Modelling an Idle Building Case through SWOT Analysis and Fuzzy DEMATEL – A Study on Anti-Commons

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Abstract:

The situation of buildings degradation is very severe in many cities in the world. The case of a degraded building is studied in this article. The building becomes ruined because owners do not agree about what to do with the building and no one can use it without the consent of the others. Besides, time makes the building become with a lower value.

After a long period of degradation, the question "what doing now?" is posed. Considering the situation of many degraded buildings, the present study aims to analyze a possible cause and work a situation of anti-commons concerning a building owned by several holders having each one exclusion rights. We use SWOT Analysis to build strategies for this anti-commons' real estate case.

Then Fuzzy DEMATEL model is applied to understand the relations between strategies for a final decision. Conclusions allow understanding the relations between strategies and how they influence each other to get a final decision for this problem.

For our case, we recommend a concrete strategy to the owners after evaluating the preferences of the decision makers.

Keywords: Multi Criteria Decision Making, SWOT Analysis, Fuzzy DEMATEL, Anti-Commons

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1. Introduction

Michelman (1982) has presented the problem of underutilization of resources known as anti-commons. This author has presented it as "a type of property in which everyone always has rights respecting the objects in the regime, and no one, consequently, is ever privileged to use any of them except as particularly authorized by others". As Heller (1997) well reports it, in an anticommons situation, there are multiple owners, each endowing the right to exclude others from a scarce resource, and no one having an effective privilege of the resource use. Heller (1997) has proposed the metaphor "tragedy of the anticommons" to highlight the situation in which there are too many owners holding rights of exclusion over a resource becoming it prone to underuse. Actually, "the anticommons thesis is simple: when too many people own pieces of one thing, nobody can use it. Usually, private ownership creates wealth. But too much ownership has the opposite effect – it leads to wasteful underuse" (Heller, 2013).

Anticommons theory is nowadays well established after more than two decades of discussion on theory and practice. The problem of anticommons related to real estate is also already worked in the literature. Since Heller (1998), who studied the problem of many storefronts that remained empty, which functions were replaced by metal kiosks in 1990's in Moscow, there are many real estate cases studied by using anticommons theory. Buchanan and Yoon (2000) showed how an anticommons tragedy could happen in a lot adjacent to a country village. After them, several other authors have also presented practical cases to explore this kind of problems through anticommons theory. Some cases will be presented later this work.

During literature survey, we couldn't determine Multi Criteria Decision Making (MCDM) applications over anticommons case which has multi alternative and multi criteria in deed. This paper intends to add to the existing literature a perspective of analysis including decision theory and anti-commons theory applied to a context of property rights in which there is a situation of a building value deterioration. A ruined building exists over which owners must decide on the building destiny. Intending to be innovator, this paper develops a new methodological situation for an urban widespread phenomenon, involving a decision-making process about a resource – a ruined building - which is owned by several agents, each one of them having property rights over it and having veto power about decisions.

The main objective of the study is to show that a Fuzzy DEMATEL (Decision Making Trial and Evaluation Laboratory) model can be used to contribute on this area through the application of quantitative methods offering a recommendation to owners and providing a solution. It is not intended in this study anymore to discuss the terminology and the general framework on which anticommons stands but providing a discussion around the application of a decision-making mathematical methodology to an urban anticommons situation. The present case consists on discussing a situation of a building for which a property regime exists in which

multiple owners hold effective rights of exclusion in a scarce resource, as Heller (1998) has well defined anticommons.

For collecting crisp data for the anticommons problem - what is itself a challenging task - we use a fuzzy decision-making method to allow a common decision. Multiple owners and a consultant determine the strategies or alternatives' factors, to be put in terms of the decision-making terminology. After gathering the strategies by using SWOT analysis, the Fuzzy DEMATEL model is applied to analyze the importance of criteria and find a proposal to be offered to the multiple owners.

Consistently, the framework for this problem involves several agents, having rights over one resource. Each agent has exclusion rights over the resource. Several different strategies are put available having them been defined by means of a SWOT analysis. A Fuzzy DEMATEL model is used to reach a proposal of solution. After the problem definition and explanation in general, property rights and anticommons are presented in order to make some clarity on the concepts in the next section. The section 3 shows the possible utilization of anticommons theory applied to real estate sector. In section 4 the methodology is described, being presented the MCDM analysis, the SWOT Analysis and the Fuzzy DEMATEL with notations. In section 5 the anticommons theory applied to an idle building is developed, presenting implementation and steps. Section 6 presents a general discussion involving the process and finally section 7 shows the main conclusions involving the present study.

2. Property Rights, Anticommons, Underutilization of Resources and Loss of Value

The notion of property has changed dramatically since Blackstone (1765-1769) and his famous assertion that property entails the "sole and despotic dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe". Property has then become defined less by dominion over possessions and more as a complex set of legal relationships among interdependent humans (Hohfeld, 1919). For Malinowski, ownership is defined by the manner in which the object is made, used and regarded by the group of men who produced it and enjoy its possession in using the craft every joint owner has a right to a certain place in it and to certain duties, privileges and benefits associated with it is the sum of duties, privileges and mutualities which bind the joint owners to the object and to each other (Malinowski, 1926). Hang (2003) refers to property rights as a relationship between individuals and not a relationship between an individual and a resource (or object) besides, as Jieming (2002) says, definitively, property rights play a key role in maintaining sustainable growth and in achieving efficient development. In consequence, the correct management of owners' privileges and duties over a resource allows a more correct utilization level for the resource than a deranged management. In this sense, when multiple owners have the right of using a resource and simultaneously, they have also effective rights

for the resource utilization exclusion, in this situation there exist conditions for the resource underutilization.

The anticommons dilemma is in part rooted in the fluidity of property theory (Heller, 1999). The existence of multiple separated owners – each capable of imposing restrictions on use, none capable of exercising the privilege of use – entails a compound construction quite distant from Blackstone (King, Major and Marian, 2016). An interesting discussion around anticommons involving this idea is made by Coelho, Filipe and Ferreira (2014), using it to analyze a process of decision making for the approval of a business project in Portugal.

Anticommons theory is nowadays already well established after the term has been presented by Michelman (1982) and popularized by Heller along more than two decades, since 1998. Meanwhile, thousands of studies have been made in this area and many examples were given for different situations showing that the excessive partition of property rights may bring inefficient utilization of resources in many situations. Complex situations resulting from excessive partition rights bring problems for suitable resources management. Areas such as patents, telecommunications, eminent domain, tourism, pharmaceutics, intellectual property, bureaucracy or natural resources as fisheries have been already presented to show how an excessive rights' fragmentation may be harmful for innovation and economic development (Filipe, 2014a; 2014b). Anyway, it is interesting to remark that in anticommons there is a possibility of existing overuse, instead of underuse as it is usual to observe, for specific situations of decision making - see Heller (2013) for an example.

Fragmentation of property rights, the inherent exclusion rights of each agent and the lack of agents' coordination are problems to deal with when facing anticommons setting. In anticommons, Heller (1998; 1999; 2008; 2013) focused mainly in the problematic of property rights. Heller (2013) stated that "the anticommons perspective shows that the content of property rights matters as much as clarity. Wasteful underuse can arise when ownership rights and regulatory controls are too fragmented". Heller (2013) also expresses the idea that "though the anticommons concept refers at its core to fragmented ownership, the idea extends to fragmented decision-making more generally. Resource use often depends on the outcome of some regulatory process. If the regulatory drama involves too many uncoordinated actors – neighbors and advocacy groups; local, state and federal legislators; agencies and courts – the multiplicity of players may block use of the underlying resource". For an interesting example on this issue see Filipe, Ferreira and Coelho (2011).

More than the property itself, some authors - as Schulz *et al.* (2002), Fennell (2009), Candela and Figini (2010) or Andergassen, Candela and Figini (2013) for example - put the emphasis in rights coordination and assembling. Schulz *et al.* (2002) show particularly the importance of agents' coordination. Also, Candela and Figini (2010) highlight its importance. Studying tourism, these authors show that a tragedy of anti-

commons can emerge, once three dimensions of the coordination problem may be considered on this area: the coordination in quantities, the coordination in quality and the coordination in prices. By his turn, for Fennell (2009) anticommons is primarily a problem of fragmentary rights assembly (what anyway involves transaction costs).

Anti-commons tragedies conceptualization allows to join - in a unifying framework - a construction that reflects a set of coordination failures in very distinct areas. As stated in Filipe (2014b), overcoming these failures may be difficult, often brutal, but solutions can be got by understanding the problems and finding solutions on the available set of strategies for agents, even if sometimes it is necessary to consider administrative solutions for the problem or a solution highly recommended and accepted by decision makers. The ability for one person to veto a solution drastically increases the obstacles to get the solution for the problem.

This situation brings problems for resources use and involves serious concerns over wealth creation/destruction. In fact, since last years of past century this "new problem" around property rights theorization has highlighted significant concerns on the existence of too many exclusion rights over a resource and a reduced level of utilization for that resource.

As Buchanan and Yoon (2000) wrote, anticommons concept helps to explain how and why potential economic value may disappear into the "black hole" of resources underutilization. This is evidenced in the well-known already referred example of Heller about the storefront shops in Moscow, which will be more developed in section 3. Vanneste *et al.* (2006) say, by the way, that "if commons lead to 'tragedy', anti-commons may well lead to 'disaster'" (some examples are given in Filipe, Ferreira and Coelho (2011) - an aquaculture project case in Portugal - or in Filipe, 2014a - a tourism case. Overcoming a tragedy of anticommons may be difficult, showing the importance of more instruct some several aspects on this area, what would represent an important contribution for a better definition of property rights and would be essential for allowing balances in resources utilization and management.

Anti-commons may emerge for situations in which resources continue to be idle even when they are in the economic area of a positive marginal productivity, resulting in the emergence of a paradox. Illogically, acting under conditions of individualistic competition, exclusion rights will be exercised even when the use of the common resource by one part could yield net social benefits (Coelho, Filipe and Ferreira, 2009). This irrationality brings a considerable loss of value, which could be avoided if a solution could be proposed for the anticommons problem. The situation exists, there is no spontaneous solution because the problem may remain by inertia of the system or by the will of one or more agents, causing a significant economic inefficiency.

Also, bureaucracy involves many individuals who may veto a decision or may delay any decision provoking problems of resource underuse. Often, projects development depends on the approval of official bodies and simply the projects get unviable due to the inertia of the system or due to multiple decision makers owning a power competency over the decision. At the view of conflicting interest's management, decision makers inertia or the system inertia itself, excessive administrative procedures or too many administrative circuits push for too late or delayed decisions, or yet for non-rational decisions in terms of value creation for economic agents (Filipe, 2014a).

3. Anticommons and Real Estate

Real estate may be considered generally, for the purpose of the present paper, simply as the property consisting of land and the buildings on it. Housing, by its turn, generally refers to the social problem of ensuring that members of society have a home in which to live. As Ha (2013) says, it is a central component of our daily life. However, in any country's towns there are significant housing problems and in general there is a huge number of idle and ruined houses.

Considering that this is an enormous socio-economic waste, it is important to reflect about many existing situations and the possible solutions to be suggested for this kind of problems. Anticommons theory has been presented to study situations when several rights to exclude exist belonging to different agents. If any agent may exercise his/her veto on a decision an anti-commons dilemma may happen.

As already seen, the problem of anticommons associated to buildings is already worked in the literature. The existence of such a kind of problem shows how a building may get degraded, because of the difficulty of making one decision when several agents do not agree or simply one agent settles on to have a veto decision. This is the core reason why often some resources are underused resulting a loss of value from this situation.

Yet in 1990's, Heller (1998) explained clearly why many storefronts remained empty after thousands of metal kiosks appeared in 1990's in Moscow, regarding the experience of transition from socialism to market. He said: "multiple owners have been endowed initially with competing rights in each storefront, so no owner holds a useable bundle of rights and the store remain empty. Once an anticommons has emerged, collecting rights into private property bundles can be brutal and slow". After analysing the situation, Heller concluded that many different agencies and private parties had rights over the use of store spaces, and it was difficult or even impossible for retailers to negotiate successfully for the use of those spaces. Interestingly, although stores were much demanded, all the agents with ownership rights were losing money with the empty stores. Permission owners were able to exercise a right of exclusion if any potential user require their permission to use the space. Stores were kept in the market and continued empty.

By their turn Buchanan and Yoon (2000) presented the example of a large vacant lot adjacent to a country village which was privatized to solve a problem of "open access" commons tragedy. If there is a single owner no efficiency problem may happen in its exploitation. However, if there are multiple owners with exclusion rights assignment an anti-commons tragedy may happen.

Since then, several authors discussed the problem of anticommons applied to real estate. Filipe (2014a), for example, discussed the bankruptcy of a project involving numerous facilities, in which a problem of anticommons and coordination was involved. Filipe (2014b) showed a problem of bureaucracy in renting market involving anticommons and coordination. Buckley and Mathema (2017) presented an excessively fragmented housing problem in Romania. Jieming (2005) and Nguyen, Van de Krabben and Samsura (2017) handled the problem of anticommons in Asian countries' urban land and housing market. On this area, Jieming (2012) illustrated also that in some cases market failures of the anticommons (and commons) are caused by state failures.

As much as explained for situations of multiple owners for a resource, the case of the building of the present study is particularly susceptible to a problem of underutilization. The mathematical formulation of such a kind of situation is particularly interesting, presupposing a set of specific features on the posed problem. As already seen, an anticommons is particularly featured by:

- property rights fragmentation;
- the exclusion rights of owners;
- coordination;
- the need of putting together the fragmented rights in a whole, in order to have an efficient decision.

In the present study an analysis is made using a mathematical decision-making tool to propose an efficient solution for this problem. We follow a mathematical approach rather than the approach had in general by abovementioned academicians. Some previous authors have dealt with anticommons cases referring mostly the formal sides of the problem involving terminology. We suggest for the present case using a mathematical approach for reaching a solution. Different from the previous studies, we will put forth the tangible strategies for the multiple owners and conclude by reaching a common decision by using the multiple owners' preferences. On this order of reasons, we aim to disseminate the quantitative approaches over anticommons cases.

4. Methodology

In this section it is aimed to present the MCDM methods, the SWOT analysis and the Fuzzy DEMATEL method. Our developments in terms of quantitative

techniques were based on theory and were developed with no means of software support.

4.1 Multi Criteria Decision Making Analysis

The development of MCDM methods has been motivated not only by a variety of real-life problems requiring the consideration of multiple criteria, but also by practitioners' desire to propose enhanced decision-making techniques using recent advancements in mathematical optimization (Abel *et al.,* 2015), scientific computing and computer technology. The impact that the MCDM paradigm makes on business, engineering, and science is reflected in the large number of articles with MCDM-type studies and analysis which are presented at professional meetings in various disciplines (Wiecek *et al.,* 2008). In general, the main important point for the MCDM method is analyzing the main components of the problem and putting forth the inner dependences of the alternatives before solving the problem.

A questionnaire was prepared to support this study in anticommons area. A model is built using a Multi-Criteria Approach. The problem is posed in terms of a hypothetical situation, by assuming that there are 5 owners over one building, each one of them having equal rights to use it and no one having the possibility of using it without the consent of the others and each one having exclusion rights. However, owners do not agree about the conditions to use the building. Finally, the possibility of selling the building comes up. With this information, it is aimed to understand the way of managing the situation and the resulting problems that arise from the decision process.

4.2 SWOT Analysis

Analysing the main components of the problem needs defining the strengths, weaknesses, opportunities and threats of the problem which leads to a SWOT analysis (Figure 1).

Figure 1. *SWOT Analysis Components*

The SWOT analysis is an important tool to support decision-making and is commonly used as a tool for systematic analysis of the internal and external environments (Rodriguez and Ventura, 2003). SWOT is a widely used tool for analysing internal and external environments in order to attain a systematic understanding of a strategic management situation (Wheelen and Hunger, 1995). The philosophy behind the SWOT analysis is that the strategies an organization adopts should match the environmental threats and opportunities with the organization's weaknesses and especially its strengths. It tries to establish a strategic fit between an organization's internal strengths and weaknesses and the opportunities and threats posed by its external environment (Lu, 2010).

In fact, the SWOT analysis aims to identify the strengths and weaknesses of an organisation and the opportunities and threats in the environment. Having identified these factors, strategies are developed which may build on the strengths, eliminate the weaknesses, exploit the opportunities or counter the threats. The strengths and weaknesses are identified by an internal appraisal of the organisation and the opportunities and threats by an external appraisal. The internal appraisal examines all aspects of the organisation covering, for example, personnel, facilities, location, products and services, in order to identify the organisation's strengths and weaknesses. The external appraisal scans the political, economic, social, technological and competitive environment with a view to identifying opportunities and threats (Dyson, 2004). SWOT analysis approach has been widely used in various areas, such as housing sector (Li *et al.,* 2016), biofuel production (Paschalidou *et al.,* 2016), forest management (Merger and Wolfslehner, 2016), human resources (Shakerian *et al.,* 2016), wind energy (Iglinski *et al.,* 2016), e-learning (Boca, 2015), cloud computing (Maresova and Kuca, 2015), e-government (Damian *et al.,* 2014) and renewable energy (Chen *et al.,* 2014).

SWOT analysis is often used with other disciplines in the literature, like AHP (Tavana *et al.,* 2016; Zhu *et al.,* 2016), TOPSIS (Shakerian *et al.,* 2016; Zare *et al.,* 2016), DELPHI (Parraga *et al.,* 2014; Tavana *et al.,* 2012), DEMATEL (Tavakoli *et al.,* 2016: Chaghooshi *et al.,* 2012; Nikjoo and Saeedpoor, 2014, Saeedpoor *et al.,* 2012) and other similar approaches.

For a decision-making problem, developing a SWOT matrix and identifying the elements will contribute to see the main internal and external powers of systems. An owner can identify the selling problem's strengths and weaknesses by using internal motives while identifying the opportunities and threats by using external influences. Elaborate analysis of the above-mentioned factors would put forth the strategies for the building owners. SWOT analysis was performed with the contribution of an expert team, consisting of a set of researchers in the area of social sciences. Based on this group opinion, strengths, weaknesses, opportunities and threats were built to allow a final proposal for the situation on which anticommons building problem caused degradation. Follows the advancement on the problem in this subject, respecting:

Strenghts:
- Getting rid of the problem
- Flash income
- Long term investing options
- Success of compromise

Weaknesses:
- Possibility of selling low price
- Long term waiting process
- High repairing cost
- Difficult renovation process

Opportunities:
- Housing market is in a growth phase
- Area can be used after demolition
- Variety options for mortgage

Threats:
- Pressure from neighbors
- Environmental filthiness
- Pressure from Governmental or Municipality
- Abundance of houses for sale
- Difficulty of obtaining loans for renovation

SWOT analysis helps Decision Makers (DMs) to develop four types of strategies respectively. Concretely:
- SO (strengths-opportunities) strategies;
- WO (weaknesses-opportunities) strategies;
- ST (strengths-threats) strategies;
- WT (weaknesses-threats) strategies.

Four kinds of strategies are built by getting advantage from strengths, weaknesses, opportunities and threats information for our problem.

SO Strategy:
Defining a real estate agent who is relevant for this region, allowing an interesting price.

ST Strategy:
Having a good compromise with the different involved agents, including acquiring the contribution of neighbors and official agents to improve facilities, infrastructures and keep neighborhood clean and unsoiled to facilitate the sale.

WO Strategy:

Making a project to facilitate the sale, with a financial plan and a renovation plan.

WT Strategy:
Making a proposal for official authorities finance a social project for the building, with the participation of the community.

4.3 Fuzzy DEMATEL

The DEMATEL technique was used to investigate and to work the complicated problem group. DEMATEL was developed based on the belief that the pioneering and proper use of scientific research methods could ameliorate comprehension of the specific problematic issues, the cluster of intertwined problems, and contribute to the identification of practical solutions by hierarchical structure (Shahraki, 2011).

Fuzzy DEMATEL method, a useful group decision making tool, has been used to transform the complex interactions between the criteria of the problems of practical life into a visible structured model. Fuzzy DEMATEL method is used for solving and modeling some complex groups of decision-making problems such as strategic planning, e-learning evaluation and decision-making projects. The aim of DEMATEL is to convert the relation between elements, causal dimensions from a complex system to an understandable structural model (Lin and Wu, 2004).

Fuzzy DEMATEL is one of the multi criteria decision making instruments and has the ability to convert the qualitative designs to the quantitative analysis. Numerical values for the surveys are difficult to obtain in many cases. To avoid the difficulty of measurement of preferences, we use linguistic variables for the utilization of the process. Linguistic variables for the preferences of experts are shown in Table 1.

Table 1. *Linguistic Variables for the Experts' preferences*

Linguistic Values	Linguistic Terms
(0.75, 1, 1)	Very High Influence (VH)
(0.50, 0.75, 1)	High Influence (H)
(0.25, 0.50, 0.75)	Low Influence (L)
(0, 0.25, 0.5)	Very Low Influence (VL)
(0, 0, 0.25)	No Influence (N)

Source: *Zargar et al., 2011.*

The Fuzzy DEMATEL method can convert the relationship between the causes and effects of criteria into an intelligible structural model of the system. Steps of the fuzzy DEMATEL can be found below (Shahraki, 2011).

Step 1. *Defining the evaluation criteria and designing the fuzzy linguistic scale:*
Different degrees of "influence" of the criteria are shown in Table 1. The DMs evaluate the influence degree and decide about it in the pairwise matrix. Then, DMs prepare sets of the pair-wise comparisons in terms of effects and direction between

criteria. The initial data can be obtained as the direct-relation matrix which is an n x n matrix T where each element of a_{ij} is denoted as the degree in which the criterion i affects the criterion j.

Step 2. *Normalizing the Direct-Relation Matrix:*

$$K = \frac{1}{\max_{1 \le j \le n} \sum_{j=1}^{n} a_{ij}} \quad i,j = 1,2, \dots, n \tag{1}$$

$$S = K \cdot T \tag{2}$$

Step 3. *Attaining the Total-Relation Matrix:*
The Total-Relation Matrix M can be obtained by using equation (3), where I denote the identity matrix.

$$M = S (I - S)^{-1} \tag{3}$$

Step 4. Producing a causal diagram:
The sum of rows and the sum of columns are separately denoted as vector D and vector R through equations (4-6). Then, the horizontal axis vector (D+R) named "Prominence" is made by adding D to R, which reveals the relative importance of each criterion. Similarly, the vertical axis (D-R) named "Relation" is made by subtracting R from D, which may divide criteria into a cause and effect groups. Generally, when (D -R) is positive, the criterion belongs to the cause group and when the (D - R) is negative, the criterion represents the effect group. Therefore, the causal diagram can be obtained by mapping the dataset of the (D+R, D-R), providing some insight for making decisions.

$$M = [m_{ij}]_{nxn}, \quad i, j = 1, 2, \dots, n \tag{4}$$

$$D = [\sum_{j=1}^{n} m_{ij}]_{nx1} = [t_i]_{nx1} \tag{5}$$

$$R = [\sum_{i=1}^{n} m_{ij}]_{1xn} = [t_i]_{1xn} \tag{6}$$

where D and R denote the sum of rows and the sum of columns, respectively. Finally, a causal and effect graph can be acquired by mapping the dataset of (D+R, D-R), where the horizontal axis (D+R) is made by adding D to R, and the vertical axis (D-R) is made by subtracting R from D.

5. Application of the Building (Anticommons) Case

After formulating the strategies by SWOT Analysis, we applied fuzzy DEMATEL method, a fuzzy aggregation method to anticommons case by using linguistic variables to deal with vague and imprecise judgments. Six experts evaluate the influence degree of the criteria in the pairwise matrix by using the linguistic variables which are shown in Table 1. These evaluations are aggregated and shown in Table 2.

Table 2. *The Initial Direct-Relation Matrix F*

	SO Strategy	ST Strategy	WO Strategy	WT Strategy
SO Strategy	0	0,615	0,740	0,500
ST Strategy	0,760	0	0,615	0,688
WO Strategy	0,677	0,542	0	0,730
WT Strategy	0,688	0,417	0,500	0

We, respectively obtain Table 3 and 4 with the help of equations 1, 2 and 3. Total relation matrix can be seen with the D, D+R and D+R values in Table 4.

Table 3. *The Generalized Direct-Relation Matrix S*

	SO Strategy	ST Strategy	WO Strategy	WT Strategy
SO Strategy	0	0,289	0,348	0,235
ST Strategy	0,358	0	0,289	0,324
WO Strategy	0,319	0,255	0	0,343
WT Strategy	0,324	0,196	0,235	0

Table 4. *The Total-Relation Matrix M*

	SO Strategy	ST Strategy	WO Strategy	WT Strategy	D	D + R	D – R
SO Strategy	**1,763**	1,629	**1,860**	**1,815**	7,067	14,845	-0,710
ST Strategy	**2,164**	1,513	**1,948**	**1,991**	7,616	13,806	1,426
WO Strategy	**2,050**	1,642	1,640	**1,919**	7,251	14,305	0,198
WT Strategy	**1,800**	1,406	1,605	1,429	6,241	13,396	-0,914
R	7,777	6,190	7,053	7,155			

*Note: The values above the threshold are shown in bold.*

It can be seen that SO Strategy "Defining a real estate agent who is relevant for this region, allowing an interesting price" is the most important criterion having the highest (D + R) value. The rest of the criteria are ranked regarding to degree of prominence as WO, ST and WT. The causal diagram could be plotted as in Figure 2.

Figure 2. *The Causal Diagram of the Strategies*
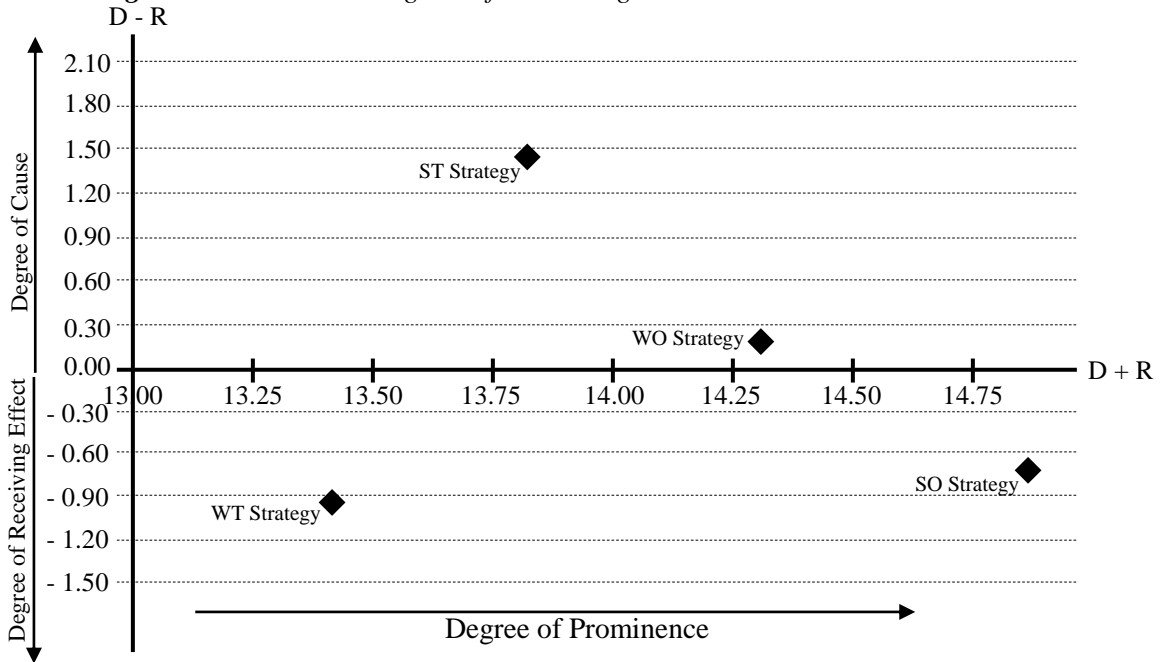
The causal diagram can give a valuable insight into the realization of the whole system and recognizing important components of strategies (Nikjoo and Saeedpoor, 2014). The relations and inner dependences of criteria can be seen in Figure 3.

Figure 3. *The Impact Relationship Map for Main Criteria*
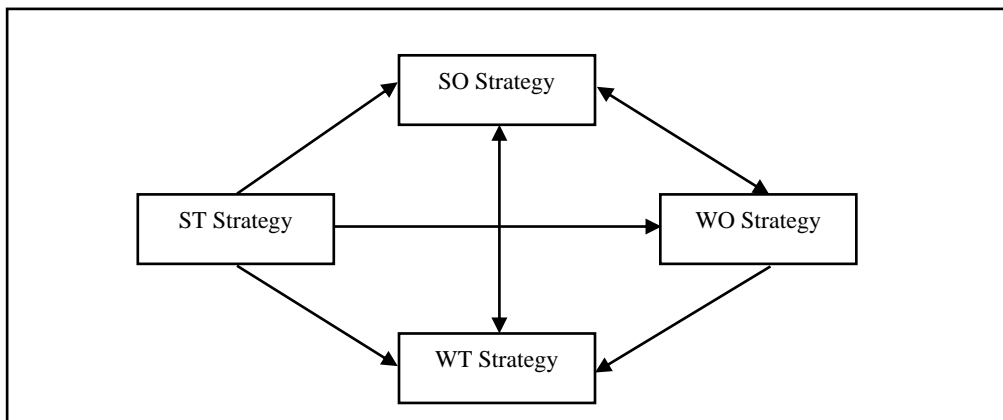
6. Discussion

It is interesting the allusion made by de Smet (2013) about waiting spaces, by saying that they can be public or private sites, large or small, built or vacant and that their common feature is a total or almost total lack of function, as they have been abandoned by the previous use (or users). A future function still must be determined, and the realization of the future function is delayed for various possible reasons, including planning processes, financial complications or unexpected technical issues. The present case may be referred precisely as a waiting space. The use is depending on the decision of owners and the existence of exclusion rights and veto power complicates the destination to be given to the building. The space remains idle while a decision is not made. A significant loss of value prevails over time.

The problem of anti-commons is the basis in this paper for the use of DEMATEL Model. The problem is that a building belongs to several owners, each one of them having veto power. If nothing is done because no one can use the building without the consent of the others, the building will remain degraded. A solution may be proposed to the decision makers based on the application of the DEMATEL model, which is applied to group decision problems.

In this case, after the already existing degradation of the building, a solution and use should be given to the building even in the present situation. Otherwise, the building continues to lose value becoming more degraded. The DEMATEL model allows finding a proposal based on a strategy, to be proposed to the owners. Based on the results the proposal consists in the following SO Strategy: "Defining a real estate agent who is relevant for this region, allowing an interesting price" as the most important criterion which has the highest (D + R) value. Considering this, the owners shall sell the building in the conditions defined in order to obtain the greatest gain. DEMATEL method was used in this research to analyze the importance of criteria and the causal relations among the criteria. The inner dependence relation was exposed, and importance of each criterion was demonstrated in the causal diagram.

7. Concluding Remarks

Michelman (1982) has presented the anticommons problem, which has been used to show how different agents owning a resource may have it underused if they do not come to an agreement when no one can use it without permission from others. Veto decision and bureaucracy problems result in destruction of value. When agents cannot use a resource because someone decides to veto its use or to create barriers to the utilization of the resource, it remains prone to be underused.

This paper considers a building and explains the reasons by which it is kept degraded. A problem of anticommons is evidenced, showing that several owners let

it underuse because no one uses it once its utilization requires the authorization from the other owners.

The question "what to do in such a situation?" is posed. The simple answer is that owners must come to a common decision: for example, to repair the building to rent or to sell it; or just to sell it the way it is. Often, in many cases, the inertia solves the problem by letting time going on, suffering the direct consequence of the building becoming degraded. This paper gives a contribution presenting a method to allow decision making agents to come to a common decision for this situation in which the building keeps ruined if a use isn't given to it. DEMATEL model allows to investigate and to work this complicated group problem to come to a common decision. By using a scientific research method, the understanding of this specific issue can be improved and a contribution to the identification of a practical solution may be got.

Considering its importance, this methodology was applied. DEMATEL not only allowed the conversion of the relations between cause and effect of criteria into a structural model, but also was used to handle the inner dependences within a set of criteria. As a further research perspective, it would be beneficial to apply an aggregated MCDM method over strategies with new questionnaires which would help us to elicit the weights by taking advantage of the experts' preferences. In this paper we propose quantitative methods applied to anticommons cases, which may contribute to promote research advances in this area.

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