, requiring to assess the environmental performances of a large urban project in the City of Milan: The CityLife district.

A new approach, which aims to simulate through specific modelling the constructions and development projects, could be able to give concrete suggestions to improve their quality and, above all, really contribute to an improvement in citizens’ quality of life. This goal can be achieved only identifying indicators that can be assessed in an integrated way and suggesting corrective actions/modification and/or integration of the projects.

Assessing Environmental performance for urban districts, bring the state of the art to the definition of drivers of quality for the neighbourhood according to drivers measurable and globally recognized as respondent to the average potential customer desire [5]. Once matched all the common characteristics usually chosen by developers in the market (in this paper defined housing general attributes) the CityLife project developer commissioned a research to Architecture Built Environment and Construction Engineering Department of Politecnico di Milano in order to define through an

assessment of top-notch and measurable attributes of its project. This is a project aiming at promoting innovative application of technologies and systems in support of "urban environment" in order to assess the environmental quality at a microscale level in a dynamic way. The model represented by a set of indicators, refers to the three main areas of activity:

- the measurement of microclimate comfort;
- the measurement of air quality;
- the measurement of acoustic comfort.

The theme of perceived quality for the housing buyer has been declined considering as consolidated the general attributes (i.e. quality of the architecture, quality of the location, aesthetics, signature projects by design architects). The experience must be considered as interesting because the assessment, commissioned by the owner of the development project to a local University of primary importance in the international ranking (Politecnico di Milano), is aimed to assess after the construction of the buildings an idea of measurable quality, communicated to the market to give also to marketers a powerful tool to push the product in an efficient way according to figure 1 strategy. One of the ideas of the owner has been pursuing a competitive advantage.

6.1. The CityLife district in Milan

CityLife is the company committed to redeveloping the ex-historical district of the Fair in Milan. This area, free by the move of the Fair plant in Rho-Pero zone, has been object of an international tender of urban qualification, that has involved companies, financiers and great names of the international architecture (figure 2).

The contest winner was CityLife, with a project signed by Zaha Hadid, Arata Isozaki and Daniel Libeskind. CityLife has assured the realization of the plan thanks to a shareholder, participated by 2 main insurance groups in the world: Generali Real Estate and Allianz. The Project started in 2009 and It will be completed in 2023. The project area measures 365.000 square metres and the Park measure 170.000 square metres. It is one of the 6 greatest parks of Milan. Residential area has been projected by Libeskind and Hadid. Tertiary area has been projected by Hadid, Libeskind and Isozaki and measure 130.000 square metres of Gross Leasable Area. Trading area, that it is the same of tertiary area, is composed of a plate at the base of 3 towers with subway stop.

6.2. *Market innovation at urban and neighbourhood scale*

A specific-oriented modelling will simulate the real conditions of the neighbourhood/district by considering all the internal and external factors.

The model is able to bring a benefit both to the Local Public Administration, which may require this type of assessment on the occasion of complex projects and to the promoters/developers, which could possibly make changes to the initial project should the evaluation identify critical issues related to the design choices (orientation of buildings, quality and presence of green, traffic emissions inside the neighbourhood, etc.).

The main result of the project is the delivery of a protocol for environmental good practice in urban planning and design at the district scale. The project will also monitor the socio-economic impact under several points of view. The work focused of four areas of research: a 3D rendering of the project area and its surroundings; a determination of the quality of urban life, at the level of the urban districts, based on international protocols; measurements of air quality and comfort of the microclimate in the finished district, through specific modelling; measurement of acoustic comfort in the finished district, through specific modelling. Leed for Neighbourhood Development has been used for retrieving indicators: availability of pedestrians streets, dependence on vehicular traffic, proximity to workplaces, cycle paths and pedestrian areas, parking systems, usability [8].

Figure 2. CityLife district in Milan, Italy

Air quality is the second driver assessed through calculations to: quantify the benefits and compare the solutions to an environment derived from a more traditional urban context; highlight the critical points of the district, driving the project of the still-to be-completed part of the neighbourhood to be implemented in the direction of improvement of the performances. In order to assess the air quality, the steps of the assessment are: selection of weather dispersive episodes and weather simulations; definition of three dimensional computational domains and of the pollution sources and calculation of emissions, study of the microscale; study of the microclimate, comparison with the sampling area [5].

A study of the acoustic comfort with the purpose of evaluation with average values has been performed with the same grade of depth of the two already quoted examples of analysis. Urban quality, Air quality and Acoustic comfort are the three categories of quality of the neighbourhood presented and assessed by the study case “CityLife assessment by department ABC of Politecnico di Milano”, a study performed using technologies and hybridizing expertise from different fields of

science, determining a fully measurable scale of parameters to define urban quality of the neighbourhood.

7. Results and discussions

Defining potential user and potential buyer of a housing project is the first key element of a market to be defined for a developer or a marketer. Once defined the two categories of "Who will buy?" and "Who will use the product?" the challenge is defined by the categories of choice, usually defined as characteristics of the built environment or of the single building difficult to be defined (ex-ante), assessed (ex-post) and measured (ex-ante and ex-post).

Push and Pull strategies are part of the marketing definition used by the actors of manufacturing world and can be declined for the Real Estate scenario as well, when aimed to sell the products of construction industry. A deep assessment study of strong and measurable drivers (easy to be communicated) can ease:

1. the market absorption of the housing products already on the market, giving a competitive advantage on the market of vacancies (ex-post);
2. the to the development projects aimed to build according to measurable quality new housing for a wiser and more informed potential user and customer (ex-ante) as it happens in the models presented in the beginning of this paper, the ones linked to e-commerce.

Communicating quality, collecting information on the environment (and about the potential user's willingness to pay for measurable characteristics of the neighbourhood project) and measuring performances according to the adaption of protocols can be the way to produce better housing in the built environment. It can be, also, the way to create a push strategy of marketing for delivering products that meet needs of the user not already expressed or to create a pull strategy when the project responds to a not well defined need for quality of living.

Creating a higher level of social awareness, a reference for future projects and a way to attract more conscious potential investor, buyer and user is the way to promote a system able to assess measurable quality for the built environment and for modern cities. Housing potential buyer must be profiled using innovative instruments, maybe the ones retrieved from market innovation in e-commerce, where the behaviour of the potential customer is driven to the best product available. Information, market innovation and competition among similar products is a theme also in Real Estate market, a system to assess the product quality is a key to success for marketer and, in a sense, a possible way to produce better quality housing products, better responding to users' needs and to universally and univocally measurable quality drivers. The systems to assess the quality of the neighbourhood must be, first of all, well linked to the local fabric. International rating systems must be adapted to social, cultural, environmental situation and scenario of any country or, even city. The potential user profiling and the definition of the scenario is a crucial part of the process of innovation of the market.

8. Conclusions

According to Agenzia delle Entrate report [1] in the housing sector "North area (+24,1%) outpaces the rest of the Country with chief towns markets (+22,9%) proving slightly stronger than other towns (+19,4%), except in Centre regions. All major cities residential sales are up (figure 3 and table 2).

Torino reach an all-time record of +37.2% while Milano further improves its growth rate to 26%. Genova rises above 25% too. Roma trails behind with +12.5% while Palermo province has the lowest rate both inside (+5.5%) and outside (+2.7%) the chief town" [1]. The growth rate set at 26% in Milan can be linked to the increasing quality of the new building product, created to respond to the crisis in terms of sales in the previous years, resulting in a huge amount of unsold stock of Housing on the market, struggling to meet a buyer [3].

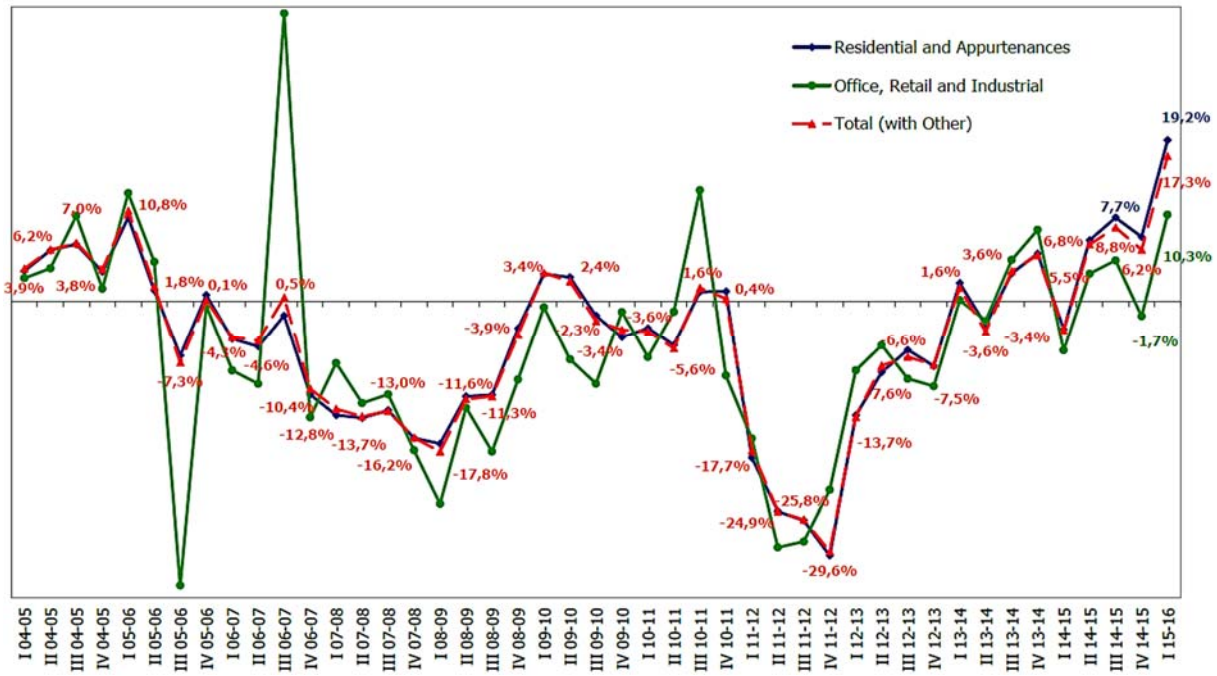

Figure 3. 2004 Q1 - 2016 Q1, year over year percentage changes by real estate sector [1]

Table 2. Quarterly residential NTN and year over year percentage changes for major cities [1].

Chief towns	III Q 2015	IV Q 2015	I Q 2016	% change III Q 14-15	% change IV Q 14-15	% change I Q 15-16
Roma	6.340	7.839	6.564	4.6%	4.5%	12.5%
Milano	4.108	5.373	4.804	18.2%	23.6%	26.0%
Torino	2.268	2.679	2.847	15.7%	9.6%	37.2%
Genova	1.264	1.557	1.468	5.6%	14.7%	27.8%
Napoli	1.370	1.596	1.584	21.2%	3.9%	22.8%
Palermo	991	1.184	1.084	9.2%	14.8%	5.5%
Bologna	1.039	1.250	1.218	6.1%	7.3%	19.3%
Firenze	975	1.157	1.063	14.1%	10.3%	21.7%
Total	*18.335*	*22.636*	*20.632*	*10.8%*	*10.8%*	*20.7%*

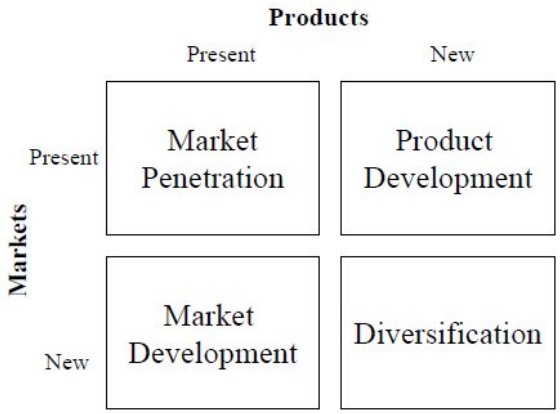

Figure 4. Ansoff Matrix: a strategic planning tool that provides a framework to help executives, senior managers, and marketers devise strategies for future growth

The idea of the Real Estate market for housing as a market in which companies have to put their investments and efforts to improve their "Market Penetration", "Product Development", "Market Development" and "Diversification" is a result of the observation of the Real Estate market in the last 25 years by the Gesti.Tec Laboratory at Politecnico di Milano and the idea for developing a product responding to the end-user needs is a category of Technology of Architecture and can be modelled through the Ansoff Matrix (figure 4), developed for competitive markets and easy to be adapted for housing market. The conservative approach of "market penetration" is the most difficult and has been the strategy adopted by a vast amount of companies producing housing in Italian cities in the past. Market Development strategies are risky because they consist on a research for new potential users of the housing, selling the same product to new potential buyers. Product Development strategy is the one of product development, innovation in the core of the product sold on the market. The strategy of Diversification is more connected to the idea of strategic positioning of the building company on the market, selling for example not only the building product but also services and in this case a product with an added value in terms of quality of the neighbourhood.

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