

The grass roots participation create new value? Simulation models for bottom-up enhancement processes of public real-estate properties

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Abstract

The enhancement of real-estate public property and its use for economic purposes is a central theme in public policy. The value of state, region and other local government assets exceeds 400 billion of Euros: for this reason, in the last few years a number of public property laws have been followed, decreed on the one hand to rationalize maintenance costs of the assets, on the other hand to draw up financial flows and settle public debt.

The economic value creation of public buildings is traditionally carried out by means of instruments aimed at liberalizing the forms to use the assets, with the consequence of less convincing results. From the numerous bidden auctions despite substantial rebates emerges the need to develop new forms of enhancement that overcome the traditional scheme that combines the value with the flexibility of new functions.

Recently in Italy, new forms of enhancement of public real-estate properties have been established, these are based on initiatives promoted by a citizen who is eager to carry on their cultural, creative and entrepreneurial projects within unused assets. The success of these bottom up enhancement processes has highlighted the creation of a new economic and social value linked to restructuring operations and the new uses.

If scientific literature has confirmed the creation of a social value in the form of new social capital, it is nevertheless important to assess whether and how such grass-roots participation can also create economic value in the enhanced assets. The paper therefore proposes to estimate the value of bottom-up processes that are structurally marked by a high degree of uncertainty.

The proposed estimation procedure uses DCFA combined with specific estimation methodologies

(Dynamic Monte Carlo) to measure the uncertain components of the model.

The first results highlight the formation of real estate values that – albeit distant from the assessments made at the stage of maximum market values – prove to be

significant and support the innovative policies of real estate valuation not only on the basis of choices related to the development of the social capital, but also more purely on the basis of expectations of increase in asset value.

1. INTRODUCTION

The severe decline in the real estate market, which in recent years has characterized Italian economy, has resulted significant consequences in the policies for the enhancement of public real-estate properties.

For a long time, on the basis of this issue there was the hypothesis to create value in the assets by means of supply-centered policies. In particular, public policies were focused to urban planning and asset management procedures that can maximize the effectiveness of local authorities' actions in relation to requests from private operators (Agenzia del Demanio, 2015, ANCE, 2015).

The major difficulties faced by administrations in the enhancement of property – a large number of deserted auctions, unsold property, stalled or negotiating projects – imposed a radical revision of the current public policies framework of enhancing public property (Antoniucci *et al.*, 2015; Attardi *et al.*, 2017; De Paola *et al.*, 2017).

The many cases of bottom-up mobilization for the recovery and enhancement of public assets reflect a new development strategy that explores, even temporarily (Inti, 2011), alternative forms of use of public property assets.

Owner administrations create value in renewed ways: they promote a new demand, promote their design and entrepreneurship by entrusting resources that are otherwise unused or underused. It is not (only) to deregulate urban and building regulations, but to assign real-estate resources for those capable of innovation in the most different sectors of the economy and society (Antoniucci & Marella, 2016; Cerreta & Poli, 2017).

Bottom-up processes loosen the link with traditional planning where everything can be envisaged in differently defined ways. They do not propose to implement a clear vision at the level of the urban planning, but trigger human and social capital mobilization processes to open up a range of options subsequently developed by the local community.

The positive externalities associated with bottom-up processes are manifold: similar processes help to regenerate abandoned or under-utilized areas and buildings; produce employment, increase the quantity and quality of local community relationships; they contribute to the economic development of the area and support local welfare services.

From the purely real estate point of view, bottom-up operations are so significant in social terms as little

appreciated in terms of strictly real-estate economics themes. The purpose of the paper is therefore to estimate the value that bottom up processes, structurally marked by high degree of uncertainty, determine in the public real-estate assets.

The paper is divided into five parts. The first summarizes the main features of the bottom-up processes to enhance public real-estate properties. The second one deepens the elements of value creation and the uncertainty that distinguishes them on the basis of a case study, the old former Ferrara fire station. The third paragraph develops the model of estimation characterized by the use of stochastic simulation to take into account the uncertainty of the input variables. The fourth part illustrates the results of the simulation, while the fifth, finally, interprets the overall results of the research.

2. THE GRASS-ROOTS PARTICIPATION TO GENERATE NEW VALUE IN PUBLIC REAL-ESTATE PROPERTIES

In Italy and internationally, the initiatives promoted by the grass-roots participation to regenerate abandoned spaces, are increasingly widespread (Andres, 2013; Campagnoli, 2015; Mangialardo & Micelli, 2017). Activities in the third sector, profit and non-profit associations, cultural and creative industries, start-up incubators and crafts are just a few of the activities that are established in the enhanced assets (Bovaird, 2007). On the basis of these experiences there is the desire to emerge economic and social innovation. These new projects are designed to meet the needs of the community. They are able to create new and stronger social relationships promoting at the same time synergy between public and private operators and by supporting otherwise difficult development initiatives (Aiken *et al.*, 2008; Inti *et al.*, 2014).

In Italy, bottom-up experiences assume a precise geography. In some areas, these mechanisms have now become widespread and consolidated, while others seem to lack the bases to stabilize similar experiences. The launch of bottom-up collaborative practices is significantly related to the endowment of social capital in the territory (Bailey, 2012; Mangialardo & Micelli, 2016), understood as the human propensity to cooperate (Putnam *et al.*, 1993). The international literature (Bailey, 2012) identifies with the endowment of social capital within a territory the main resource able to stimulate and involve the local community to bring out new businesses

and to encourage the development of social entrepreneurial and cultural relations in the territory.

The location of real-estate assets is another important aspect of the development of bottom up experiences. Normally, they are located in the center of large cities, that are places characterized by a high presence of social and human capital (Andres, 2013; Aiken *et al.*, 2008).

Bottom-up enhancement processes are incremental, they are carried out in progress through programs and actions that are defined according to their partial outcomes (Crosta, 2011). The uncertainty of their outcome makes the temporariness a determining factor for the development of these processes. The use of the asset for a short period makes it less risky – for the owner and users – to invest in social enterprises and, in the event of a positive outcome, the period may be prolonged (Finan, 2014; Micelli & Mangialardo, 2017; Nèmeth & Langhorst, 2014).

The legal forms to manage the assets reflect this uncertainty: properties and users are linked by flexible contracts. The bailment at no charge – or moderate rents – is a key element in promoting the development of bottom-up practices (Mangialardo & Micelli, 2017). The wide flexibility of these practices allows the opportunity to leave the property without any burdens with an advantage associated with an important value of option (Coscia *et al.*, 2015; D’Alpaos & Marella, 2014).

From a managerial point of view, the spontaneity of these initiatives is only apparent. In most cases, the experiences host a mix of functions represented by small entrepreneurial realities – start-ups, bars/restaurants, leisure services, etc. – that are able to ensure the economic equilibrium of the project. Some activities are capable of generating positive margins while others, which have a voluntary nature – cultural activities linked to social welfare – exist through fundraising, external funding, and donations.

The social entrepreneur plays a decisive role in the success of such processes (Bailey, 2012; Mangialardo & Micelli, 2016). A figure able to coordinate all activities with the aim of creating an internal equilibrium to stabilize the project over time is a key factor for a successful outcome of the bottom-up enhancement experience (Mangialardo, 2017).

Abandoned real-estate assets are thus transformed into a common resource that the community reapplies no longer with the aim of extracting an income but in order to experiment new forms of economic and social development. Real-estate assets can thus be renewed by offering original opportunities for the formation of new economies (Arena and Iaione, 2015).

3. VALUE DETERMINED BY PARTICIPATING PROCESSES: METHODOLOGY, CHOICE OF VARIABLES AND THE MEASUREMENT OF THE UNCERTAINTY

Bottom-up enhancement processes are deeply different from traditional development models based on the

demolition of obsolete constructions and the realization of new properties. In a way coherent with the principles of circular economy, the aim of these projects consists of the extraction of the residual value of existing buildings, with their reuse promoting – where possible – the upcycle, and thus enhancing even seemingly obsolete parts of the assets transforming them into distinctive and remarkable elements of the building.

However, not all participatory enhancement processes are successful. The experimental nature of the initiatives and activities undertaken shows a wide variability in terms of success and development, as recent studies show (Mangialardo & Micelli, 2017). The lack of historical data on the degree of success of such experiences and the wide heterogeneity of activities carried out with different outcomes makes these processes uncertain, hardly foreseeable in advance.

Capital appreciation determined by participatory processes can be evaluated through income estimation procedures. Thanks to the discounted cash flow analysis (DCFA) it is possible to consider the variability of economic and financial flows assuming a time frame that can consider temporary processes and at the same time investments of a greater temporal amplitude.

In particular, the proposed procedure does not take account the financial flows, which in most of the participating initiatives are very small or non-existent, but rather the economic benefits deriving from the activities. They are represented by the interventions to restore and maintain the buildings, whose costs are borne by the beneficiaries of assets.

The DCFA model to estimate the valorisation process is based on the sum of the economic flows determined by the tenant’s actions. These flows are postponed and limited over time, assuming a temporal perspective linked to the contract with the administration.

Still, it is assumed that the property, at the end of the enhancement process through the grassroots participation, returns to the market. However, this hypothesis does not exclude that the same social entrepreneur acquires it, this time in return for payment, by the same proprietary administration (Del Giudice & De Paola, 2014; Hoesli & Morri, 2012; Jayaraman & Mascagni, 2013; Michieli & Michieli, 2002, pp. 2012-202) (2):

$$V = \sum [R_j/q^j] + [R_f/r_f q^n] \quad (2)$$

where:

R_j represents the net economic benefits obtained during the years of contract with the social entrepreneur;

q_j represents the sum of the unity and discount rate of the economic and financial flows of valorisation process;

n reports the number of years of renting the property to the social entrepreneur;

R_f constitutes the rent obtainable by the proprietary administration at the conclusion of the contract;

r_f is the property capitalization rate supposed transformed and put back on the market.

The first element of formula (2) represents the sum of all the appropriately discounted economic flows, which contribute to the enhancement of the complex on the assumption that all the relevant costs of the property are borne by the tenant. The second element identifies the output value of the asset at the end of the period, assuming a contractually fixed value.

The procedure to evaluate the enhancement of public buildings through participatory processes must consider their particular high uncertainty. For this purpose, in the DCFA model outlined, two types of distinct variables in the literature have to be distinguished: controllable variables and variables of exogenous or random inputs (Erto, 2008 pp. 238-249; Sivarethinamohan, 2005). Both variables are stochastic and are characterized by uncertainty. However, the first category belongs to the variables that, due to the number of historical data deriving from authoritative sources. They are predictable and can be treated according to the traditional estimation method (Micheli & Micheli, 2002 pp. 97-98). These variables are estimated by the evaluator and in the case of properties valued by the bottom-up processes, they are represented by the time of development of the retraining operation, the rent supposed at the end of the contract and the capitalization and the discounted rate¹.

Exogenous input variables are characterized by a high degree of uncertainty. For these variables there are no historical data and they depend on events that only partially can be evaluated and controlled by the decider. These variables represent the main value drivers that contribute to the regeneration of the assets through participatory processes, but at the same time are difficult to predict.

In particular, three exogenous variables were identified. The difficulty in measuring them is due to the absence of appropriate historical data to be referred to. These derive from the only enablers of bottom-enhancement processes: the activities that are settled in the building.

To be estimated and then included in the financial model, these variables require a deepening, which provides for the use of specific sources that in this case are privileged witnesses, through which it is possible to elaborate detailed probabilities distribution of the same variables. In this way, significantly uncertain variables are represented by probability distributions that assume different forms. In particular, a single percentage of probability is attributed to each permissible value of the

uncertain variable (Byrne & Cadman, 1996; Dowd, 2002; Gabrielli & French, 2004; 2005).

The first variable is represented by the number of activities that can be located on the property. In some real-estate assets regenerated through participatory processes, there is only one activity, while others have dozens of initiatives. Some of them can be replaced over time by new activities leaving their spaces before the end of the loan.

The second element characterized by significant uncertainty is represented by the area used for each activity. Some activities occupy only one room, while others come to occupy hundreds of square meters. Some bottom-up experiences show how the entire surface of the asset has been enhanced, while in others the unoccupied spaces are more than half.

The third and final uncertain variable takes into account the restructuring costs which contribute to increase the value of the property. Usually, contracts that the administration stipulates with users do not include minimum costs of restructuring operations to be done in the spaces they occupy. Sometimes, thanks to donations and offers, crowd funding and public fundings, tenants make substantial renovations of the spaces they occupy. In most cases, extraordinary maintenance operations are self-financed and thus they cover the safety interventions of the assets. It may happen that some activities decide to transform the space available with costly restructuring interventions. Similarly, there may be entrepreneurs that not having the necessary resources initially decide to perform the minimum interventions for the utilization of the spaces, postponing to the next few years the most expensive operations.

The three exogenous variables return the highly uncertain dimension of bottom-up projects due to external factors of random and aleatory nature. Consequently, it is necessary to proceed with estimating the value of the assets with an approach capable of considering the random dimensions of similar processes.

The appraisal model is thus composed on the one hand by the variables of which the value has been estimated on a traditional basis, on the other side by the probability distributions developed for the variables marked by higher uncertainty. To make the synthesis between different inputs possible, the Monte Carlo simulation model is used. This approach allows, through the repeated series of extractions from the different distributions, to develop a final probability distribution of the values derived by the participatory enhancement (see Figure 1).

4. THE FORMER BARRACKS OF FERRARA FIRE STATION: THE DETERMINANTS OF VALUES AND THEIR UNCERTAINTY

Factory Grisù, a former fire station located in Ferrara and converted into a business and cultural activities incubator,

¹ Considering the level of uncertainty and originality characterizing bottom-up processes, a 7% discount rate was assumed that reflects the higher level of risk for such transactions than the ordinary income tax, for which a market capitalization test for similar goods of 6% is taken into account.

is the case study selected to estimate the value generated by the regeneration processes through the grassroots participation. The experience was chosen because it fully reflects the characters mentioned above. The former barracks extend over 4,000 square meters (of which 2,600 are built) in the center of Ferrara, near the railway station. Built at the beginning of '900, in 2004 it was officially decommissioned and the property passed to the Province of Ferrara that places the buildings in the real-estate assets alienation plan². An auction has been banished from the starting value of 3.5 million Euro, without receiving any offer³.

Following years of inefficiency, in 2011, the Grisù association, borned specifically to recover the buildings, proposes to the Province to obtain the management of the fire station to create a space for the creative and cultural businesses of the entire Emilia Romagna. The former fire station is granted, starting in 2012, for five years with the legal formula of bailment at no charge, with the clause that the barracks remains subject to possible alienation. In return, the association has the commitment of transforming and enhancing to its own expense the parts used of the complex⁴.

The association also has the task of recruiting entrepreneurial activities to entrust the restructuring operations of occupied spaces, to manage the activities and events in the building and deal with the property. In 2016 the management of the property passed to Grisù Consortium with a new bailment at no charge contract of use until 2023, extendable up to 2025.

Today there are ten activities settled that have contributed to renovate approximately 800 square meters of the floor area. This experience highlights the opportunities of bottom-up processes, that are centered on culture and innovation, to return a role and function to a property that is otherwise destined for abandonment. In addition to these benefits, more than 20 jobs have been created. In addition, Factory Grisù offers new services for the local community and, this initiatives allowed the redevelopment of an entire block that was abandoned and at risk of vandalism.

The success of Factory Grisù allowed the Province of Ferrara to win a call from the Emilia Romagna Region, which has allocated €500,000 for interventions on public areas (renovation of the roof and provision for connection to district heating). To date, however, not all of the

property has been recovered. The first years of management have proceeded intermittently and, since 2016, as a result of the change in management, the project is substantially increasing even though it is difficult to predict if and when the entire property can be fully recovered. The enhancement of the former fire station confirms the aleatory and highly uncertain nature of regeneration approach promoted through grassroots mobilization.

Thanks to field interviews with privileged witnesses, information obtained through documents and desk research, it was possible to estimate the probability distribution of the three variables that affect the uncertainty of the final outcome of this enhancement process.

The first uncertain element is given by the number of activities that are located in the complex. At the beginning of the project six activities were based in the former fire station. To date two activities have withdrawn, but six others have occupied other spaces, contributing to recover 800 square meters of the floor area. Every year the Consortium publish two calls for new projects to be included in the building and about two projects a year are settle in the cultural incubator. The number of companies who will occupy or abandon the Factory until 2025 is not, however, a priori definable.

The second element of uncertainty is given by the occupied surface. Most of the initiatives occupy a commercial area of between 40 and 50 square meters. One of them occupies over 100 square meters and another over 250 square meters. Today it is not possible to predict how many of these activities will expand during the loan. Similarly, it is difficult to predict the surface of activities that could still settle in unused spaces.

Regarding the restructuring costs, the operations were self-financed with an average cost of 300 Euro/sqm. The interventions concerned the refurbishment of electrical systems, the replacement of existing pavement and the painting of spaces. Even this variable can not be determined a priori: in the contract with the province of Ferrara no obligation has been established regarding the minimum costs of the interventions to be supported and each initiative is free to choose which operations to support according to a schedule that remains at the discretion of those who occupy the spaces.

The uncertainty resulting from the actions of users of the spaces is also reflected on the terminal value. The enhanced surface at the end the contract is a function of the number of enterprises that stay inside the structure and from the surface that each activity will decide to occupy and therefore to restructure. Developing the DCF model by attributing the modal values to the variables, as shown in the last row of Table 2, the valued surface is equal to 54% of the total of the former barracks. Consequently, the terminal value takes into account the areas currently recovered and those expected for future use in light of the simulations made.

² According to art. 58 of the Italian Legislative Decree 112/2008 Recognition and enhancement of the real estate assets of regions, municipalities and other local authorities.

³ For further information on the auction of the former barracks, please refer to the following link: <http://www.estense.com/?p=121171>.

⁴ To explore the beginnings of the enhancement process started by the association Grisù please refer to the following link: <http://www.designcontext.net/107-spazio-grisu/>.

Table 1 - Input variables to evaluate Factory Grisù

	VARIABLES	SOURCE	VALUE	UNCERTAINTY
Controllable input variables	Capitalization rate	Nomisma, second half of 2016	0.6	–
	Development times (Duration of the contract, from 2017 until 2025)	interviews	9 years	–
	Rent at the end of the contract	Osservatorio del Mercato Immobiliare, second half of 2016, Area C1, tertiary intended use terziaria, state of maintenance like a new building (minimum value of the range published)	6.5	–
Exogenous/ aleatory input variables	Number of activities	interviews	10 activities up to now	How many activities will enter in the future?
	Restructuring costs	interviews	An average of 300 Euro/sqm	What will be the future interventions?
	Enhanced surface	interviews	800 sqm	By 2025 how much surface will be recovered?

The table 1 describes the major variables to be searched, and the source from which we have found the value drivers for the enhancement of the former fire station. On the one hand the controllable input variables, which

include all inputs specified by the decider, estimated by stochastic way; on the other hand, exogenous input variables, whose stochastic distribution was determined on the basis of field interviews.

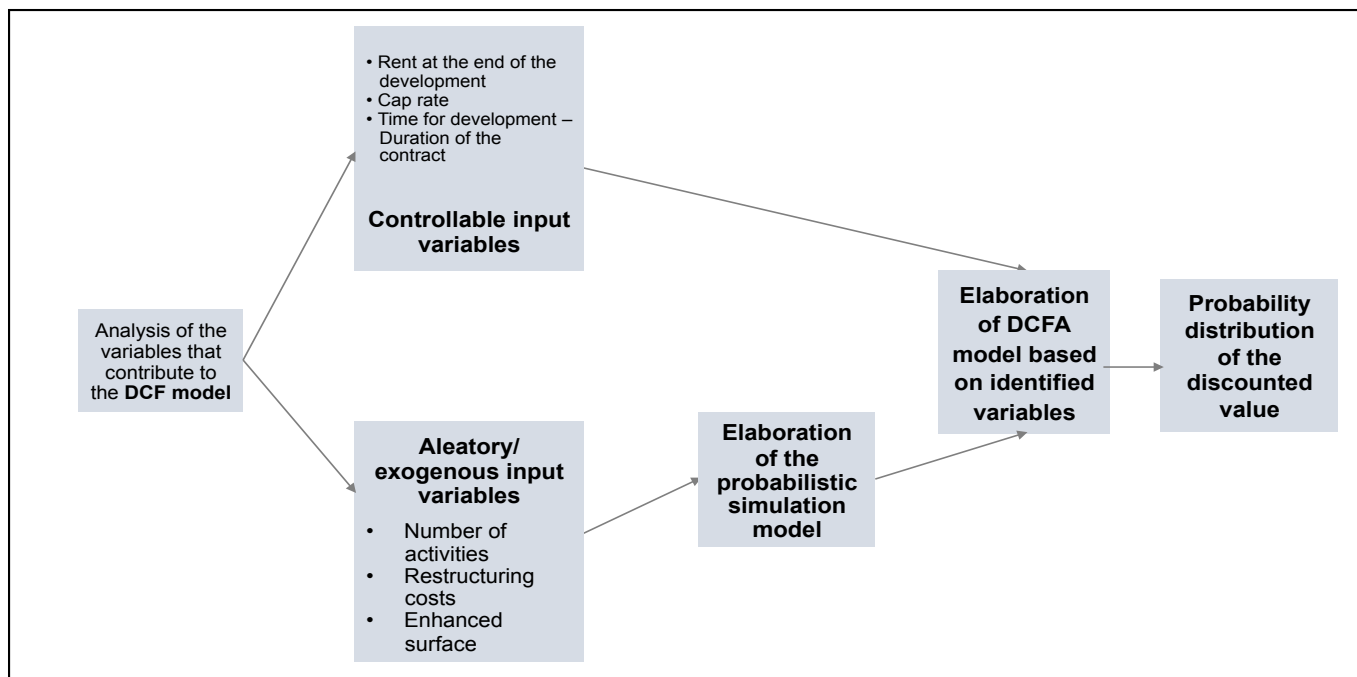


Figure 1 - Methodology to estimate the value
Source: Author's elaboration from various sources

5. THE ESTIMATION OF THE ENHANCEMENT OF BOTTOM-UP PROCESSES THROUGH A MONTE CARLO SIMULATION

The Monte Carlo simulation is the methodology adopted to measure the uncertainty in probabilistic terms of the aleatory input variables through a reworking of DCFA model, obtaining, as a final output, a range of market values in the light of the enhancement process in place (Elishakoff, 2003; Putnam & Handzy, 2002).

In operational terms, the values of the aleatory/exogenous input variables – which depend solely on the choices and actions of the tenants – are replaced in the calculation model with other values that are estimated on the basis of the distributions previously determined randomly, recording at each operation the final output.

The DCFA model previously described has been included in the Crystal Ball © software to implement the simulation model (French & Gabrielli, 2004; 2005). The Monte Carlo simulation runs a number of times sufficiently high, typically between 10,000 and 100,000 simulations. In each simulation, the values of aleatory variables are randomly selected by the software and they are combined generating from time to time different outputs.

A continuous distribution represent the results of the simulation. This final distribution explain the output link with the input variables, thus representing all the possible expected market values of the property (Evans, 1992, French & Gabrielli, 2004, 2005).

It should be emphasized as the constitutive uncertainty of exogenous variables render the distribution of the values assigned to these variables dissimilar from a Gaussian distribution. For the elaboration of the probability distribution of the three random variables of the model we have chosen to use the triangular distribution. This method, commonly used, is considered to be the best to express the distribution of aleatory variables (French & Gabrielli, 2004; 2005; Wilson, 1982).

The triangular distribution is represented by the most probable intermediate value that is the triangle vertex, and two other values for which the probability becomes null in the other two vertices. The function is linear between the minimum value and the most probable value and also between the modal value and the maximum value (Dowd, 2002; Evans, 1992; French & Gabrielli, 2004).

To process such distribution is necessary to estimate three values: the minimum value, which corresponds to the lowest value of the variable, the maximum value, which coincides with the highest case and the modal value, that is the most probable. In the simulation, the variable can assume any value between the indicated extremes (French & Gabrielli, 2004; Gimpelevich, 2011). Table 2 shows the minimum, maximum and modal value identified for each of the three exogenous variables. For the 10 existing enterprises, based on the interviews with the tenants, it is expected that they will remain until the end of the

contract without expand or making improvements to the space occupied.

Based on historical data and due to the current Factory Grisù development has been estimated that, by 2025, the number of enterprises will increase to 12 in the most likely scenario, and up to a maximum of 16 in the optimistic case. In a pessimistic scenario, by contrast, the assumption of the model is that there is no new established enterprise.

The second element concerns the area occupied by the activities. For each of the existing businesses, the square meters of occupied area have been identified. The surface occupied by the activities of which it is assumed the future settlement amounts, assuming as the most probabilistic scenario, the average value occupied by the already present initiatives, equal to 45 sqm. The minimum value was determined in 15 sqm, while the most optimistic case is determined in 200 sqm.

The third variable concerns the transformation costs, according to both the intrinsic characteristics of the compartments occupied – not all in the same maintenance quality conditions – and the investment readiness of individuals allowed in the complex. A more likely investment value of new initiatives was taken into account at 300 Euros/sqm. The minimum value attributed to each operation is zero, assuming that the occupant considers the space appropriate to his/her needs. The maximum value has been assumed to be 600 Euro/sqm⁵.

The processing costs were distributed over the first seven years, leaving the last two without any benefits for the property, assuming that occupants do not find it cheaper to invest for just two years of stay overall (See Table 2).

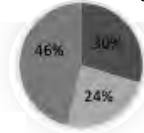
The Monte Carlo simulation proceeds through the extraction from probability distributions to the number of interactions selected by the evaluator, in this case 50,000 (Gabrielli & French, 2004; Kelliher, 2000). The output generated by each simulation allows to define the outcome of the Monte Carlo analysis expressed in a range of probability distributions represented in Figure 3 and in Table 3.

The value of old former as a result of the enhancement of the Factory Grisù initiatives, corresponds from a minimum value of 1.463.000 Euro to a maximum value of 4.088.000 Euro. The average value is €2,625,000 and the median amount €2,612,000 (see Table 4). The average result, in unit terms, returns a benefit of 1,010 Euro/sqm.

⁵ Transformation costs have been distributed in the first few years, leaving the last two years without property benefits, assuming that occupants do not find it cheaper to invest in staying in the property for a short period (see Table 2 and Figure 2).

These costs correspond to the benefits of the administration and have been divided into two types: the interventions that the companies have independently financed and the external financing (500,000 Euros from the Emilia Romagna Region).

Table 2 - Probability distribution of exogenous/aleatory variables

Variables	Modal value	Minimum value	Maximum value	Probability distribution (software Crystal Ball)
Number of enterprises	11	0	16	Triangular distribution with parameters: Minimum 0,00 Modal 11,00 Maximum 16,00 The range is between 0,00 and 16
Enhanced surface	50 sqm for each enterprise	0 sqm	200 sqm	Percentage of sqm used by each enterprise compared to the total surface to be enhanced(1800 mq) Triangular distribution with parameters: Minimum 0,00 Modal 50,00 Maximum 200,00 The range is between 0,00 and 200
Restructuring costs	150-400 Euro/sqm, with an average of 300 Euro/sqm	0 Euro/sqm	600 Euro/sqm	Values were calculated on the modal value of the surface occupied by each enterprise Triangular distribution with parameters: Minimum 0,00 Modal 300,00 Maximum 600,00 The range is between 0,00 and 600,00
Terminal value: enhanced surface	Sum of sqm currently occupied by existing companies (800 mq) and the surface that will occupy the future activities(aleatory variable, second row of the table)			Percentage were determined through the modal values of the three aleatory variables  <ul style="list-style-type: none"> ■ Sqm of existing enterprises ■ Sqm occupied by the future enterprises ■ Sqm available

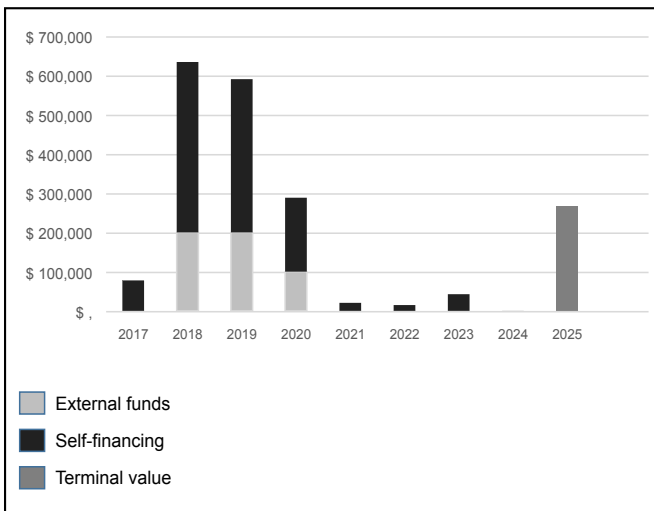


Figure 2 - Discounted benefits during the bailment at no charge contract, they were calculated on modal values of each input variable

The value of the former barracks in 90% of the simulations was between 2,122,000 and 3,166,000 Euros. If one assumes an interval such as to ensure 70% probability, the final value is between 2,290,000 and 2,950,000 Euro Euro, while if it drops to 50% probability, the interval is between 2,400,000 Euro and €2,830,000.

The asymmetry index is positive, equal to 0.260 and indicates how the output distribution form extends asymmetrically to positive values (Gabielli & French, 2005, Jackel, 2002).

Figure 4 shows the contribution of the terminal value and the restructuring measures (made by existing and future companies) in percentage terms over the estimated value. Validated values of 60% of the value are related to users' expenses, while only 26% comes from external financing and finally the terminal value is just under 15%.

6. AN INTERPRETATION OF THE MONTE CARLO SIMULATION

The enhancement of the former fire barracks in Ferrara reveals that the mechanisms from below can generate value in favor of otherwise abandoned spaces. And this is due not only in terms of important issues for the community, such as the creation of new social value or availability of a major new incubator for local creative industries, but also more closely to the assets for the possibility of increasing the value of real-estate property otherwise destined to abandonment or underuse.

It is useful to contrast the results of the estimation output with other values which the owner administration must confront. The first value is represented by the estimated value on the basis of which the various auctions have been exhausted and then went deserted. This value,

Table 3 - Summary of the statistic data emerged from Montecarlo analysis

STATISTICS VALUES	
Number of simulation	50.000
Average	2.577.058.94 €
Median	2.570.012.26 €
Standard deviation	228.858.67 €
Variance	52.376.289.802.17 €
Asymmetry index	0.1906
Kurtosis	3.00
Variation coefficient	0.0888
Minimum	1.733.760.08
Maximum	3.741.448.01 €
Range amplitude	2.007.687.93 €
Standard error of the mean	1.023.49 €

estimated in 2011, amounted to 3,500,000 euros, with a unit value of 1,346 Euro / sqm.

In fact, the unrealistic nature of this value has been the subject of extensive confirmation: no developer has ever presented any offer to buy the former. neither considering the latest market prices, fell around 800 euro per square meter according to the leading official and unofficial local sources.

More properly correct it appears the comparison between the value determined through bottom-up processes and the value at which the assets of public and private property abandoned by years such as non-performing loans (NPL). In these market segments assets are quoted at an average rating of just under 30% of the estimated value (Longo, 2017).

With these premises it is possible to outline the possible strategies available for the administration. In the absence of developers and investors willing to invest resources, administrations have two scenarios. In the first place, the proprietary administration is expecting a developer/investor after experiencing the usual auction proceedings in the knowledge that values do not reach the value of a limited fraction of the estimated value set in the years preceding the transformation of the market.

In the case of the former in Ferrara, the present value of the asset can be estimated with reference to the market of non-performing loans in 1,040,000 Euros, for a unit value of about 400 Euro/sqm⁶ with a decrease compared to the nominal value of the auction of about 2.500.000 Euros.

⁶ This value was obtained by computing 30% of the auctioned value in 2011.

The second option for administration is to encourage the activation of participatory value creation processes. The uncertainty that characterizes similar processes is relevant and uncertainty relating to the transfer of value to the asset by the subjects of which are only partly known the number and availability investment is wide. However, such processes contribute to the regeneration of assets and, in the case of Factory Grisù, settled activities carried out several restructuring operations whose conservation status has gone from bad to good⁷.

If we consider the only benefits that the Province of Ferrara has obtained from the investment operations by the occupants, together with the resources put in place by the Emilia Romagna Region on specific programs dedicated to similar processes, the convenience of experimentation appears largely justified: the process value from the bottom-up experience largely exceeds the value estimated through NPL values.

The enhancement of the former in Ferrara reveals that participatory processes represent a solution not only capable of supporting the mobilization of social and human capital in cities, particularly in the emerging sectors of creative industries, but it can represent a solution to the issue of the enhancement through new forms the Italian abandoned public property.

The final value obtained from the Monte Carlo simulation (cf. Figure 3), although far from the estimate of 2011, shows that the initiatives of Factory Grisù have led to a significant revaluation of the NPL than current values: participation is not only functional consolidate and create new social connections, but it is functional to enhance the abandoned real-estate properties.

Specific contractual solutions can then manage the risk inherent in such processes. In particular, the use of competition announcement for assign the spaces to the community allows a reduction of the aleatory degree of similar processes while, at the same time, it reduce the forms of active participation.

In a context sufficiently rich in social and human capital, in the face of a significant demand for profit entrepreneurship and the third sector, an administration may, for example, constrain the number of persons present in an abandoned asset, setting minimum investment thresholds so that the transfer of value follows a less random path.

However, the risk reduction in terms of capital appreciation corresponds to the reduction in the number

⁷ Despite the already achieved and designed interventions, there are still many restructuring operations that have not been prevented by individual companies or with the project deriving from the funds of the Emilia Romagna Region. The operations still to be expected, qualifying the structure in a very good state of conservation concern the replacement of the interior and exterior doors, the refurbishment of the internal and external façade, the arrangement of the exterior courtyard.

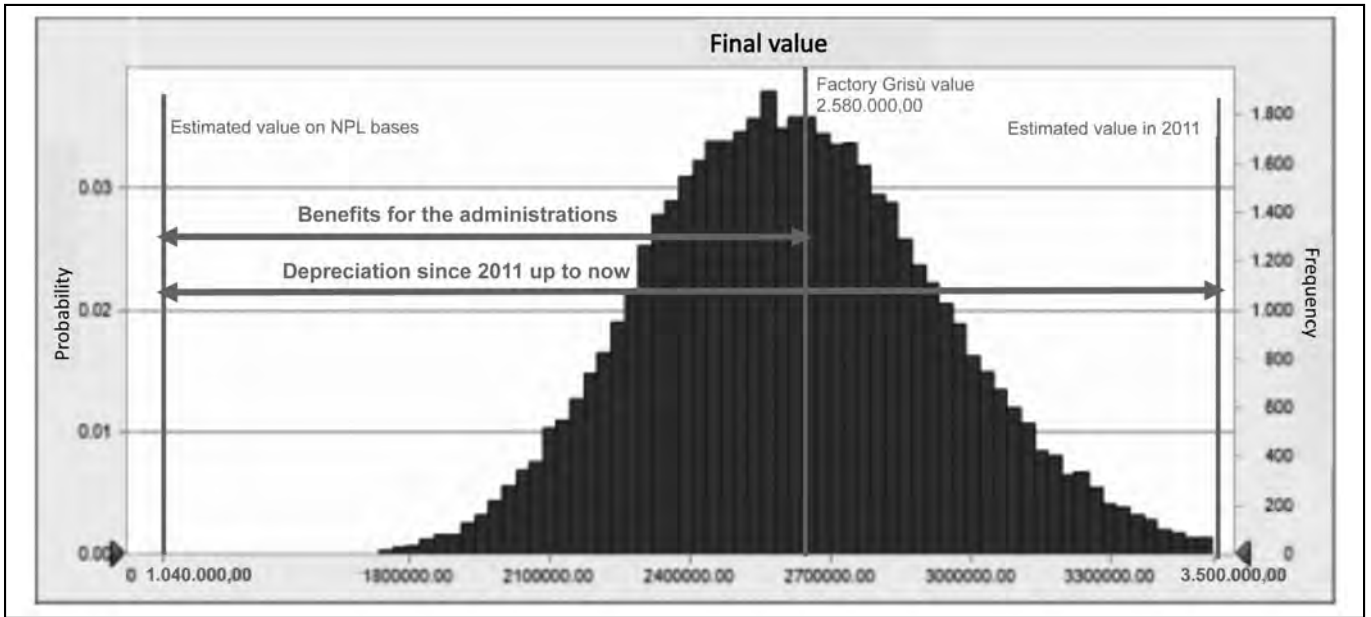


Figure 3 - Output distribution emerged from Montecarlo analysis (software Crystal Ball). Elaboration from the authors

of people potentially interested to activate these processes with a possible impoverishment of the initiatives that are found in public buildings and development. The trade-off between the variability of cash-flows and inclusion of the various initiatives is not only a reflection of asset choices, but is the result of precise political decision-maker preferences in respect of the range of subjects that require spaces for different activities.

It also is possible to support these initiatives through specific support programs, as demonstrated by numerous programs including Laboratori Urbani⁸ and Fondazione per il Sud⁹, with the aim of making business and financial plans more robust where through the success of the enterprise depends the success of the enhancement process.

7. CONCLUSIONS

Bottom-up processes generate social and cultural benefits in the territory and for the local community. In addition to this, the aim of the present paper was to go to measure the purely wealth benefits that similar initiatives generate in real estate assets.

The difficulty to predict the future outcome of the activities promoted through participatory processes and

their aleatory process imposed the use of a methodology of estimation that took into account the high degree of uncertain nature of such processes.

The Monte Carlo simulation has allowed the estimation of the current value of Factory Grisù by measuring the uncertainty level of exogenous variables – the number of firms, restructuring costs, and upgraded surface – by randomly extracting probability distributions with a large number of simulations. The final output resulted a range of values ranging from 1,463,000 Euro to a minimum of 4,088,000 Euros, with a more likely average value of around 2,600,000 Euros (see Table 3).

In addition to the positive externalities that bottom up

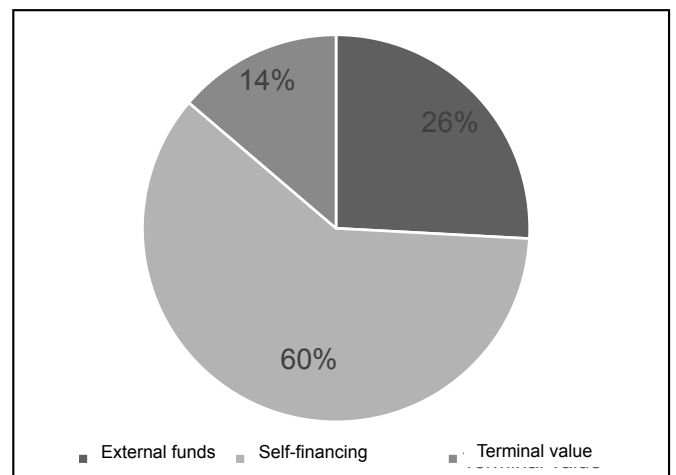


Figure 4 - Elements to generate value of the surface to reuse. Elaboration of the authors

⁸ To learn more about Laboratori Urbani, please refer to the official website: <http://www.fondazioneconilsud.it/>.

⁹ For details, please refer to the official website: <http://www.fondazioneconilsud.it/>.

processes produce at social and cultural level, these experiences can also increase the value of the enhanced asset. From a minimum value that can be associated with NPLs, the Grisù Consortium has made significant extraordinary maintenance work. Thanks to these restructuring operations, asset valuation for administration extends far beyond the present value of the former barracks, which is no longer estimated with reference to nowadays values but through credible values referred on the market of non-performing loans.

Strategic asset development processes can therefore consider the option of the enhancement through bottom-up processes and they can be used not merely as a temporary strategy or as a solution capable of responding to contingent social problems. Instead, they

are solutions capable of ensuring a more economic return that is more appropriate to real-estate market trends that are far from some important urban areas and specific contexts and market segments that can attract an important demand.

Further research can refer to different areas. From a purely real-estate economics point of view, one could go to compare the value that bottom up processes generate based on the characteristics of places and social capital. While such experiences have become a fundamental aspect of administrative policies, on the other, some local authorities hinder these processes, preventing their development. From the urban and social point of view, all the benefits that self-organized communities can bring to a territory could be assessed.

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