MANAGING INTERACTION PROCESSES BETWEEN LAND USE AND TRANSPORT

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ABSTRACT

Land use and transport policies have been the two main streams of action to influence the spatial distribution of activities, often used as operational alternatives to achieve specific objectives in the configuration of urban areas. Direct intervention on land use policy or indirect influence on land use patterns through intervention on transport policy are common actions, reason why these instruments should rather be seen as complementary to each other in the developing and shaping of sustainable urban areas.

A number of distinct aspects involve this problématique in terms of interdependence between transport and land-use policies that are both inside and outside the political and administrative system. Outside the system we have mainly the interdependence between territorial (or spatial) facts and processes associated with land use and infrastructure use. Inside the system the interdependence focus is mainly between the different approaches to planning and the need for co-ordination between the actors and policies in the different fields.

The political and administrative frameworks of a city or conurbation are influencing factors for the level of performance that is required in the interaction between these two sectors – land-use and transport – which despite a consensual recognition that co-ordination between them is needed are, in most cities all over the world, under different institutional settings. Despite the intensity of political statements and scientific background on the need for good performance in the interaction between these sectors, a major challenge is, still today, to answer the following question: “why interaction between land use and transport does not work?”

The object of this research work is to analyze the processes of interaction between transport and land use that occur in the scope of territorial management, identifying the critical aspects that have contributed for a deficient interaction between these two sectors. The current situation in many cities may give us some preliminary answers, and is depicted by the inexistence of municipal entities specifically dedicated to the urban planning (in a continuous and articulated way); the reactive-prone character of urban legislation (and its deficient application); the isolation and non-articulation of most interventions; and the deficiencies in the institutional structure (e.g. the overlapping of missions, roles and functions) and in the qualification of the technical board.
The case study is led in Lisbon (Portugal), in the perspective of a further analysis of three Brazilian cities of similar dimension, Fortaleza, Belo Horizonte and Curitiba. In the comparison of case studies, the operational processes undertaken in the cities will be identified. The similarities and differences among them will be analyzed, and the performances of processes evaluated through process indicators.

This paper aims to analyze the interaction between the land use and transport sectors, from the operational processes perspective. Considering the added value of the processes management approach, namely the monitoring and continuous improvement, this work intends to contribute with theoretical and practical knowledge on the interaction between land use and transports aiming to obtain insights on instruments that may induce more effective implementation of some of the theoretical knowledge already obtained.

1 INTRODUCTION

The location of urban functions in the territory raises the need for displacements, in order for the citizens to accomplish their individual and collective activities. The mobility supplied (transport infrastructure and services), on the other hand, defines the places in the territory that one may reach, from a given point, and how these places may be reached – i.e. the accessibility (Bertolini, L. 2005). The cycle of reciprocal influences between land use and transports makes it difficult to distinguish the causes from the effects in the urban dynamics. On one side, the location of activities defines the trip motive (e.g. vehicle ownership and modal choice). On the other side, the accessibility of the urban functions influences their attractiveness, therefore influencing their allocation and development.

In spite of representing the main elements that account for the spatial distribution of activities and the trip making, the land use and transport policies tend to compete between each other: direct intervention through land use policies or indirect intervention through transport policies are usual actions. Therefore, these policies should rather be considered complementary, in order to reach the sustainable development of urban areas.

The interrelation between land use and transports has direct and indirect social, economical and environmental impacts. The results to be reached through the interaction between these two sectors, in turn, vary according to the models of interaction adopted in each urban administration, and the intended objectives of their policies. However, in a general way, these results can be synthesised, in the land use side, as the “reduction of the need for travel”, and in the transports side, as “making the remaining traffic sustainable” (Greiving & Kemper, 1999).

Despite the intensity of political statements and scientific background on the need for good performance in the interaction between these sectors, a major challenge is, still today, to answer the following question: “why interaction between land use and transport does not work?”
The political and administrative framework of a municipality influences the required performance level of the interaction between land use and transports. In spite of the consensus in the recognition that this coordination is necessary, these sectors – land use and transports – have separate institutional structures in many cities around the world. Besides that, in many cities there is a lack of entities specifically dedicated to the urban planning, in a continuous and coordinated way. The urban legislation, on the other hand, is prone to be reactive, instead of inductive, and imperfectly applied. Most of the interventions on the territory are isolated and not articulated, and there are deficiencies in the institutional structure (e.g. overlapping of missions, roles and functions) and in the qualification of the technical board.

This paper aims to propose a methodology of identification and hierarchisation of the processes performed in the urban management, identifying the critical aspects that contribute to the flaws in the interaction between land use and transports. In the development of this study, the processes that guide the management of the territory will be identified, taking into account that interaction.

2 THE PROCESSES OF INTERACTION BETWEEN LAND USE AND TRANSPORTS

Land use and transports are “parts of a dynamic system, related in time lagged feedback loops” (Greiving & Kemper, 1999). In the definition of urban policies, the difficulty on the prediction of urban evolution is caused not only by these time lagged loops, but also by the lack of accumulated information for monitoring. Aggregate models have been developed to comprehend that evolution. However, one of the difficulties on its application is the great amount of information inputs needed (i.e. the costs implied in collecting this information and the lack of time consistency in this collection). Adding to this, and according to Banister (Banister, D. 2002), the organizational environment in which the aggregate models for evaluation of land use and transports are used doesn’t lead them to be operational.

There have been enough studies on the state of the art of (a) the impacts of land use policies on the behaviour of passengers and (b) the impacts of transport policies in the allocation of dwelling and companies in urban areas (Greiving & Kemper, 1999). Such studies relate to the interaction between these two sectors. There is however a need for more in depth studies on the potentialities and the problems on coordinating land use and transports policies at urban and regional levels, in the different institutional frameworks (Greiving & Kemper, 1999).

The interaction between land use and transports occurs adequately at the strategic level, where integrated and sectoral policies are defined. At the tactical level, the interaction between these two sectors is still adequate, this time regarding planning, action programs and sectoral measures. The policy guidelines generally succeed to be transferred from the strategic to the tactical level. Given the institutional and processes separation, and the growing hierarchical branching, the interaction tends to lose consistency at the
operational level, or more specifically in the transfer between the tactical and the operational levels of decision or planning levels.

The following diagram (Diagram 1) depicts the levels of the urban management where the interactions between land use and transports take place, and their respective instruments. As explained above, there is an institutional void at the operational level that prevents the processes from the different sectors to be performed in a coordinated way, accounting for a poor interaction between these sectors.

![Diagram 1: Levels of interaction processes between land use and transports (source: authors)](image)

As previously stated, the integrated decision between the land use and the transports sectors, at the strategic, tactical and operational levels, promotes the urban sustainability. The previous reasoning shows that, in order to accomplish this integration, we must understand what is hindering the integrated decision and the transferring of the planning objectives from the tactical to the operational level, where the results are obtained and delivered. This will be the focus of a further development of this work.

3 THE PROCESS MANAGEMENT

Processes can be defined as combined activities that transform inputs into outputs. The productive activities, as well as the services, may be analyzed in this way. Once the territorial management is understood as a process, this work will try to identify the requisites of the client (objectives), and evaluate its satisfaction (achievement of objectives). In the scope of territorial management, the customers to be satisfied and the objectives to be achieved can be defined, respectively, as the various stakeholders involved (citizens,
real estate entrepreneurs, operators and public and private entities) and the satisfaction of its specific needs, as well as the achievement of the objectives of the urban management, defined in its mission.

The understanding of the various processes and subprocesses carried out in an organization, as well as the recognition of the sequence of activities in each of them, its links up and downstream, its agents (the main ones and the secondary ones) and the applied resources, allows the evaluation of the effectiveness and the efficiency of these processes and subprocesses” (adapted from Azevedo, A. 2002).

In an organization, being a public body or a private entity, the processes are structured along the following decision – or planning – levels.

- **STRATEGIC**: Processes related to future of the organization, where, the objectives and the management system are defined, resources are allocated and long term objectives are set. At this level the following questions should be answered: “What do we aim to achieve? Which are the objectives to be reached and the available resources? What type of city do we want to have”;
- **TACTICAL**: Processes related to the way the objectives are fulfilled, and where the rules and functions for the action of each stakeholder are defined. This level should answer the question: “How are the development processes going to be organized? What type of services
and good should be provided in a city with such (strategically defined) aims and objectives”;

- **OPERATIONAL**: Processes related to the detail, where the activities, tasks and work instructions are performed. The following questions should be answered: “How do we deliver what has been planned? Are we delivering the services and goods conform to the objectives previously defined?” (detailed level).

The knowledge about the processes (and its recognition) starts with their survey and the definition of the sequence of activities that constitute these processes. This survey should encompass a general identification of processes, as well as an individual analysis of each process, not only the ones within each entity but also the ones shared among multiple entities. In the identification of the key or critical processes, it is important to recognize which “processes are determinant for the success of the operations and for the quality of the product/service, envisaging the achievement of the vision, the mission and the strategic objectives of the company.” or entity (Azevedo, A. 2002). In the definition of the activities, the processes are arranged according to the dimension, criticalness and importance of the processes, subprocesses and activities. It is possible to confirm, from the mapping of the processes, the “interaction between the structure of the processes and the hierarchical structure of the functions in the organization” (Azevedo, A. 2002). At the organizations level, whether they are private companies or public entities, the organization by processes represents an important management instrument.

### 3.1 Analysis of barriers to the integration of strategic decision and integrated planning of transports and land use

From the initial considerations about the land use and transports interaction and about the processes management, it matters to identify and to analyse the processes adopted in the territorial management, on the component of land use and transports interaction. This analysis aims at identifying the processes' critical points of inefficiency and ineffectivenesses. As from that, the next step of the present work will carry out case studies in cities with similar sizes, urban developments and legal frameworks, but different management styles, in order to validate the achieved results. Such comparison will be carried out at the Brazilian cities of Fortaleza, Belo Horizonte and Curitiba, in the framework of an undergoing dissertation in a Master Course on Transportation.

The analysis of these processes has been carried out, in a first iteration, at the Municipality of Lisbon, out of inquiries to municipal technicians and field observations. We conclude that there is a “process gap” (Juran, J. 1951) between the urban planning (product design) and the urban management (capacity to deliver the product). The ‘product’ is understood here as the service delivered by the public entity (Municipality and other intervening entities) in territorial management. The urban planning and the urban management are, many times, conducted autonomously with no articulation or even consistency concerns. In the institutions and in their adopted processes,
one can find inconsistencies at the strategic, tactical and operational decision levels.

In the Lisbon case study, the input to the elaboration of plans and programs (strategic and tactical levels) is hierarchically oriented in a bottom-up process, from the operational level, along the several bureaucratic and functional resorts, as seen in Diagram 3. There are no transversal information flows inside a same resorts, along different, yet related, sectors.

![Diagram 3 Information flows at the territorial management](image)

The Urban Master Plan (strategic level) has its policies materialized in the public budget through an Activity Plan (tactical level). The Activity Plan and the revised edition of the Urban Master Plan receive inputs from the municipal departments, in order to adapt the Urban Master Plan to the “real world.” The distortions start at this stage.

The inputs of the various departments represent planning instruments. However, the Urban Master Plan is seen as a sum of objectives with conflicting rules, because it receives, in its elaboration, contributions from various sectors, without harmonization or elimination of the inconsistencies between them. The strategic plan is developed, in the end, in a disaggregate way, once sectoral inputs are considered. On the other hand, there is no tradition on defining the actions, at the tactical level, according to a logical phasing, in the perspective of an integrated plan or program. Instead of that, it is made according to budgetary possibilities. In all the levels of planning or decision, it is notorious the lack of monitoring to support the decision, what
would enable to undertake actions for correction of trajectories or even prevention of potential misguidance. At last, intersectoral projects are only made compatible at the upper hierarchical levels, with evident waste of resources.

The following example describes a licensing process in Lisbon. The current licensing methodology is supported by the Urban Master Plan (edition of 1994, now under reviewing process).

- The real estate agent (e.g. common citizen, entrepreneur, etc) makes the requirement for a plotting. In Lisbon, the requirements for urban entrepreneurship (e.g. construction, reconstruction, expansion and demolition works) have three possible legal procedures: licensing, authorization and previous communication. They differ from each other, for instance, on the type of the urban intervention and on the existence of local scale urban plans;
- The requirement for the urban entrepreneurship follows to a Department, in the Urban Administration, responsible for the approval of that type of project (for instance, to the Strategic Projects Department). The first agent in the Department to receive the requirement sends it to the technicians in charge for the respective areas (e.g. building code, environmental legislation and health and sanitary issues), according to the complexity of the project;
- The technicians in the Department verify if the proposed urban design and project attributes match the legislation;
- The object of the requirement returns to the first agent, the inducer one (process manager), responsible for dealing with the real estate agent;
- If there are no technical restrictions and rectifications to be done, the requirement follows to be approved.

From this still preliminary analysis of the process, we could verify the following evidences:

- There may be problems on the indicators adopted for the analysis of the projects. In some cases, there are no clearly defined requisites to be applied, or these have just been created (there is no institutional memory on its application). The technical board applies “good sense” as rule of thumb in the cases where these requisites are not defined. Such practice is obviously susceptible of plea from the real estate agents (petitioners);
- According to the Urban Master Plan, the licensing can only follow the legislation. The guidance on how to analyse the projects is found in general guidelines, service orders, municipal regulations and municipal bulletins;
- The processes have no previously defined structures (sequences of responsible agents for its analysis). They follow different steps along the bureaucracy, in a sequence defined case by case, according to the requisites of the projects and the availability of the technical board to be involved. The processes take different arrangements, with no formal
systemization of attributes and principles to justify these arrangements. However, informal rules are usually adopted;

- The links that relate the entities (Departments and Directions) are established through official letters and telephone calls. The acquaintance of the agents to be responsible for each stage of the process is made at personal level. In the cases a certain project involves entities never gathered before under a same process, the process manager establishes the first contact with the new entities;
- The traffic impact studies are validated in the Road Security and Traffic Department, in order to evaluate the large scale projects in its potential for trip generation. The evaluation requisites to the medium and small scales projects could not be identified. In spite of its notorious impact collectively, these projects are considered in a disaggregate way, and their individual impact is neglected;
- The time duration of the activities (in the licensing process) is subject to the weekly frequency of the work meetings between the involved departments and the term fixed by the legislation. This stated period is distributed among the activities (and its agents) in a discretionary way by the 'process manager'.

The interventions on land use (built space) are not only made through licensing, but also, at the public side, through the infrastructure (Public Works Direction), interventions at the public space, as public lighting (Urban Environment Direction) and interventions on the built estate (Dwelling Direction and local technical boards and project units). The planning of the public infrastructure lacks a public manager with a generalist character, who perceives the interactions and as the mission to follow and enhance the process.

The projects with a common scope are discussed by the Mayor and the City Councillors in biweekly meetings. The intersectoral projects are then made compatible. The information inputs are driven downside, since the Department Divisions and Departments, up to the Town Councils. In this phase, the projects with incompatibilities, managed by different sectors (land use and transports), get to be adjusted or archived (to the detriment of other projects, according to their priorities).

CONCLUSIONS

The expected results of this survey represent practical and theoretical contributions to the territorial management, namely the achievement of the objectives defined by the policies of land use and transports interaction. Even in an undergoing phase, this work allows to take some conclusions. In spite of the political intentions (in policies and plans) and the scientific background, the consistency of action between the strategic, tactical and operational levels at the territorial management is not yet obvious. This assertion, made in an empirical way, based in field observations, is granted by the lack of clearly defined functions to each of these levels. The lack of a processes approach, on the other hand, diminishes the efficiency of activities, once monitoring and continuous improvement are not adopted. The information flows (inputs and
outputs) do not occur between the stakeholders and levels where presumably there would be more gains of productiveness and knowledge.

The land use and transports interaction does not occur at the operational level, with the exception of large scale projects, when the mobility needs are analyzed. However, in these cases, the public transport and pedestrian mode are not subject to analysis. The control of the processes interaction is hindered by the lack of clearly defined standards to the constitution of processes, as so as by the lack of legitimacy of the process manager to define the accountability for each activity in the process. The lack of monitoring hinders the corrective and preventive actions on that interaction.

At last, the objectives defined at Urban Master Plans (strategic level) and Sectoral Plans (tactical levels) do not find related instruments at the operational level, that allow a collective intervention, comprehending the individual entrepreneurship in an aggregate way. The sum of individual interventions, in this case, does not lead to the intended collective results.

The territorial management processes will be analyzed in the Brazilian cities mentioned before, taking as reference the city of Lisbon. The found results may come to validate these preliminary conclusions.

BIBLIOGRAPHY


